

# Course Descriptions

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## COURSES

### **AAST 2300. INTRODUCTION TO AFRICAN AMERICAN STUDIES. 3 Hours.**

This course introduces students to the African American experience in the United States, including an interdisciplinary analysis of the African American experience in politics, the arts, folklore, religion, economics, sociology, psychology, and community development; and an examination of local history, contemporary issues, and recent events in the African American community. This course satisfies the University of Texas at Arlington core curriculum requirement in Social and Behavioral Sciences.

### **AAST 2303. HISTORY AND APPRECIATION OF HIP HOP AND R&B MUSIC. 3 Hours.**

Explores the history and evolution of Hip Hop and modern urban music, emphasizing musical style and social context, from rhythm and blues through the present. Offered as AAST 2303 and MUSI 1303; credit will be granted in only one department.

### **AAST 2337. ECONOMICS OF SOCIAL ISSUES. 3 Hours.**

Economic analysis and application of basic economic principles to a variety of social issues and topics. Students will become familiar with the U.S. economy, its structure, and how economics applies to an assortment of public policy topics such as crime, energy, immigration, drug use, prostitution, minimum wage, our aging population, healthcare, gender driven wages, recycling, and the macro economy, to name a few. In addition, current economic issues and events may be incorporated into the course via lecture and/or class discussions. This is a non-technical course which satisfies the core requirement for social and behavioral studies. Will not serve to meet degree requirements for College of Business Administration majors. Offered as ECON 2337 and AAST 2337; credit will be granted in only one department.

### **AAST 2371. LANGUAGE IN A MULTICULTURAL USA. 3 Hours.**

The relationship between language in the U.S. and social power. This course explores how negative attitudes toward some language varieties and languages spoken in the U.S. arise from social factors, rather than features of the languages themselves. In addition to studying language varieties, the course shows how American institutions such as the educational system and the media reinforce these negative attitudes and contribute to discrimination. Offered as AAST 2371 and LING 2371; credit will be granted in only one department.

### **AAST 3300. TOPICS IN GENDER, WOMEN & SEXUALITY STUDIES. 3 Hours.**

Special topics of interest in the disciplines of Gender, Women & Sexuality Studies. May be repeated for credit when the topic changes. Offered as GWSS 3300 and AAST 3300; credit will be granted in only one department.

### **AAST 3301. THEORIES OF HUMAN BEHAVIOR. 3 Hours.**

This course explores, within the context of a strengths and empowerment perspective, theories of human behavior. For social work majors, it is strongly recommended that SOCW 2302 be taken before this course. Offered as AAST 3301 and SOCW 3301; credit will be granted in only one department. This course is required for Social Work Field Instruction and Seminar I (SOCW 4951).

### **AAST 3310. BLACK FAMILIES. 3 Hours.**

Course will focus on the historical and cultural development of black families. Topics include slavery, segregation, family structure, and socioeconomic issues. Special attention will be given to people, places, and events that are important for understanding African American family life in the Dallas/Ft Worth area.

### **AAST 3314. CIVIL WAR AND RECONSTRUCTION. 3 Hours.**

The background and causes of secession and the Civil War, the organization of the Confederate States of America, the progress of the war, and the attempts to solve the racial, social, political, and economic problems of the post-war period. Offered as AAST 3314 and HIST 3314; credit will be granted in only one department.

### **AAST 3317. DIVERSE POPULATIONS. 3 Hours.**

Introduction to theoretical, practical, and policy issues related to diverse populations. Historical, political, and socioeconomic forces are examined that maintain discriminatory and oppressive values, attitudes, and behaviors in society in diverse populations and in all levels of organizational behavior. This course is required for admission to the Bachelor of Social Work (BSW) program. Offered as AAST 3317, SOCW 3307 and MAS 3319; credit will be granted in only one department.

### **AAST 3319. U.S. IMMIGRATION POLICY AND THE AMERICAN DREAM. 3 Hours.**

This course focuses on diverse ethnic and racial identities in America through the examination of immigration to the United States, past and present, and the evolution of U.S. immigration policy. Topics include U.S. attitudes and policy responses to European, Asian, and Latin American immigration and to the incorporation of the descendants of African slaves and Native Americans. Emphasis on the decline of the melting pot idea and the incorporation of recent immigrants. Offered as MAS 3320, AAST 3319, and SOCW 3320. Credit will be granted only once.

### **AAST 3320. BLACK WOMEN IN SOCIETY. 3 Hours.**

Course provides an overview of historical and current issues facing African American women. Topics include racism, sexism, political involvement, education, religion, family, and comparisons with the experiences of black men.

### **AAST 3321. THE LATINA EXPERIENCE. 3 Hours.**

A course on the social, cultural, and economic experiences of Latina and Latin American origin women in the United States. Offered as MAS 3314, SOCI 3314, SOCW 3314, GWSS 3314, and AAST 3321. Credit will be granted in only one department.

**AAST 3322. AFRICAN AMERICAN HISTORY TO 1863. 3 Hours.**

History of blacks in America from their African origins to 1863. Emphasis on early African society, American slavery, and the development of black institutions and culture in the U.S. Offered as AAST 3322 and HIST 3322; credit will be granted in only one department.

**AAST 3323. AFRICAN AMERICAN HISTORY SINCE EMANCIPATION. 3 Hours.**

Emphasis on the transition from slavery to freedom and the political, social, and economic status of blacks in the late 19th century, 20th century black institutions and culture, and the evolution of the civil rights movements. Offered as AAST 3323 and HIST 3323; credit will be granted in only one department.

**AAST 3328. RACE, REPRESENTATION, AND THE MOVIES. 3 Hours.**

This course examines the history of race and representation among black Americans in the United States through films, short clips, and documentaries. Offered as HIST 3328 and AAST 3328; credit will be granted only once.

**AAST 3329. CONTEMPORARY AFRICAN CULTURES. 3 Hours.**

A comparative study of African communities with an emphasis on sub-Saharan Africa. Covers regional cultural geography and history as well as ethnography of specific communities. Explores both the challenges facing contemporary African nations as well as emerging solutions. Includes exposure to African art, literature, music, cinema, and food. Offered as AAST 3329 and ANTH 3329; credit will be granted in only one department.

**AAST 3330. CULTURAL DIVERSITY AND IDENTITY. 3 Hours.**

The ways identity is constructed in contemporary societies in an increasingly complex and multicultural world. Ethnic, racial, gender, and class identities. How and when identity is asserted and assigned, and how it can both draw boundaries and forge ties between peoples. Formerly listed as ANTH 2350. Credit cannot be given for both ANTH 2350 and ANTH 3330. Also listed as MAS 3330; credit cannot be granted for both ANTH 3330 and MAS 3330. Offered as AAST 3330 and ANTH 3330; credit will be granted in only one department.

**AAST 3332. COMPARATIVE KINSHIP AND FAMILY SYSTEMS. 3 Hours.**

Variation in kinship and family systems from crosscultural and evolutionary perspectives. Structure, function, and dynamics of kinship and family systems as adaptations to diverse ecological, social, and historical circumstances. Implications of this approach for understanding kinship and family in American society also addressed. Formerly listed as ANTH 4338. Credit cannot be given for both ANTH 3338 and ANTH 4338. Also offered as GWSS 3338; credit will be granted only once. Offered as AAST 3332 and ANTH 3338; credit will be granted in only one department.

**AAST 3336. SOCIAL INEQUALITY. 3 Hours.**

Examines the processes, characteristics, and consequences of social inequality in society. Topics include the social class structure, status groups, and elite power structure as they influence people's life chances. Offered as AAST 3336 and SOCI 3336; credit will be granted in only one department.

**AAST 3337. RACIAL & ETHNIC GROUPS IN US. 3 Hours.**

Compares the immigration, acculturation, and adjustment processes of various racial/ethnic groups in the U.S. Examines historical and contemporary discrimination in relation to the social conditions of racial/ethnic minority groups in the U. S. Topics include classical and contemporary theory; individualistic, cultural, and structural arguments about social arrangements; and conflict among majority and minority groups. Offered as AAST 3337, MAS 3337, and SOCI 3337; credit will be granted in only one department. Credit will not be granted for both SOCI 3337 and SOCI 4310 or for MAS 3337 and MAS 4310.

**AAST 3338. CONTEMPORARY BLACK EXPERIENCE. 3 Hours.**

An overview of recent research concerning the African American experience in the post-civil rights era. Topics include explanations for racial differences across spheres of society such as income, education, and occupation; the debate over race versus social class; the persistence of racial discrimination; and emerging disputes within the black community regarding "what it means to be black." Offered as AAST 3338 and SOCI 3338; credit will be granted in only one department.

**AAST 3339. RACE, SPORT AND MEDIA. 3 Hours.**

The media, including television, film, print, audio, and online outlets, influence how we view the world. This course analyzes overt, subtle and subliminal messages about culture, race, ethnicity, and sport as presented to us through various forms of the media. Through examinations of media portrayals of race, both past and present, students will analyze media artifacts, identify recurring themes, and examine research focused on the societal effects of stereotypical media portrayals. Offered as AAST 3339 and SOCI 3339; credit will be granted in only one department.

**AAST 3341. THE OLD SOUTH, 1607-1863. 3 Hours.**

Colonial origins of plantation agriculture, slavery, economics, King Cotton, politics and secession. Other topics include slave cultures, religion, slave insurrections, plantation lifestyle, honor, dueling and southern belles. Offered as AAST 3341 and HIST 3342; credit will be granted in only one department.

**AAST 3342. RELIGION IN MODERN AMERICA. 3 Hours.**

This course provides an overview of the scientific study of religion from a sociological perspective. The focus is on theories, research and trends relevant to religion in the contemporary United States. Topics include, but are not limited to, religious traditions, practices, and beliefs; declining religious participation; and religion and social change. The relationship between religion, politics, race relations, sex and gender will also be examined. Offered as SOCI 3343 and AAST 3342; credit will be granted in only one department.

**AAST 3343. THE NEW SOUTH, 1863-PRESENT. 3 Hours.**

From military defeat to Sun Belt growth. Topics include Reconstruction, segregation, migration of Southerners to the North and West, depressions, reforms, Civil Rights, Moral Majority, cultural expressions in literature and music. Offered as AAST 3343 and HIST 3343; credit will be granted in only one department.

**AAST 3344. SOCIOLOGY OF THE 1960S. 3 Hours.**

This course presents a sociological analysis of the sixties, stressing the connection between grassroots mobilization and large structures of power, war, race and gender. The legacy of the sixties is examined through stories told by and about activists of the period. Parallels between the sixties and the present are identified. Movements covered may include civil rights, black power, anti-war and women's rights. Offered as AAST 3344 and SOCI 3345; credit will be granted in only one department.

**AAST 3345. AFRICAN-AMERICAN LITERATURE. 3 Hours.**

Examines African-American literature in its various traditions, forms, and cultural and historical contexts. Offered as AAST 3345 and ENGL 3345; credit will be granted in only one department. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**AAST 3347. TOPICS IN MULTICULTURAL AMERICAN LITERATURES. 3 Hours.**

Focuses on literature produced within one or more ethnic communities in the U.S. in order to trace a theme or to explore issues such as intersectionality, hybridity/mestizaje, diaspora, or immigrant experiences. Topics may include Afro-Latino poetry, third-world feminist writing, multicultural literature of the Southwest, cultural memory and the Jewish literary tradition, or Asian-American fiction. Offered as ENGL 3347, AAST 3347, and MAS 3347; credit will be granted in only one department, and credit for MAS 3347 will be granted only once. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**AAST 3350. BLACK POLITICAL AND SOCIAL THOUGHT. 3 Hours.**

Course examines goals, viewpoints, and strategies of African American political and social movements. Topics include Black Nationalism, Inter-racial Integration, tensions between major historic leaders, reparations, the emergence of "race-neutral" politicians, and changing commitments to liberal and conservative causes.

**AAST 3353. SOCIAL CLIMATE OF CITIES. 3 Hours.**

A comparative study of urban communities and metropolitan areas in terms of their distinctive social life and culture. Topics touching on power and urban politics, race and ethnic relations, poverty, and leisure and lifestyles will be examined in terms of their contribution to the unique social climate of cities. Offered as AAST 3353 and SOCI 3353; credit will be granted in only one department.

**AAST 3373. ARCHAEOLOGY OF EGYPT. 3 Hours.**

The culture of ancient Egypt from its earliest occupation until the Arab invasion (7th century A.C.), with emphasis on the first 20 pharaonic dynasties (third and second millennia B.C.). Egyptian social, religious, economic and political development traced through the surviving material culture (architecture, art, industries, artifacts of daily life, funerary remains, etc.) supplemented by historical and literary evidence as pertinent. Egypt's relations with neighboring regions (Crete, Anatolia, Palestine, Nubia and Libya) considered. Offered as AAST 3373 and ANTH 3373; credit will be granted in only one department.

**AAST 3378. HISTORY OF THE CARIBBEAN. 3 Hours.**

A comparative history of the different societies in the Caribbean (including Cuba, Jamaica, and Haiti) with emphasis on the coming of slavery and the consequences of emancipation. Traces the development of emerging new societies from intermingling of Amerindian, African and European elements. Offered as AAST 3378 and HIST 3378; credit will be granted in only one department.

**AAST 3380. RACE, CRIME, AND JUSTICE. 3 Hours.**

An examination of race in the context of the criminal justice system. Emphasis is on social construction of crime; and the treatment of racial minorities as victims and offenders by law enforcement, courts, and corrections. Offered as CRCJ 3380 and MAS 3380; credit will be granted only once. Offered as AAST 3380 and CRCJ 3380; credit will be granted in only one department. Prerequisite: CRCJ 2334.

**AAST 3385. AFRICAN HISTORY I. 3 Hours.**

Examines African prehistory, ancient civilizations, religion, gender issues, slavery, and commerce in precolonial Africa. Offered as AAST 3385 and HIST 3385; credit will be granted in only one department.

**AAST 3386. AFRICAN HISTORY II. 3 Hours.**

Africa from the "Scramble for Africa" through the establishment of the various colonial systems, through the beginnings of African nationalism, to the contemporary period. The African Revolution and the development of the independent African states. Offered as AAST 3386 and HIST 3386; credit will be granted in only one department.

**AAST 4317. ETHNIC GROUP POLITICS IN THE UNITED STATES. 3 Hours.**

The influence of selected major ethnic groups with special attention given to organizational development, participation in political parties, leadership, ideology, immigration policy, current issues, and relations with the dominant culture and other ethnic groups. Offered as AAST 4317 and POLS 4317; credit will be granted in only one department. Prerequisite: POLS 2311 and POLS 2312.

**AAST 4318. POLITICS OF AFRICAN AMERICANS. 3 Hours.**

The influence of African-American politics on United States government and policies with special attention given to organizational development, participation in political parties, leadership, ideology, the Civil Rights movement, current issues, and relations with other ethnic groups. Offered as AAST 4318 and POLS 4318; credit will be granted in only one department. Prerequisite: POLS 2311 and POLS 2312.

**AAST 4325. HISTORY OF HIP HOP. 3 Hours.**

Focused study of the origins and development of Hip Hop as an artistic genre and political and cultural movement. Topics include deejaying, emceeing, sampling and other musical techniques as well as issues of ethnic and other identities, commercialism, capitalism, cultural appropriation, and authenticity. Offered as HIST 4325 and AAST 4325; credit will be granted only once.

**AAST 4326. DIVERSITY IN ORGANIZATIONS. 3 Hours.**

This course examines the implications of employee diversity in organizations, an issue of increasing importance. It includes study of the changing demographics of workers, including multiple demographic groups and areas of difference important to organizational treatment and outcomes. This course examines research on treatment, access, and customer discrimination. Legislation related to diversity is also reviewed. This course also provides suggestions for individuals and organizations to increase opportunities and outcomes for workers of all backgrounds. Offered as MANA 4326, AAST 4326 and GWSS 4326; credit will be granted in only one department. Prerequisite: Junior standing.

**AAST 4331. RACE, ETHNICITY & FAMILY FORMATION. 3 Hours.**

Investigates the ways in which cultural understandings of race and ethnicity have shaped historical and contemporary variations in family structure, familial experiences, and the legal possibilities for family formation. Junior standing (60 hours) or permission of the instructor required to enroll in this course. Offered as AAST 4331 and SOCI 4331; credit will be granted in only one department.

**AAST 4333. COMPARATIVE CIVIL RIGHTS HISTORY. 3 Hours.**

Explores the U.S. civil rights movement from a comparative perspective, exploring the African American civil rights movement, Chicano movement, women's liberation movement, gay liberation, and disability rights movement. Offered as AAST 4333 and HIST 4333; credit will be granted in only one department.

**AAST 4339. TOPICS IN AFRICAN-AMERICAN LITERATURE. 3 Hours.**

Concentrates on a topic or theme within the canon of African-American literature, such as a particular genre or era, significant authors, or a philosophical movement. Examples include the Harlem Renaissance, the Civil-Rights/Black-Power era, African-American autobiography, short fiction, and Afrofuturism. Offered as AAST 4339 and ENGL 4339; credit will be granted in only one department. May be repeated for credit as course content changes. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**AAST 4341. INEQUALITIES IN PUBLIC EDUCATION. 3 Hours.**

This course examines the manner in which race, ethnicity, and class affect the quality of education in the public schools. Topics include the resegregation of schools, class and race based achievement and funding gaps, and the role the schools play in reproducing inequality. This course has a service learning component and requires volunteering in programs designed to reduce inequality in the schools. Offered as AAST 4341 and SOCI 4341; credit will be granted in only one department.

**AAST 4342. TOPICS IN CULTURAL ANTHROPOLOGY. 3 Hours.**

Selected topics, to include anthropological theory, population and cultural ecology, semiotics, and humanistic anthropology. May be repeated for credit with departmental permission. Also offered as ANTH 4342. Credit will be granted in only one department.

**AAST 4350. SPECIAL TOPICS IN AFRICAN AMERICAN STUDIES. 3 Hours.**

Special topics related to African American studies. May be repeated for credit when the topic changes.

**AAST 4376. AFRICAN DIASPORA I. 3 Hours.**

The major developments which have shaped the history of Africans and their descendants in the Atlantic, Mediterranean, and Indian Ocean areas from the earliest times to 1800. Emphasis on the comparative history of Black Diasporic communities; linkages between Africans and their descendants in the Diaspora. Offered as AAST 4376 and HIST 4376; credit will be granted in only one department.

**AAST 4377. AFRICAN DIASPORA II. 3 Hours.**

The major developments which have shaped the history of Africans and their descendants in Latin America, the Caribbean, and North America since 1800. Emphasis on the comparative history of Black Diasporic communities; linkages between Africans and their descendants in the Atlantic Diaspora. Offered as AAST 4377 and HIST 4377; credit will be granted in only one department.

**AAST 4378. WEST AFRICA AND THE ATLANTIC DIASPORA. 3 Hours.**

This course examines the history of West Africa and how this region was integrated into the Atlantic world through the Atlantic slave trade. The course adopts an interdisciplinary approach that integrates traditional classroom instruction with field-based learning in West Africa. This learning method, combined with cultural immersion, challenges students to develop their academic and cross-cultural knowledge and skills. Offered as AAST 4378 and HIST 4378; credit will be granted in only one department.

**AAST 4391. CONFERENCE COURSE. 3 Hours.**

Directed independent study for the advanced undergraduate. A close examination of a chosen topic through research and/or reading; format designed by instructor and student. May be repeated for a maximum six credit hours when the subject matter varies. Prerequisite: Departmental permission.

**AAST 4399. CAPSTONE AFRICAN AMERICAN STUDIES. 3 Hours.**

In consultation with the course instructor, students will design a research project or an internship that will integrate their previous course work into a capstone experience in either the applied or the cultural studies stream of the African American Studies minor. Prerequisite: AAST 2300 and departmental permission.

**AAST 6391. CONFERENCE COURSE. 3 Hours.**

Directed independent study for a masters-level or doctoral student. A close examination of a chosen topic through research and/or reading; format designed by instructor and student. May be repeated for maximum six credit hours when the subject matter varies. Prerequisite: Permission from CAAS Director.

**COURSES****ACCT 2301. PRINCIPLES OF ACCOUNTING I. 3 Hours. (TCCN = ACCT 2301)**

The accounting process and its informational output. Financial accounting concepts, basic procedures, and the resulting reports. Recognition and creation of accounting information as bases for decisions. An accounting lab is required. The grade for this course requires the completion of both the lecture component and the accounting lab. Prerequisite: 30 credit hours or permission of the department.

**ACCT 2302. PRINCIPLES OF ACCOUNTING II. 3 Hours. (TCCN = ACCT 2302)**

A study of managerial accounting concepts and techniques. Topics include cost behavior, budgeting, responsibility accounting, and product costing. An accounting lab is required. The grade for this course requires the completion of both the lecture component and the accounting lab. Prerequisite: ACCT 2301 with a grade of C or higher.

**ACCT 2303. ACCOUNTING AND COMPLIANCE OF NON-PROFIT ORGANIZATIONS. 3 Hours.**

The primary objective of this course is to help students understand accounting theories and compliance issues that relate to non-profit and philanthropic organizations. The course introduces students to general accounting theories, budgeting, internal control, fraud, and compliance issues of non-profit organizations. Restriction: Students enrolled in this course cannot be accounting majors. Prerequisite: Students enrolled in this course cannot be accounting majors, 30 credit hours.

**ACCT 3133. PROFESSIONALISM IN ACCOUNTING. 1 Hour.**

Topics to engender a stronger sense of professionalism: business and social etiquette, self-assessment, professional deportment, networking, effective communication skills, and dressing professionally. Topics primarily presented by accomplished professionals from public accounting, industry, and government. Prerequisites: Accounting major and ACCT 3311, can be taken concurrently.

**ACCT 3303. INTRODUCTION TO ACCOUNTING INFORMATION SYSTEMS. 3 Hours.**

The structure of contemporary accounting systems with emphasis on controls, auditing, reporting, and efficient operation. Prerequisite: ACCT 2302 and INSY 2303 with grades of C or higher.

**ACCT 3308. FINANCIAL STATEMENT ANALYSIS FOR BANKING. 3 Hours.**

The environment of accounting, development of standards, basic theory, financial statements, worksheets with a particular focus on the application of accounting topics of Intermediate Accounting to banking institutions. Prerequisite: ACCT 2301 with a grade of C or higher. Credit will not be received for both ACCT 3311 and ACCT 3308.

**ACCT 3309. ACCOUNTING FOR MANAGERS. 3 Hours.**

Planning, controlling, decision making, and performance evaluation. Uses a variety of teaching techniques (e.g., problems, cases, and projects) and is open only to non-accounting majors. Credit will not be given for both this course and ACCT 4302. Prerequisite: ACCT 2302 with a grade of C or higher.

**ACCT 3311. FINANCIAL ACCOUNTING I. 3 Hours.**

The environment of accounting, development of standards, basic theory, financial statements, worksheets, annuities and present value, receivables, inventories, liabilities, plant assets, depreciation and depletion, and intangible assets. Prerequisite: ACCT 2301 with a grade of C or higher and successful completion of basic accounting skills exam. (See the departmental website for details about the exam.).

**ACCT 3312. FINANCIAL ACCOUNTING II. 3 Hours.**

Stockholders' equity, earnings per share, investments in bonds and stocks, equity method, revenue recognition, accounting changes, error analysis, income taxes, leases, and cash flows. Prerequisite: ACCT 3311 with a grade of C or higher.

**ACCT 3315. PRINCIPLES OF FEDERAL INCOME TAX. 3 Hours.**

A study of general federal income tax principles such as income, deductions, losses, and property transactions. Emphasis is placed on the taxation of individuals as well as on an understanding of property transactions which apply to individuals and other entities. Prerequisite: Accounting major with junior standing and ACCT 3311 with a grade of C or higher.

**ACCT 3316. DATA ANALYTICS FOR ACCOUNTING. 3 Hours.**

Businesses use data analytics to evaluate organizational data and improve business decisions. The ability to collect, analyze, and use data to provide information for better decisions is a critical skill for accounting professionals. This course will introduce students to the growing role of analytics to answer business questions. Students will analyze data to solve problems frequently encountered in accounting. This course will also introduce students to basic statistical techniques used to analyze specific accounting related business problems. Prerequisite: ACCT 2302 with a C or better.

**ACCT 4191. STUDIES IN ACCOUNTING. 1 Hour.**

Advanced studies, on an individual basis, in the various fields of accounting. Prerequisite: Senior standing and permission of instructor. May be repeated for credit with consent of department chair.

**ACCT 4193. ACCOUNTING INTERNSHIP. 1 Hour.**

Practical training in accounting. Analysis of theory applied to real life situations. Graded on a pass/fail basis. No credit will be given for previous experience or activities. Prerequisite: ACCT 4393 and accounting major with junior standing and consent of department internship advisor.



**ACCT 4291. STUDIES IN ACCOUNTING. 2 Hours.**

Advanced studies, on an individual basis, in the various fields of accounting. Prerequisite: Senior standing and permission of instructor. May be repeated for credit with consent of department chair.

**ACCT 4302. COST ANALYSIS AND DECISION MAKING. 3 Hours.**

This course will cover advanced cost analysis concepts including Cost-Volume-Profit analysis, cost-benefit analysis, product and service costing, pricing and budgeting. Class discussions will integrate concepts and applications of cost analysis with corporate practice through use of analytical problem solving, real world examples and case analyses. Prerequisite: Accounting major with 60 credit hours and ACCT 3303 with a grade of C or higher.

**ACCT 4304. MANAGEMENT PLANNING AND CONTROL. 3 Hours.**

This course covers intermediate and advanced concepts in decentralization and management control, including budgetary control, performance measurement and incentive structures, and transfer pricing. Class discussions will integrate concepts and applications of control with corporate practice through use of analytical problem solving, real world examples and case analyses. Prerequisite: Accounting major with junior standing and ACCT 4302 with a grade of C or higher.

**ACCT 4318. AUDITING. 3 Hours.**

Principles, concepts, and techniques which are appropriate to the acquisition, evaluation, and documentation of audit evidence. Internal control concepts, financial compliance, and operational auditing. Prerequisite: Accounting major with junior standing and ACCT 3303 and ACCT 3312 with grades of C or higher.

**ACCT 4319. FINANCIAL ACCOUNTING III. 3 Hours.**

Accounting for business combinations, preparation of consolidated financial statements, multinational operations, and partnerships. Prerequisite: ACCT 3312 with a C or higher.

**ACCT 4323. CORPORATE SUSTAINABILITY REPORTING. 3 Hours.**

This course examines current trends in corporate sustainability reporting by business organizations. Topics include stakeholders, voluntary reporting frameworks, mandatory reporting standards, climate risk disclosures, sustainability ratings, and assurance. Student learning will be enhanced with in-class discussions, guest speaker visits, and assignments that require critical thinking, written communication, and oral communication. Prerequisite: Junior standing.

**ACCT 4325. GOVERNMENTAL ACCOUNTING. 3 Hours.**

Budgeting, accounting, and financial reporting for local governmental units, hospitals, voluntary health and welfare organizations, and other nonprofit entities. Prerequisite: Accounting major with junior standing and ACCT 3312 with a grade of C or higher.

**ACCT 4331. SEMINAR IN ACCOUNTING. 3 Hours.**

Readings and discussions of special topics in accounting. Prerequisite: Junior or senior standing and consent of instructor. May be repeated for credit with consent of department chair.

**ACCT 4332. INTERNAL AUDITING I. 3 Hours.**

A comprehensive study of internal auditing standards, ethics, concepts, audit techniques, and reporting practices. Prerequisite: Accounting major with junior standing and ACCT 3303 with a grade of C or higher or consent of the instructor.

**ACCT 4333. INTERNAL AUDITING II. 3 Hours.**

An advance study of operational, organizational, and quality control audits. Topics will include operational audit methodology, audits of administrative and support services, audits of line functions, and audits of special areas. Prerequisite: Accounting major with junior standing and ACCT 4332 with a grade of C or higher and a 3.0 GPA.

**ACCT 4340. STUDY OF FEDERAL INCOME TAX FOR ENTITIES OTHER THAN INDIVIDUALS. 3 Hours.**

Comprehensive analysis of the federal income tax consequences applicable to entities other than individuals. Analysis of the relevant tax principles of corporations, partnerships, trusts and estates will be undertaken. Cannot be taken for credit within the 36-hour program requirements for Master of Science in Taxation program. Prerequisite: ACCT 3315 with a C or higher.

**ACCT 4380. ETHICS IN ACCOUNTING. 3 Hours.**

This course is intended to introduce students to ethical reasoning, integrity, objectivity, independence, professionalism and other core values. The course incorporates the essentials of professional responsibilities, including elements of trust and communications with clients and other professionals. Both ethical principles and rules are considered. This course is intended to satisfy conditions of the Texas State Board of Public Accountancy that require candidates for the CPA Exam to have completed an approved ethics course. Accounting majors may take this course as a business elective, but may not count this course as an accounting elective nor include it in the calculation of their accounting GPA. Prerequisite: ACCT 3312 with a grade of C or higher.

**ACCT 4391. STUDIES IN ACCOUNTING. 3 Hours.**

Advanced studies, on an individual basis, in the various fields of accounting. Prerequisite: Senior standing and permission of instructor. May be repeated for credit with consent of department chair.

**ACCT 4393. ACCOUNTING INTERNSHIP. 3 Hours.**

Practical training in accounting. Analysis of theory applied to real life situations. May be used as an advanced business elective only; graded on a pass/fail basis. No credit will be given for previous experience or activities. Prerequisite: Accounting major with junior standing and consent of department internship advisor.

**ACCT 5133. PROFESSIONALISM IN ACCOUNTING. 1 Hour.**

Topics to engender a stronger sense of professionalism: business and social etiquette, self-assessment, professional deportment, networking, effective communication skills, and dressing professionally. Topics primarily presented by accomplished professionals from public accounting, industry, and government. Prerequisite: ACCT 5311 with a grade of C or higher or acceptance in the PPIA .

**ACCT 5199. GRADUATE ACCOUNTING INTERNSHIP. 1 Hour.**

Practical training in accounting. Analysis of theory applied to real life situations. Course counts as an elective and has a pass/fail grade. No credit will be given for previous experience or activities. Prerequisite: Minimum twelve accounting semester hours beyond principles completed or with approval of the internship coordinator.

**ACCT 5299. GRADUATE ACCOUNTING INTERNSHIP. 2 Hours.**

Practical training in accounting. Analysis of theory applied to real life situations. Course counts as an elective and has a pass/fail grade. No credit will be given for previous experience or activities. Prerequisite: Minimum twelve accounting semester hours beyond principles completed or with approval of the internship coordinator.

**ACCT 5301. ACCOUNTING ANALYSIS I. 3 Hours.**

Introduction to concepts, purposes, problems, methodology, and terminology of financial accounting.

**ACCT 5302. ACCOUNTING ANALYSIS II. 3 Hours.**

Introduction to concepts, purposes, problems, methodology, and terminology of managerial accounting. Prerequisite: ACCT 5301 with a grade of C or higher.

**ACCT 5307. MEASUREMENT AND ANALYSIS FOR BUSINESS DECISION-MAKING. 3 Hours.**

This course provides students with a comprehensive overview of financial reporting, analysis and measurement issues in the context of business decision making. Student will gain an understanding of financial statements and their underlying measurements. They will then use this understanding to conduct analyses using financial ratios. Students will then explore the role of cost measurements, allocations, etc. in determining the performance measures of parts of the organization and their inter-relationship with both choosing and evaluating strategies in various business contexts. They will cover issues such as matching strategies to performance measures, choosing and evaluating key performance indicators and balanced scorecards, etc.

**ACCT 5311. FINANCIAL ACCOUNTING I. 3 Hours.**

Examination of financial accounting process, problems encountered in preparation of financial statements, and concepts and principles used to resolve these problems. Prerequisite: ACCT 5301 with a grade of C or higher.

**ACCT 5312. FINANCIAL ACCOUNTING II. 3 Hours.**

Study of additional problems encountered in preparation of financial statements. Prerequisite: ACCT 5311 with a grade of C or higher.

**ACCT 5313. SOFTWARE TOOLS. 3 Hours.**

An in-depth study of software that would likely be used by accountants and other business people. May include spreadsheet, database, and accounting software, tax software, and other types of tools such as XBRL and XML. Prerequisite: ACCT 5302 with a grade of C or higher.

**ACCT 5314. PRINCIPLES OF FEDERAL INCOME TAX. 3 Hours.**

A study of general federal income tax principles such as income, deductions, losses and property transactions. The principles of individual taxation will be covered as well as an overview of tax considerations for entities such as corporations and partnerships. Prerequisite: ACCT 5301 with a grade of C or higher.

**ACCT 5315. ACCOUNTING SYSTEMS ANALYSIS. 3 Hours.**

Analysis and design of business information processes. Includes coverage of control concepts, audit trails, and the uses of information technology. Emphasis on the role of accounting in collecting, storing, and communicating information for management planning and control. Prerequisite: ACCT 5302 with a grade of C or higher.

**ACCT 5316. AUDITING CONCEPTS AND PRACTICES. 3 Hours.**

Concentrates on practice of professional accounting and auditing. Emphasizes decision making in a variety of unstructured situations where decisions demand a grasp of purpose, method, and judgment for their resolution. May not be taken for credit by students who have received credit for a course in auditing. Prerequisite: ACCT 5312 and ACCT 5315 with grades of C or higher.

**ACCT 5317. COST ANALYSIS AND DECISION MAKING. 3 Hours.**

The course will cover advanced cost analysis concepts including Cost-Volume-Profit analysis, cost-benefit analysis, product and service costing, pricing and budgeting. Class discussions will integrate concepts and applications of cost analysis with corporate practice through use of analytical problem solving, real world examples and case analyses. Prerequisite: ACCT 5302 with a grade of C or higher.

**ACCT 5318. STUDIES IN AUDITING. 3 Hours.**

A critical analysis of advanced topics in both auditing theory and professional practice. Emphasis on: development of auditing theory, generally accepted auditing standards, professional responsibilities, auditing EDP, SEC practice and reporting, cases in audit decision making, and analyses of emerging issues and contemporary problems in auditing. Prerequisite: ACCT 5316 with a grade of C or higher.

**ACCT 5319. FINANCIAL ACCOUNTING III. 3 Hours.**

Accounting for business combinations, preparation of consolidated financial statements, multinational operations, partnerships, and estates and trusts. Prerequisite: ACCT 5312 with a grade of C or higher.

**ACCT 5320. GOVERNMENTAL AND NONPROFIT ACCOUNTING. 3 Hours.**

Budgeting, accounting and financial reporting, managerial control, and auditing considerations of governmental and nonprofit entities. Prerequisite: ACCT 5312 with a grade of C or higher.

**ACCT 5321. RESEARCH IN ACCOUNTING ISSUES. 3 Hours.**

Designed to improve student's ability to research complex areas in accounting and to sharpen understanding and application of accounting concepts and principles. Case studies and problems considered and analyzed. Prerequisite: Excel certification and ACCT 5312 with a grade of C or better.

**ACCT 5322. ACCOUNTING FOR MANAGEMENT PLANNING AND CONTROL. 3 Hours.**

This course covers intermediate and advanced concepts in decentralization and management control, including budgetary control, performance measurement and incentive structures, and transfer pricing. Class discussions will integrate concepts and applications of control with corporate practice through use of analytical problem solving, real world examples and case analyses. May not be taken for credit by students who previously received credit for ACCT 4302 (before Fall 2020) or ACCT 4304 (after Fall 2020) or equivalent. Prerequisite: ACCT 5317 with grade of C or higher.

**ACCT 5323. CORPORATE SUSTAINABILITY REPORTING. 3 Hours.**

This course examines current trends in corporate sustainability reporting by business organizations. Topics include stakeholders, voluntary reporting frameworks, mandatory reporting standards, climate risk disclosures, sustainability ratings, and assurance. Student learning will be enhanced with in-class discussions, guest speaker visits, and assignments that require critical thinking, written communication, and oral communication.

**ACCT 5324. FINANCIAL STATEMENT ANALYTICS AND BUSINESS VALUATION. 3 Hours.**

This course covers the use of financial data to analyze business performance. Students will develop an understanding of financial data, how to evaluate a firm's strategy and risk factors, how to analyze and forecast financial statements, and techniques to value a business's equity. Students implement these lessons through the use of case studies involving data analytics. Prerequisite: ACCT 5307 or equivalent course with a grade of B or higher.

**ACCT 5327. CONTEMPORARY ISSUES IN ACCOUNTING THEORY. 3 Hours.**

Designed to familiarize students with significant problems currently facing the accounting profession, to examine in depth various solutions proposed by accounting scholars and others, and to strengthen student understanding of today's critical issues in accounting theory. Prerequisite: ACCT 5312 with a grade of C or higher.

**ACCT 5329. ADVANCED ACCOUNTING INFORMATION SYSTEMS AND ANALYTICS. 3 Hours.**

An exploration of advanced topics critical to accounting information systems. The course is designed to enhance student understanding of complex and emerging issues and technologies related to reporting, internal controls, system security and effectiveness. Topics may change semester to semester. Prerequisite: ACCT 5315 with a grade of C or higher.

**ACCT 5330. INTERNATIONAL ACCOUNTING AND FINANCIAL REPORTING. 3 Hours.**

Financial accounting and reporting principles and practices in various countries, the role of accounting in economic development, as well as the accounting considerations in international business operations -- e.g. foreign currency translation, auditing, accounting systems, taxation, and sensitive payments. Prerequisite: ACCT 5302 with a grade of C or higher.

**ACCT 5332. OPERATIONAL AUDITING. 3 Hours.**

A study of operational audit methodology for management audits. Audits of administrative and support functions, and other special areas such as fraud audits. Prerequisite: Graduate standing and six hours of accounting with grades of C or higher.

**ACCT 5335. ACCOUNTING ANALYTICS. 3 Hours.**

The analysis of data as it pertains to accounting professionals. Focuses on analytical techniques and the skills necessary to translate accounting information into actionable proposals that can be presented to decision makers in areas such as auditing, risk management, forensics, predictive modeling and strategic planning. Prerequisite: Business statistics, ACCT 5315 and ACCT 5316 with a grade of C or higher or consent of instructor.

**ACCT 5339. TAX PLANNING AND RESEARCH. 3 Hours.**

A study of the use of various techniques and procedures available in evaluating issues arising under federal income tax law. Emphasizes research into individual and business tax problems and planning alternatives. Prerequisite: ACCT 5314 with a grade of C or higher.

**ACCT 5340. STUDY OF FEDERAL INCOME TAX FOR ENTITIES OTHER THAN INDIVIDUALS. 3 Hours.**

Comprehensive analysis of the federal income tax consequences applicable to entities other than individuals. Analysis of the relevant tax principles of corporations, partnerships, trusts and estates will be undertaken. Cannot be taken for credit within the 36-hour program requirements for Master of Science in Taxation program. Prerequisite: ACCT 5314 with a grade of C or higher.

**ACCT 5341. TAXATION OF PASSTHROUGH ENTITIES. 3 Hours.**

Analysis of the federal income tax rules governing passthrough entities. Credit will not be received for both ACCT 5340 and ACCT 5341. Prerequisite: ACCT 5339 with grade of C or higher.

**ACCT 5342. TAX PROBLEMS OF CORPORATIONS AND SHAREHOLDERS. 3 Hours.**

Analysis of the federal income tax rules governing corporations and shareholders. Subjects include corporate formations, corporate capital structure, administrative requirements affecting corporations, the corporate alternative minimum tax, special tax provisions (such as the personal holding company and accumulated earnings taxes and the collapsible corporation rules), nonliquidating distributions, stock dividends, redemptions and partial liquidations, liquidating distributions, corporate reorganizations, and Subchapter S corporations. Credit will not be received for both ACCT 5340 and ACCT 5342. Prerequisite: Excel certification and ACCT 5339 with grade of C or higher.



**ACCT 5343. TAX PROBLEMS OF TRANSACTIONS IN REAL ESTATE. 3 Hours.**

Problems and elections relating to the acquisition, holding, and disposition of real property. Subjects include means of acquisition and disposition, capital gains and losses, deferred payment sales, organization of syndicates, sale and leaseback, dissolutions, and general tax-saving methods. Prerequisite: ACCT 5339 with grade of C or higher.

**ACCT 5345. STATE AND LOCAL TAXATION. 3 Hours.**

Introduction to the principles and practices of state and local taxation. Topics considered in the course include the application of both inter- and intra-state taxation, allocation and apportionment principles and issues in relation to the predominant forms of state taxes, such as franchise, sales, use, income, ad valorem, and property tax. Prerequisite: ACCT 5339 with grade of C or higher.

**ACCT 5346. TAX PRACTICE AND PROCEDURE. 3 Hours.**

This course overviews the procedural aspects of dealing with the Internal Revenue Service. The focus is from the private practitioner's perspective in assisting clients in navigating the Service's administrative requirements. Topics include administrative organization of the Service, tax audits, the use of Service administrative summonses, statutes of limitation, penalties, interest charges, civil and criminal procedures and appeals. Prerequisite: ACCT 5339 with grade of C or higher.

**ACCT 5347. FEDERAL TAXATION OF GIFTS AND ESTATES. 3 Hours.**

A comprehensive survey of the principles and procedures involved in determining the federal estate tax and the supplementary federal gift tax including taxability and valuation of property and the determination of deductions and credits. Prerequisite: ACCT 5339 with grade of C or higher.

**ACCT 5352. INFORMATION SYSTEMS AUDIT AND CONTROL. 3 Hours.**

A study of modern approaches to the audit and control of business information systems. Prerequisite: ACCT 5315 and ACCT 5316 with grades of C or higher.

**ACCT 5353. STATISTICAL TECHNIQUES USED IN ACCOUNTING. 3 Hours.**

A study of statistical techniques used in accounting. Topics include alternative sample selection methods, attribute methods, mean-per-unit estimation, ratio and difference estimation, monetary unit sampling, and regression analysis. Prerequisite: STAT 5301 with a grade of C or higher.

**ACCT 5366. FRAUD EXAMINATION. 3 Hours.**

Analysis of fraud examiner and auditor responsibilities and current methodologies with respect to financial fraud investigation, detection, and prevention. Management's responsibilities for fraud deterrence and implementation of effective prevention measures. Identification, analysis, and examination of financial fraud using actual case studies. Prerequisite: ACCT 5316 with a grade of C or higher.

**ACCT 5372. FEDERAL TAXATION OF INTERNATIONAL TRANSACTIONS. 3 Hours.**

This course provides an overview of the U.S. system for taxing international transactions. Topics include U.S. jurisdictional and source-of-income rules; the foreign tax credit; anti-deferral provisions; taxation of U.S. activities of foreign persons, and issues common to both outbound and inbound activities including intercompany transfer pricing rules. Prerequisite: ACCT 5339 with grade of C or higher.

**ACCT 5380. ETHICS IN ACCOUNTING. 3 Hours.**

This course is intended to introduce students to ethical reasoning, integrity, objectivity, independence, professionalism and other core values. The course incorporates the essentials of professional responsibilities, including elements of trust and communications with clients and other professionals. Both ethical principles and rules are considered. This course is intended to satisfy conditions of the Texas State Board of Public Accountancy that require candidates for the CPA Exam to have completed an approved ethics course. Prerequisite: ACCT 5311 or equivalent.

**ACCT 5382. INDEPENDENT STUDIES IN ACCOUNTING. 3 Hours.**

Extensive analysis of an accounting topic. Prerequisite: Consent of faculty member and department chair.

**ACCT 5392. SELECTED TOPICS IN ACCOUNTING. 3 Hours.**

In-depth study of selected topics in accounting. May be repeated when topics vary. Prerequisite: consent of instructor.

**ACCT 5398. THESIS. 3 Hours.**

Thesis. Graded F, R. Prerequisite: permission of Accounting Graduate Advisor.

**ACCT 5399. GRADUATE ACCOUNTING INTERNSHIP. 3 Hours.**

Practical training in accounting. Analysis of theory applied to real life situations. Course counts as an elective and has a pass/fail grade. No credit will be given for previous experience or activities. Prerequisite: Minimum twelve accounting semester hours beyond principles completed or with approval of the internship coordinator.

**ACCT 5698. THESIS. 6 Hours.**

Thesis. Graded F, R. Prerequisite: permission of Accounting Graduate Advisor.

**ACCT 6101. ACCOUNTING RESEARCH COLLOQUIUM. 1 Hour.**

A forum in which visiting scholars and U.T. Arlington faculty members present and discuss results of their contemporary research. Doctoral students participate by meeting with visiting scholars, reading the research papers, providing written critiques, and discussing the papers. Doctoral students are required to enroll and attend the colloquia presentations each fall and spring semester until the students pass all their comprehensive examinations. May be repeated for credit. Prerequisite: consent of College PhD advisor.

**ACCT 6309. SEMINAR IN ACCOUNTING RESEARCH I. 3 Hours.**

Analysis of the theoretical and empirical literature in accounting. Prerequisite: consent of College PhD advisor.

**ACCT 6310. SEMINAR IN ACCOUNTING RESEARCH II. 3 Hours.**

Analysis of Theoretical and Empirical Research in Accounting.

**ACCT 6311. SEMINAR IN ACCOUNTING RESEARCH III. 3 Hours.**

Continuation of analysis of the theoretical and empirical literature in accounting. Prerequisite: ACCT 6310 with a grade of C or higher and consent of the College Ph.D. advisor.

**ACCT 6312. SEMINAR IN ACCOUNTING RESEARCH IV. 3 Hours.**

Continuation of analysis of the theoretical and empirical literature in accounting.

**ACCT 6313. SEMINAR IN ACCOUNTING RESEARCH V. 3 Hours.**

Seminar will cover advanced accounting research topics.

**ACCT 6390. SPECIAL TOPICS IN ACCOUNTING RESEARCH. 3 Hours.**

Doctoral level coverage of advanced topics in accounting. Topics may vary. Prerequisite: Approval by faculty member and doctoral program advisor.

## COURSES

**ADVT 2337. INTRODUCTION TO ADVERTISING. 3 Hours. (TCCN = COMM 2327)**

The role of advertising in society. Basic concepts include marketing message creation, budget determination, agency-client relationships, and social responsibility of advertisers.

**ADVT 3304. STRATEGIC COMMUNICATION I. 3 Hours.**

Introductory strategy course focusing on creative communication in advertising and marketing communication planning. The evolution and development of the strategic creative process is evaluated relative to campaign objectives and research, especially as it impacts Integrated Marketing Communication and branding programs. Students successfully completing Strategic Communication I advance to Strategic Communication II. Prerequisite: COMM 2311, ADVT 2337, and either MATH 1308 or MATH 1309, all with a grade of C or better.

**ADVT 3305. ADVERTISING MEDIA. 3 Hours.**

Decision-making in selection and use of advertising media. Evaluation of media alternatives in terms of marketing communication objectives and strategy, audience analysis, media-market research, cost, and editorial/program content. Media plans are developed consistent with Integrated Marketing Communication and branding programs. Prerequisite: COMM 2311, ADVT 2337, and either MATH 1308 or MATH 1309, all with a grade of C or better.

**ADVT 3306. STRATEGIC COMMUNICATION II. 3 Hours.**

Advanced strategy course building on the foundation from Strategic Communication I; assumes a basic understanding of strategy and research. Advanced critiques of existing campaigns coupled with the development of strategic communication for various media, including print, broadcast, direct mail, and Internet. Persuasive presentation of strategies and executions to others as in an agency setting; includes copywriting, basic art direction, and multimedia usage. Prerequisite: ADVT 3304 with a grade of C (2.0/4.0 scale) or better, and COMM 3303.

**ADVT 3308. DIGITAL ADVERTISING DESIGN. 3 Hours.**

Course covers the practice of results-oriented creative advertising and design, including both visual and copy concepts through digital execution with an emphasis on strategic development. The course also focuses on advanced applications of digital software to design and communicate targeted messages utilizing communication theory and practice. Prerequisite: COMM 3303 with a grade of C (2.0/4.0 scale) or better.

**ADVT 4300. DIGITAL INTEGRATED MARKETING COMMUNICATION (IMC) MANAGEMENT. 3 Hours.**

Theory and management of digital integrated marketing communication. The course focuses on using digital analytics to plan and execute successful integrated strategies that reach appropriate audiences with targeted messages. Key topics include digital advertising, social media, digital media, email marketing, and search engine optimization (SEO). Prerequisite: A grade of C or better in PREL 3320.

**ADVT 4301. ADVERTISING AND IMC CAMPAIGNS. 3 Hours.**

Advanced study in the application of advertising and marketing communication theories. Advertising campaigns are developed consistent with Integrated Marketing Communication and branding programs. Student agency teams develop speculative advertising and IMC plans for organizations, products and/or brands. Prerequisite: A grade of C (2.0/4.0 scale) or better in the following courses: ADVT 3305, ADVT 3306, and ADVT 4300.

**ADVT 4391. CONFERENCE COURSE. 3 Hours.**

Topic assigned on an individual basis, covering individual research or study in the designated areas. May be repeated when topic changes. Prerequisite: 60 or more hours earned and permission of the department.

**ADVT 4393. SPECIAL TOPICS. 3 Hours.**

Special studies in advertising. Topic varies from semester to semester. May be repeated when topic changes, for a maximum of six credit hours. Prerequisite: 60 or more hours earned and permission of the department.

**ADVT 4395. PROFESSIONAL INTERNSHIP. 3 Hours.**

Individual research in advertising while working with business and industry. Individual conference to be arranged. Graded Pass/Fail. Prerequisite: 60 or more hours earned and permission of the department.

## COURSES

### **AE 5100. PREPARATORY COURSE FOR AEROSPACE ENGINEERING. 1 Hour.**

The course may be offered with multiple sections, wherein each section is paired with a corresponding UG course being offered that semester. The purpose of this course is to strengthen academic preparation of students who were found inadequately prepared for a graduate degree in Aerospace Engineering. Students can concurrently enroll in multiple sections and may need to enroll in this course multiple times until their academic preparation is deemed complete. In order to pass this class, the student has to earn at least a B grade in aggregate based on all the assignments and exams. The student will earn an R grade if the class aggregate is a C/D and will need to repeat the course until the student passes the class. The student will Fail the class if the aggregate is an F. The course may be repeated as often as required.

### **AE 5101. GRADUATE SEMINAR. 1 Hour.**

The purpose is to acquaint graduate students with ongoing research at UTA, and outside in academia and industry. Seminars are given by graduate students of the department based on their ongoing research. Seminars are also given by external speakers from academia, industry and government.

### **AE 5191. ADVANCED STUDIES IN AEROSPACE ENGINEERING. 1 Hour.**

Individual research or design project performed for fulfilling the requirements of the Master of Engineering degree option. Prior approval of the AE Graduate Advisor is required for enrollment. A written and/or oral report is required.

### **AE 5197. RESEARCH IN AEROSPACE ENGINEERING. 1 Hour.**

Research in masters programs.

### **AE 5200. PREPARATORY COURSE FOR AEROSPACE ENGINEERING. 2 Hours.**

The course may be offered with multiple sections, wherein each section is paired with a corresponding UG course being offered that semester. The purpose of this course is to strengthen academic preparation of students who were found inadequately prepared for a graduate degree in Aerospace Engineering. Students can concurrently enroll in multiple sections and may need to enroll in this course multiple times until their academic preparation is deemed complete. In order to pass this class, the student has to earn at least a B grade in aggregate based on all the assignments and exams. The student will earn an R grade if the class aggregate is a C/D and will need to repeat the course until the student passes the class. The student will Fail the class if the aggregate is an F. The course may be repeated as often as required.

### **AE 5291. ADVANCED STUDIES IN AEROSPACE ENGINEERING. 2 Hours.**

Individual research or design project performed for fulfilling the requirements of the Master of Engineering degree option. Prior approval of the AE Graduate Advisor is required for enrollment. A written and/or oral report is required.

### **AE 5297. RESEARCH IN AEROSPACE ENGINEERING. 2 Hours.**

Research in masters programs.

### **AE 5300. PREPARATORY COURSE FOR AEROSPACE ENGINEERING. 3 Hours.**

The course may be offered with multiple sections, wherein each section is paired with a corresponding UG course being offered that semester. The purpose of this course is to strengthen academic preparation of students who were found inadequately prepared for a graduate degree in Aerospace Engineering. Students can concurrently enroll in multiple sections and may need to enroll in this course multiple times until their academic preparation is deemed complete. In order to pass this class, the student has to earn at least a B grade in aggregate based on all the assignments and exams. The student will earn an R grade if the class aggregate is a C/D and will need to repeat the course until the student passes the class. The student will Fail the class if the aggregate is an F. The course may be repeated as often as required.

### **AE 5301. ADVANCED TOPICS IN AEROSPACE ENGINEERING. 3 Hours.**

To provide formal instruction in special topics pertinent to Aerospace Engineering from semester to semester depending on the availability of faculty. May be repeated for credit as provided topics change.

### **AE 5302. ADVANCED FLIGHT MECHANICS. 3 Hours.**

Rigid body motion. Kinematics and dynamics of aerospace vehicles. Linear and nonlinear control of aircraft and spacecraft. Advanced aircraft and spacecraft modeling and control issues. Prerequisite: MAE 3405 and MAE 4310.

### **AE 5303. CLASSICAL METHODS OF CONTROL SYSTEMS ANALYSIS AND SYNTHESIS. 3 Hours.**

Equip the student with familiarity of significant tools of the control engineer. Topics covered include controllers and their effect on system performance and stability, block diagram algebra, stability and analysis, system performance definition, root locus, frequency techniques, and state variable methods. Digital simulation tools for design and simulation of control systems. Demonstration of controller design and performance in the laboratory. Also offered as ME 5303.

### **AE 5305. DYNAMIC SYSTEMS MODELING. 3 Hours.**

To equip the student with the capability of determining the necessary equations for distributed and lumped parameter modeling of mixed physical system types including mechanical, fluid, electrical, and thermal components. Models are formulated for computer simulation and analysis for systems with deterministic and stochastic inputs. Topics of random vibration and system identification are included. Offered as AE 5305 and ME 5305. Credit will be granted only once.

### **AE 5310. FINITE ELEMENT METHODS. 3 Hours.**

Finite element method in the study of the static response of complex structures and of continua applications to field problems; analytical methods emphasized and digital computer application undertaken. Offered as AE 5310 and ME 5310. Credit will be granted only once.

**AE 5311. STRUCTURAL DYNAMICS. 3 Hours.**

Natural frequencies; forced response of complex structural systems studied through the use of the finite element method; computational aspects of these problems discussed, and digital computer applications undertaken. Offered as AE 5311 and ME 5311. Credit will be granted only once.

**AE 5312. CONTINUUM MECHANICS. 3 Hours.**

Study of the underlying physical and mathematical principles relating to the behavior of continuous media; interrelationships between fluid and solid mechanics. Offered as AE 5312 and ME 5312. Credit will be granted only once.

**AE 5313. FLUID DYNAMICS. 3 Hours.**

Basic conservation laws, flow kinematics, special forms of the governing equations, two-dimensional potential flows, surface waves and some exact solutions of viscous incompressible flows. Offered as AE 5313 and ME 5313. Credit will be granted only once.

**AE 5315. FUNDAMENTALS OF COMPOSITES. 3 Hours.**

This fundamental course will introduce students to mechanics of composites at various scales, including analysis, characterization, and manufacturing methods. Emphasis is on constitutive relations; mechanical and hygrothermal behavior; stress analysis; and simple applications. Offered as AE 5315 and ME 5315. Credit will be granted only once.

**AE 5320. DESIGN OPTIMIZATION. 3 Hours.**

The purpose of this course is to present modern concepts of optimal design of structures. Basic ideas from optimization theory are developed with simple design examples. Analytical and numerical methods are developed and their applications discussed. Use of numerical simulation methods in the design process is described. Concepts of structural design sensitivity analysis and approximation methods will be discussed. The emphasis is made on the application of modern optimization techniques linked to the numerical methods of structural analysis, particularly, the finite element method.

Prerequisite: AE 5310 or ME 5310.

**AE 5322. AEROELASTICITY. 3 Hours.**

A fundamental course addressing phenomena related to the time-independent interactions between structural flexibility and aerodynamic loads as relevant to flying vehicles. Emphasis is placed upon the development and use of simple analytical and/or interactive computational models that capture the essential aspects of the static aeroelastic phenomena investigated and provide insight into the response, including i) aeroelastic divergence; ii) aeroelastic change in control effectiveness; iii) aeroelastic distribution of lift; and iv) aeroelastic change in longitudinal static stability.

**AE 5323. ENGINEERING RESEARCH METHODS. 3 Hours.**

This hands-on course will teach the tools that are essential for conducting graduate research, with an aim to prepare the students for project-based graduate research. The course will be focused on the integration of engineering concepts to complete course projects that imitate mini research projects. Prerequisite: Undergraduate education in engineering or science.

**AE 5325. COMBUSTION. 3 Hours.**

Fundamental treatment of problems involving simultaneous occurrence of chemical reaction and transfer of heat, mass and momentum. Topics include kinetically controlled combustion phenomena; diffusion flames in liquid fuel combustion; combustion of solids; combustion of gaseous fuel jets; flames in premixed gasses. Offered as AE 5325 and ME 5325. Credit will be granted only once.

**AE 5326. AIR-BREATHING PROPULSION. 3 Hours.**

Development of thrust and efficiency equations, thermodynamic cycle analysis, cycle design methods of aerospace propulsion systems, component performance analysis methods, component matching and dynamic interactions, and vehicle/propulsion-system integration.

**AE 5327. COMPUTATIONAL AERODYNAMICS I. 3 Hours.**

Solution of engineering problems by finite-difference methods, emphasis on aerodynamic problems characterized by single linear and non-linear equations, introduction to and application of major algorithms used in solving aerodynamics problems by computational methods.

**AE 5328. COMPUTATIONAL AERODYNAMICS II. 3 Hours.**

Review of the fundamental equations of aerodynamics, development of methods for solving Euler, boundary-layer, Navier-Stokes, and parabolized Navier-Stokes equations, application to practical aerodynamic analysis and design problems.

**AE 5329. ADDITIVE MANUFACTURING. 3 Hours.**

The range of technologies and processes, both physical and digital, used to translate virtual solid model data into physical models using additive layering methods. Emphasis is given to application of these technologies to manufacture end use components and assemblies but rapid prototyping is also discussed. Metal, polymer, ceramic, and composite material applications of additive manufacturing are included. Discussion includes advantages and limitations of additive methods with respect to subtractive methods and to each other. Principles of design for additive manufacturing are covered along with discussion of applications. Students complete a project to design and build an engineering component or assembly for additive manufacturing. Offered as AE 5329 and ME 5329. Credit will be granted only once. Prerequisite: Graduate standing.

**AE 5331. ANALYTIC METHODS IN ENGINEERING. 3 Hours.**

Introduction to advanced analytic methods in engineering. Methods include multivariable calculus and field theory, Fourier series, Fourier and Laplace Transforms. Offered as AE 5331 and ME 5331. Credit will be granted only once. Prerequisite: Undergraduate degree in engineering, physics, or mathematics.

**AE 5332. ENGINEERING ANALYSIS. 3 Hours.**

Introduction to partial differential equations and complex variable theory with application to modeling of physical systems. Offered as AE 5332 and ME 5332. Credit will be granted only once.

**AE 5333. THERMAL PHENOMENA IN MICROSYSTEMS. 3 Hours.**

Introduction to experimental methods for microscale thermal transport, including experimental measurement techniques, design of experiments, data acquisition and analysis tools. Significant emphasis on carrying out mini-projects on related topics. Course learning outcomes are directly relevant for engineering jobs in semiconductors, energy conversion and other related industries. Offered as AE 5333 and ME 5333. Credit will be granted only once.

**AE 5335. OPTIMAL CONTROL OF DYNAMIC SYS. 3 Hours.**

Linear and nonlinear optimization methods; optimal control; continuous time Ricatti equation; bang-bang control; singular arcs; differential inclusions; collocation techniques; design of optimal dynamic system trajectories. Offered as AE 5335 and ME 5335. Credit will be granted only once.

**AE 5336. OPTIMAL ESTIMATION OF DYNAMIC SYSTEMS. 3 Hours.**

Kalman filter design and implementation. Optimal filtering for discrete-time and continuous-time dynamical systems with noise. Wiener filtering. State-space determination. Offered as EE 6327, AE 5336 and ME 5336. Credit will be granted only once. Prerequisite: Prior introductory systems or identification course is desirable.

**AE 5337. INTRODUCTION TO ROBOTICS. 3 Hours.**

An overview of industrial robots and their application to traditional and emerging applications. Coordinate systems and homogeneous transformations, kinematics of manipulators; motion characteristics and trajectories; dynamics and control of manipulators; actuation and design issues. Programming of industrial robotic manipulators in the laboratory. Offered as AE 5337 and ME 5337. Credit will be granted only once.

**AE 5338. ANALYTICAL & COMPUTATIONAL DYNAMICS. 3 Hours.**

The course focuses on developing the equations of motion for dynamic systems composed of multiple, connected and unconnected, rigid bodies using Kane's method and the Lagrangian approach. The resulting model is used to simulate and visualize the predicted motion. Topics include kinematics, Euler parameters, kinematic constraints, virtual work, the calculus of variations, energy, momentum, contact, impact, and checking functions. Offered as AE 5338 and ME 5338. Credit will be granted only once.

**AE 5339. INTERMEDIATE MECHANICS OF MATERIALS. 3 Hours.**

This fundamental mechanics course covers the concepts of deriving stress formulas from deformation and the stress-strain relationship, stress and failure analysis, 2D elasticity, energy methods, and elastic stability. Offered as AE 5339 and ME 5339. Credit will be granted only once.

**AE 5341. CONTROL SYSTEM COMPONENTS. 3 Hours.**

The components and hardware used in electronic, hydraulic, and pneumatic control systems; techniques of amplification, computation, compensation, actuation, and sensing; modeling of multiport systems as well as servo systems analysis. Pulse modulated systems. Offered as AE 5341 and ME 5341. Credit will be granted only once. Prerequisite: Undergraduate introductory control course in Mechanical Engineering or equivalent or ME 5303 or equivalent.

**AE 5342. GAS DYNAMICS. 3 Hours.**

Review of fundamental compressible flow theory, method of characteristics for perfect gases, the Rankine-Hugoniot conditions, linearized flow theory. Offered as AE 5342 and ME 5342. Credit will be granted only once. Prerequisite: MAE 3303 or equivalent.

**AE 5345. NUMERICAL HEAT TRANSFER AND FLUID FLOW. 3 Hours.**

Introduction to numerical solutions for problems in heat transfer and fluid flow by the finite-volume method. The focus will be on numerical aspects pertaining to incompressible fluids. It provides the background training towards the use of commercial software. Offered as AE 5345 and ME 5345. Credit will be granted only once.

**AE 5347. ROCKET PROPULSION. 3 Hours.**

Thrust and efficiency relations, trajectory analysis, introduction to design and performance analysis of chemical (liquid and solid), electrical and nuclear rocket systems, combined cycle propulsion systems, and pulse detonation rockets.

**AE 5348. HYPERSONIC PROPULSION. 3 Hours.**

Design and performance analysis of propulsion systems for sustained flight at hypersonic speeds, airframe/propulsion system integration, supersonic combustion, finite-rate chemistry effects, radiative cooling.

**AE 5349. POLYMER SCIENCE AND ENGINEERING. 3 Hours.**

This course provides a broad introduction to polymer science, technology, and use in engineering design. Topics covered are: polymer chemistry (major synthetic polymerization routes); Polymer physics (solution and melt behavior, solid-state morphology and properties); polymer engineering (melt processing, recycling methods); and polymer applications (automotive, aerospace, composites, 3D printing). Offered as AE 5349 and ME 5349. Credit will be granted only once.

**AE 5350. CLASSICAL AERODYNAMICS. 3 Hours.**

To present a classical treatment of incompressible and compressible aerodynamics. Kinematics of fluid flow. Potential flow theory applied to non-lifting and lifting wings and bodies. Subsonic and supersonic wings and bodies. Familiarity with advanced engineering mathematics is recommended.

**AE 5362. GUIDANCE, NAVIGATION, AND CONTROL OF AEROSPACE VEHICLES. 3 Hours.**

Basics of flight dynamics and control. Autopilot structures for aerospace vehicles (aircraft, missiles, launch vehicles). Equilibrium glide trajectories for atmospheric flight. Discussion of the various guidance algorithms used in aircraft/missiles/launch vehicles. Basics of Kalman filtering, sensor and data fusion. Selection and trade-off between various navigation components such as the IMU, GPS and other navigation components. Integration of the guidance, navigation and control components in aerospace vehicles.



**AE 5363. INTRODUCTION TO ROTORCRAFT ANALYSIS. 3 Hours.**

History of rotorcraft. Behavior of the rotor blade in hover and forward flight. Rotor configurations, dynamic coupling with the fuselage, elastic and aeroelastic effects. Offered as AE 5363 and ME 5363. Credit will be granted only once.

**AE 5364. INTRODUCTION TO AERODYNAMICS OF ROTORCRAFT. 3 Hours.**

Practical aerodynamics of rotors and other components of rotorcraft. Introduction to performance, handling qualities, and general flight mechanics related to rotorcraft design, test, and certification requirements. Emphasis is on real rotorcraft mission capabilities as defined by the customer. Offered as AE 5364 and ME 5364. Credit will be granted only once.

**AE 5365. INTRODUCTION TO HELICOPTER AND TILTROTOR SIMULATION. 3 Hours.**

Dynamic and aerodynamic modeling of rotorcraft elements using vector mechanics, linear algebra, calculus and numerical methods. Special emphasis on rotors, aerodynamic interference, proper axis system representation, model assembly methods and trimming. Offered as AE 5365 and ME 5365. Credit will be granted only once.

**AE 5367. HIGH-SPEED AIRCRAFT AND SPACE ACCESS VEHICLE DESIGN. 3 Hours.**

An introductory course on high-speed aircraft and space access vehicle design. The course concentrates on reusable flight vehicles. Topics covered are historical case studies, design disciplines, design space visualization and proof of design convergence. Prerequisite: consent of the instructor.

**AE 5368. FLIGHT VEHICLE SYNTHESIS AND SYSTEMS ENGINEERING. 3 Hours.**

An introductory course on multi-disciplinary design decision-making applied to flight vehicle design. The course introduces decision-making techniques leading to efficient aerospace product design. The following main topics are covered: a) management domain, b) operational domain, c) engineering domain.

**AE 5372. PARAMETRIC SIZING OF HIGH-SPEED AIRCRAFT. 3 Hours.**

An introductory course on high-speed aircraft design. Aimed to develop insight into basic concepts underlining the analysis and design of supersonic and hypersonic aircraft. Topics covered are historical case studies, design disciplines, and design methodologies. Prerequisite: MAE 4350, MAE 4351 or equivalent.

**AE 5374. NONLINEAR SYSTEMS ANALYSIS AND CONTROLS. 3 Hours.**

Nonlinear systems; phase plane analysis; Poincare-Bendixon theorems; nonlinear system stability; limit cycles and oscillations; center manifold theorem, Lyapunov methods in control; variable structure control; feedback linearization; backstepping techniques. Offered as AE 5374 and ME 5374. Credit will be granted only once.

**AE 5378. INTRODUCTION TO UNMANNED VEHICLE SYSTEMS. 3 Hours.**

Introduction to UVS (Unmanned Vehicle Systems) such as UAS (Unmanned Aircraft Systems), UGS (Unmanned Ground System) and UMS (Unmanned Maritime System), their history, missions, capabilities, types, configurations, subsystems, and the disciplines needed for UVS development and operation. UVS missions could include student competitions sponsored by various technical organizations. This course is team-taught by engineering faculty. Offered as AE 5378 and ME 5378. Credit will be granted only once.

**AE 5379. UNMANNED VEHICLE SYSTEM DEVELOPMENT. 3 Hours.**

Introduction to the technologies needed to create an UVS (Unmanned Vehicle System). Integration of these technologies (embodied as a set of sensors, actuators, computing and mobility platform sub-systems) into a functioning UVS through team work. UVS could be designed to compete in a student competition sponsored by various technical organizations or to support a specific mission or function defined by the instructors. This course is team-taught by engineering faculty. Offered as AE 5379 and ME 5379. Credit will be granted only once. Prerequisite: B or better in MAE 4378 or AE 5378 or ME 5378 and admission to the UVS certificate program.

**AE 5380. DESIGN OF DIGITAL CONTROL SYSTEMS. 3 Hours.**

Difference equations, Z- and w-transforms, discrete TF (Transfer Function). Discrete equivalence (DE) to continuous TF. Aliasing & Nyquist sampling theorem. Design by DE, root locus in z-plane & Youla parameterization. Discrete state-space model, minimality after sampling, pole placement, Moore-Kimura method, linear quadratic regulator, asymptotic observer. Computer simulation and/or lab implementation. Offered as EE 5324, AE 5380 and ME 5380. Credit will be granted only once. Prerequisite: MAE 4310 or equivalent.

**AE 5381. BOUNDARY LAYERS. 3 Hours.**

An introductory course on boundary layers. The coverage emphasizes the physical understanding and the mathematical foundations of boundary layers, including applications. Topics covered include laminar and turbulent incompressible and compressible layers, and an introduction to boundary layer transition. Offered as AE 5381 and ME 5381. Credit will be granted only once.

**AE 5382. ADVANCED ASTRONAUTICS. 3 Hours.**

Topics include orbital mechanics, orbital maneuvering, relative motion, orbit determination and estimation, three body problem, perturbations and numerical techniques.

**AE 5383. HYPERSONIC FLOW. 3 Hours.**

A study of the basic principles of hypersonic flows. Inviscid and viscous hypersonic flows. The course focuses on the effects of high temperature on the gas properties and associated effects on canonical gas dynamics processes. Applications in aerodynamic heating and atmospheric entry. Application of numerical methods.

**AE 5385. HIGH TEMPERATURE GASDYNAMICS. 3 Hours.**

Surveys kinetic theory, statistical mechanics, and chemical reaction rate theory. Application to the prediction of thermodynamic properties of gasses and the analysis of problems in high-temperature gasdynamics.

**AE 5386. WIND & OCEAN CURRENT ENERGY HARVESTING FUNDAMENTALS. 3 Hours.**

A broad senior/graduate first course in wind/wave/ocean current energy harvesting systems, focused on fundamentals, and serving as the basis for subsequent MAE specialized follow-on graduate course offerings focused on structures (conventional and composite), aero/hydro-mechanical response and control, and tailoring and smart material actuation, respectively, as well as for non-MAE, specialized graduate courses.

**AE 5391. ADVANCED STUDIES IN AEROSPACE ENGINEERING. 3 Hours.**

Individual research or design project performed for fulfilling the requirements of the Master of Engineering degree option. Prior approval of the AE Graduate Advisor is required for enrollment. A written and/or oral report is required.

**AE 5397. RESEARCH IN AEROSPACE ENGINEERING. 3 Hours.**

Research in masters programs.

**AE 5398. THESIS. 3 Hours.**

Thesis.

**AE 5400. PREPARATORY COURSE FOR AEROSPACE ENGINEERING. 4 Hours.**

The course may be offered with multiple sections, wherein each section is paired with a corresponding UG course being offered that semester. The purpose of this course is to strengthen academic preparation of students who were found inadequately prepared for a graduate degree in Aerospace Engineering. Students can concurrently enroll in multiple sections and may need to enroll in this course multiple times until their academic preparation is deemed complete. In order to pass this class, the students has to earn at least a B grade in aggregate based all the assignments and exams. The student will earn an R grade if the class aggregate is a C/D and will need to repeat the course until the student passes the class. The student will Fail the class if the aggregate is an F. The course may be repeated as often as required.

**AE 5698. THESIS. 6 Hours.**

Thesis.

**AE 6196. AEROSPACE ENGINEERING INTERNSHIP. 1 Hour.**

For students participating in internship programs. Requires prior approval of Graduate Advisor.

**AE 6197. RESEARCH IN AEROSPACE ENGINEERING. 1 Hour.**

Research in doctoral programs.

**AE 6297. RESEARCH IN AEROSPACE ENGINEERING. 2 Hours.**

Research in doctoral programs.

**AE 6299. DISSERTATION. 2 Hours.**

Dissertation Prerequisite: Admission to candidacy for the Doctoral of Philosophy degree.

**AE 6304. ADVANCED MECHANICS OF MATERIALS. 3 Hours.**

This graduate level course will cover the calculation of stresses and strains in a body that experiences hyperelastic, viscoelastic and plastic deformation. Offered as AE 6304 and ME 6304. Credit will be granted only once. Prerequisite: AE 5339, ME 5339, or instructor consent.

**AE 6310. ADVANCED FINITE ELEMENT METHODS. 3 Hours.**

Modeling of large systems, composite and incompressible materials, substructuring, mesh generation, solids applications, nonlinear problems. Offered as AE 6310 and ME 6310. Credit will be granted only once. Prerequisite: AE 5310, ME 5310, or instructor consent.

**AE 6311. ADVANCED STRUCTURAL DYNAMICS. 3 Hours.**

Normal mode method for undamped and proportionally damped systems, component mode synthesis, generally damped systems, complex modes, effect of design modification on system response. Offered as AE 6311 and ME 6311. Credit will be granted only once. Prerequisite: AE 5311, ME 5311, or instructor consent.

**AE 6314. FRACTURE MECHANICS. 3 Hours.**

Linear elastic fracture mechanics, energy of fracture, mixed mode crack propagation, fatigue crack growth, numerical methods for stress intensity factor determination, damage tolerance and durability design. Offered as AE 6314 and ME 6314. Credit will be granted only once. Prerequisite: AE 5339, ME 5339, or instructor consent.

**AE 6315. ADVANCED COMPOSITES. 3 Hours.**

This course introduces students to advanced mechanics of composites at various scales, including analysis and characterization methods. Emphasis is on advanced methods for material characterization; nonlinear constitutive relations; structural and microstructural analysis; and advanced materials and structures applications. Offered as AE 6315 and ME 6315. Credit will be granted only once. Prerequisite: AE 5315, ME 5315, or instructor consent.

**AE 6337. ADVANCED ROBOTICS. 3 Hours.**

Advanced robotic design concepts considering structural statics, dynamics and control strategies for both rigid and flexible manipulators will be studied using optimization techniques and analytical approaches and introduction to micro- and mobile robotic devices. Study of emerging applications of robotics will be explored. Digital simulation of robotic devices and programming and demonstration of robotic devices in the laboratory. Prerequisites: AE 5337 or ME 5337 or equivalent.

**AE 6397. RESEARCH IN AEROSPACE ENGINEERING. 3 Hours.**

Research in doctoral programs.

**AE 6399. DISSERTATION. 3 Hours.**

Dissertation Prerequisite: admission to candidacy for the Doctor of Philosophy degree.

**AE 6697. RESEARCH IN AEROSPACE ENGINEERING. 6 Hours.**

Research in doctoral programs.

**AE 6699. DISSERTATION. 6 Hours.**

Dissertation. Prerequisite: Admission to candidacy for the Doctor of Philosophy degree.

**AE 6999. DISSERTATION. 9 Hours.**

Dissertation. Prerequisite: Admission to candidacy for the Doctor of Philosophy degree.

**AE 7399. DOCTORAL DEGREE COMPLETION. 3 Hours.**

This course may be taken during the semester in which a student expects to complete all requirements for the doctoral degree and graduate. Enrolling in this course meets minimum enrollment requirements for graduation, for holding fellowships awarded by The Office of Graduate Studies and for full-time GTA or GRA positions. Students should verify that enrollment in this course meets other applicable enrollment requirements. To remain eligible in their final semester of study for grants, loans or other forms of financial aid administered by the Financial Aid Office must enroll in a minimum of 5 hours as required by the Office of Financial Aid. Other funding sources may also require more than 3-hours of enrollment. Additional hours may also be required to meet requirements set by immigration law or by the policies of the student's degree program. Students should contact the Financial Aid Office, other sources of funding, Office of International Education and/or their graduate advisor to verify enrollment requirements before registering for this course. This course may only be taken twice. Students who do not complete all graduation requirements while enrolled in this course must enroll in a minimum of 6 dissertation hours (6699 or 6999) in their graduation term. Graded P/F/R.

## COURSES

**ANTH 1200. PERSONAL AND PROFESSIONAL SUCCESS IN THE SOCIAL SCIENCES. 2 Hours.**

A first year experience course for new students and new transfer students interested in a career in the social sciences. Provides the necessary foundation for success in a college environment while balancing personal and/or work obligations. Orients students to life on campus, demonstrates how to leverage campus resources to achieve career and academic goals, and emphasizes engagement outside the classroom through collaborative and co-curricular opportunities. Fulfills the University requirement for either UNIV 1101 or UNIV 1131. Offered as SOCI 1200 and ANTH 1200; credit will be granted only once.

**ANTH 1306. INTRODUCTION TO ANTHROPOLOGY. 3 Hours. (TCCN = ANTH 2346)**

This course, primarily intended for non-majors and as a first course for students considering majoring in anthropology, provides an overview of the subdisciplines of anthropology: ethnology (cultural anthropology), archaeology, physical (biological) anthropology, and linguistic anthropology.

**ANTH 1310. GREAT DISCOVERIES IN ARCHAEOLOGY. 3 Hours.**

A survey of some of the most spectacular and otherwise significant archaeological discoveries worldwide over the past three centuries. Consideration of particular archaeological sites as case studies to illustrate cultural development from the Stone Age to Medieval times.

**ANTH 2307. BIOLOGICAL ANTHROPOLOGY. 3 Hours. (TCCN = ANTH 2301)**

Human variation and human evolution. Genetics, living and fossil nonhuman primates, the human skeleton, the fossil record of human evolution, modern human variation and biological adaptation.

**ANTH 2322. GLOBAL CULTURES. 3 Hours. (TCCN = ANTH 2351)**

Methods and theories of sociocultural anthropology. Examines systems of social organization and cultural meaning in contemporary human societies. Topics include fieldwork, cross-cultural analysis, applied anthropology, and global perspectives on political, economic, and social institutions.

**ANTH 2339. INTRODUCTION TO ARCHAEOLOGY. 3 Hours. (TCCN = ANTH 2302)**

Archaeology is the study of the human past through physical evidence and material remains. This evidence ranges from entire landscapes to small objects. Students learn how archaeological sites are discovered, investigated, and interpreted, and how this knowledge contributes to our understanding of human society.

**ANTH 2349. HONORS PRINCIPLES OF ARCHAEOLOGY. 3 Hours.**

Methods and theories of prehistoric archaeology. Techniques and approaches employed in recovering, dating and interpreting prehistoric cultural materials. Writing-intensive course including group and individual projects and oral presentations. Prerequisite: Membership in the Honors College or permission of instructor.

**ANTH 2357. ANTHROPOLOGY IN ACTION. 3 Hours.**

Anthropological examination of a particular culture, region or cultural industry. Topics include identity, heritage, commoditization, historical and cultural representation, and authenticity. May be offered on campus or as a field course or study abroad course.

**ANTH 2358. ARCHAEOLOGICAL CULTURES. 3 Hours.**

Survey of a particular archaeological culture, region, or period. Can be offered on campus or as a field course or study abroad course.

**ANTH 2359. MYTHS AND MYSTERIES IN ARCHAEOLOGY. 3 Hours.**

This course will critically examine pseudoscience, cult archaeology and creationism from a scientific perspective. Through the close examination of case studies we will dispel archaeological myths and mysteries which are often depicted as fantastic or cult archaeology. This course will demonstrate that a strong adherence to scientific investigation can uncover facts about prehistory that are as interesting as the myths.

**ANTH 2370. ASIAN AMERICAN EXPERIENCE. 3 Hours.**

Examines the lived experiences and diverse histories of Asian Americans. Various aspects of the Asian American experience are addressed, including, but not limited to, immigration; citizenship; civic engagement, including alliances with Mexican American and African American social movements; health; and creative expressions in art, film, literature, and music. Themes related to the Asian American diaspora such as imagination, authenticity, identity, representation, stereotypes, consumption, ritual, and borders will also be discussed.

**ANTH 3300. DEBATES IN CULTURAL ANTHROPOLOGY. 3 Hours.**

Explores core concepts, critiques of past applications, and current challenges of theory and practice in cultural anthropology.

**ANTH 3301. ARCHAEOLOGICAL METHOD AND THEORY. 3 Hours.**

Explores core concepts, critiques of past applications, and current challenges of theory and practice in archaeology. Topics include history of archaeological thought, processual and actualistic approaches, ethnoarchaeology, evolutionary archaeology, stewardship of the archaeological past, and post-processual critiques. Prerequisite: ANTH 2339 or permission of instructor.

**ANTH 3307. EVOLUTIONARY MEDICINE. 3 Hours.**

The application of evolutionary theory to the practice of medicine from an anthropological perspective. Topics include diet/paleodiets, sleep habits, infectious diseases, the developmental origins of health and disease, mental health, women's health and reproduction, and aging/senescence, among others. Offered as BIOL 3307 and ANTH 3307; credit will only be granted in one department.

**ANTH 3308. FORENSIC ANTHROPOLOGY. 3 Hours.**

Explores the role of skeletal biology and physical anthropology in criminal investigation. Topics include determination of victim identity and context of death. Case studies will be used to demonstrate application of the methods studied.

**ANTH 3310. LATINOS IN THE U.S.. 3 Hours.**

Examines the Latino experience in the U.S. from an interdisciplinary perspective. Discusses the commonalities and cultural differences among various Latino groups, and focuses on important contemporary Latino issues such as education, employment, family and gender, identity, immigration, and politics. May receive credit for either MAS 3310 or ANTH 3310.

**ANTH 3311. HUMAN ADAPTATION AND THE CONCEPT OF RACE. 3 Hours.**

The study of modern human biological variation in the context of the history of the concept of race. Detailed historical review explores changing perspectives on variation within our species. Course examines physiological adaptations to environmental stress among a variety of human populations and implications of recent genetic research. Offered as BIOL 3313 and ANTH 3311; credit will only be granted in one department.

**ANTH 3313. PRIMATE EVOLUTION AND BEHAVIOR. 3 Hours.**

An overview of the Primate Order covering primate origins, evolution, ecology, adaptation, and behavior. Examination of the environmental context within which primates live, how the form of their bodies reflects their activities, and how they relate behaviorally to their environments and to one another. Offered as BIOL 3314 and ANTH 3313; credit will only be granted in one department.

**ANTH 3316. LATINO HEALTH ISSUES. 3 Hours.**

A cross-cultural examination of issues in Latino health and relevant health practices in the United States through the lenses of social sciences. Themes include the Latino Threat Narrative, acculturation histories and health care status of major Latino ethnic enclaves in the U.S. Listed as SOCI 3316, MAS 3316 and ANTH 3316; may receive credit for either SOCI 3316, MAS 3316, or ANTH 3316.

**ANTH 3318. BORDERS, CULTURES, AND CARTELS. 3 Hours.**

Critically examines life on the Mexico-U.S. border through ethnography, taking into account the impact of the U.S. war on drugs and the influence of cartels on the lives of those living in the southern border region. Topics may include impacts and influences of drugs and narco life on religion, crime, music, and daily life at the nexus of US-Mexico relations. Listed as ANTH 3318 and MAS 3318; may receive credit for either ANTH 3318 or MAS 3318.

**ANTH 3325. ETHNOGRAPHY OF SOUTH AMERICA. 3 Hours.**

The indigenous groups of South America, with emphasis on the Aymara and Quechua of the Andes. Topics include culture change, environmental destruction, and preservation of cultural heritage.

**ANTH 3328. CIVILIZATIONS OF SOUTH AMERICA. 3 Hours.**

Complex agrarian civilizations in South America, concentrating on political, social, and cultural developments of the Chavin, Nazca, Moche, Tiahuanaco, Wari-Tiahuanaco, Inca, and Conquest periods. Formerly listed as ANTH 4328. Credit cannot be given for both ANTH 3328 and ANTH 4328.

**ANTH 3329. CONTEMPORARY AFRICAN CULTURES. 3 Hours.**

A comparative study of African communities with an emphasis on sub-Saharan Africa. Covers regional cultural geography and history as well as ethnography of specific communities. Explores both the challenges facing contemporary African nations as well as emerging solutions. Includes exposure to African art, literature, music, cinema, and food. Offered as AAST 3329 and ANTH 3329; credit will be granted in only one department.

**ANTH 3330. CULTURAL DIVERSITY AND IDENTITY. 3 Hours.**

The ways identity is constructed in contemporary societies in an increasingly complex and multicultural world. Ethnic, racial, gender, and class identities. How and when identity is asserted and assigned, and how it can both draw boundaries and forge ties between peoples. Formerly listed as ANTH 2350. Credit cannot be given for both ANTH 2350 and ANTH 3330. Also listed as MAS 3330; credit cannot be granted for both ANTH 3330 and MAS 3330. Offered as AAST 3330 and ANTH 3330; credit will be granted in only one department.

**ANTH 3331. CULTURE AND PERSONALITY. 3 Hours.**

The interplay of culture and personality in various Western and non-Western societies. The relationship of specific practices to the development of personality and the psychological effects of colonization, modernization, and economic development of traditional societies.

**ANTH 3332. FOOD AND CULTURE. 3 Hours.**

Considers food systems from biological, ecological, and political-economic perspectives. May include food history, cuisines, food preferences, and other areas of anthropological scholarship on food and culture. May cover food and economic development, hunger and overnutrition, food and religion, and the globalization of foods and food systems.

**ANTH 3333. NORTH AMERICAN INDIANS. 3 Hours.**

North American Indian cultures and their development both before and after European contact.

**ANTH 3334. ANTHROPOLOGY OF SOUTH ASIA. 3 Hours.**

With a focus on the Indian subcontinent, this course introduces students to the culture, history and politics of South Asia. Drawing upon anthropological studies and a range of materials, including Bollywood films, music, tourist brochures, advertisements, Gandhi's writings, and South Asian literature, students will gain an increased understanding of the region's past and present.

**ANTH 3335. GLOBAL ICONS: GANDHI, KING, MANDELA & OTHERS IN POPULAR CULTURE. 3 Hours.**

Addresses the life and times of Mahatma Gandhi, Martin Luther King, Jr., Nelson Mandela, and other global icons in order to explore cultural politics, social movements, and globalization processes. Students gain an understanding of the enduring significance of these figures in popular culture.

**ANTH 3336. ANTHROPOLOGY OF RELIGION. 3 Hours.**

A crosscultural study of magic and religion. Theories of the origin and function of magic and religion in pre-industrial societies.

**ANTH 3338. COMPARATIVE KINSHIP AND FAMILY SYSTEMS. 3 Hours.**

Variation in kinship and family systems from crosscultural and evolutionary perspectives. Structure, function, and dynamics of kinship and family systems as adaptations to diverse ecological, social, and historical circumstances. Implications of this approach for understanding kinship and family in American society also addressed. Formerly listed as ANTH 4338. Credit cannot be given for both ANTH 3338 and ANTH 4338. Also offered as GWSS 3338; credit will be granted only once. Offered as AAST 3332 and ANTH 3338; credit will be granted in only one department.

**ANTH 3339. URBAN ANTHROPOLOGY. 3 Hours.**

Examines main issues, theoretical approaches and ethnographic methods used by anthropologists working in cities. Also discusses relevant contemporary topics such as growth of global cities, gentrification, poverty and inequality, and the economic, social and cultural integration of international immigrants in U.S. cities.

**ANTH 3341. RESEARCH METHODS IN CULTURAL ANTHROPOLOGY. 3 Hours.**

Observational techniques, participant-observation, hypothesis testing, research design, use of the computer in research, analysis, and report writing, and oral presentations of research reports. Satisfies oral communication and computer use competence requirements. Prerequisite: ANTH 1306 or ANTH 2322 or permission of instructor.

**ANTH 3343. APPLIED ANTHROPOLOGY. 3 Hours.**

Explores the use of anthropological knowledge and skills to address practical problems in today's global society, and examines how these are used in government, non-profit, and private sector industries. Addresses issues of health, education, environment, human rights, economic development, and others.

**ANTH 3345. VISUALIZING CULTURE: MEDIA, IDENTITY AND POLITICS IN THE GLOBAL WORLD. 3 Hours.**

Introduces students to key concepts in Visual Anthropology. This course highlights the contribution of anthropological methods in theorizing the visual in everyday life for the construction of nationalist, gender, ethnic, and class identities. Readings are drawn from diverse geographical regions. Visual material discussed in class may include ethnographic films, art, graphic novels, comics, illustrated magazines, virtual exhibitions and soap operas. Assignments include a writing and research component, and team-based exercises. Offered as ANTH 3345 and COMM 3345; credit will be granted only in one department.

**ANTH 3346. GLOBAL IMPACTS OF TOURISM. 3 Hours.**

Examines the cultural practices of travel and the impact of tourism on both host and guest communities. Various forms of tourism are addressed including, but not limited to, ethnic, historical, regional, health and medical, and ecotourism. Themes of the "tourist gaze" authenticity, identity, consumption, ritual, borders, and pilgrimage will be explored.

**ANTH 3348. CULTURAL ENCOUNTERS: MIGRATION AND IDENTITIES. 3 Hours.**

This course focuses on the expanding field of migration studies in social and cultural anthropology. It traces the history of migration studies in anthropology, discusses the major theoretical contributions of anthropologists to the interdisciplinary field of migration, and addresses key contemporary topics in migration studies including globalization, transnational communities, gender, identity, and citizenship. The course heavily relies on ethnographic case studies of different immigrant populations in the U.S. written by anthropologists in the recent past.

**ANTH 3349. ANTHROPOLOGY OF GLOBALIZATION. 3 Hours.**

The forces of economic globalization now reach every corner of the world to the point that few societies have been untouched by their impact. This course examines the forces that drive globalization and their repercussions upon local communities around the world. It examines how economic globalization affects the lives of real people in developing and industrialized countries as well as in small-scale societies traditionally studied by anthropologists.

**ANTH 3350. NORTH AMERICAN ARCHAEOLOGY. 3 Hours.**

Prehistoric cultural adaptations in North America from human arrival to European contact. Topics treated include the question of when and where the first Native Americans arrived; the beginnings of village and farming life; and the development of Puebloan and "Mound-building" cultures.



**ANTH 3351. ARCHAEOLOGY OF THE AMERICAN SOUTHWEST. 3 Hours.**

This course investigates the peoples and places of the prehistoric North American Southwest. The focus is on the period of increasing settlement, diversity, movement, and change from 500 to 1500 C.E. Focuses on the archaeological record, ethnographies and comparative research to understand the past and present peoples of the Southwest.

**ANTH 3352. ARCHAEOLOGY OF AFRICA. 3 Hours.**

Course follows the African archaeological record from earliest evidence for human behavior through beginnings of state society. Topics may include stone tool technologies, forager strategies, agricultural systems, early iron technology, and trade and social networks. This is a lecture course, with an emphasis on student research. No prerequisites required, but ANTH 2339 is recommended preparation.

**ANTH 3353. STONE AGE HUNTERS AND FARMERS. 3 Hours.**

Human adaptations and cultural evolution in the Old World from the earliest African sites over two million years ago to the domestication of plants and animals about ten thousand years ago. Formerly ANTH 2353; credit cannot be granted for both ANTH 2353 and ANTH 3353.

**ANTH 3354. ANTHROPOLOGY OF HUNTING. 3 Hours.**

Covers a broad range of topics exploring hunting through time, from the prehistoric to the present. Topics include cross-cultural issues of meat and diet, hunter-gatherer subsistence behavior, overkill and animal extinction, and sport hunting. Course is relevant to environmental studies and sustainability studies.

**ANTH 3355. THE RISE OF CIVILIZATION. 3 Hours.**

The development of complex cultures from village farming societies in various regions of the Old and New Worlds. The civilizations of Mesopotamia, Egypt, and Mesoamerica, among others, will be treated, along with general questions concerning the rise, development, and collapse of early civilizations. Formerly ANTH 2355; credit will not be granted for both ANTH 2355 and ANTH 3355.

**ANTH 3356. MESOAMERICAN ARCHAEOLOGY. 3 Hours.**

Covers cultural developments in Mesoamerica through the rise of complex societies and the Spanish conquest. Topics include the emergence of Olmecs, Zapotecs, Maya, Toltecs, and the Aztecs, and explore the factors that contributed to their appearance and decline. New discoveries within the field of Mesoamerican archaeology will be examined.

**ANTH 3357. COLLAPSE AND SUSTAINABILITY OF SOCIETIES. 3 Hours.**

This course investigates the collapse of past societies. Understanding why and how archaeologically-known societies collapsed may provide insights to help us understand contemporary social and environmental sustainability problems.

**ANTH 3358. UNDERWATER ARCHAEOLOGY. 3 Hours.**

Explores the field of underwater archaeology and research methods. Topics include shipwrecks, submerged terrestrial sites, the use of scuba diving, robots, and sonar in excavation and survey, and the history and development of the discipline.

**ANTH 3359. STONE TOOLS. 3 Hours.**

Covers the evolution of stone tools from the first modified stone objects to the use of stone tools in complex societies such as the ancient Maya and Egyptians. Introduces students to lithic analysis and manufacture, emphasizing hands-on learning.

**ANTH 3360. ARCHAEOLOGY IN PRACTICE. 3 Hours.**

Covers the practical aspects of archaeology with a focus on hands-on activities and experiential learning. Students learn archaeological skills and understand the life and research of archaeologists. Topics may include research design, survey, and the laws protecting archaeological sites.

**ANTH 3366. SEX, GENDER, AND CULTURE. 3 Hours.**

The ways gender and sexuality are culturally constructed. Readings include ethnographies, life histories, and fiction. Debates within anthropology and within specific cultures over maleness and femaleness. Offered as ANTH 3366 and GWSS 3366; credit will be granted only once.

**ANTH 3369. MEDICAL ANTHROPOLOGY. 3 Hours.**

Medical systems studied cross-culturally to understand how environmental, biological, social, and cultural factors affect disease and health. The cultural dynamics of traditional practitioners and rituals within the health care system. Methods of articulating modern medicine with traditional medicine are discussed.

**ANTH 3370. ARCHAEOLOGY OF THE PREHISTORIC AEGEAN. 3 Hours.**

Origin, evolution and decline of the first high civilizations in Europe, namely the Minoans on the island of Crete and the Mycenaeans in Greece. Stone Age background and Early Bronze Age seafaring in the Cycladic Islands; Late Bronze Age society, economy, and religion; art and architecture of the Minoan and Mycenaean palaces; Linear A and B tablets; Mycenaean collapse and the beginning of the Iron Age; Homer's Iliad, archaeology and the Trojan War.

**ANTH 3371. ARCHAEOLOGY OF GREECE. 3 Hours.**

Material evidence relevant to our understanding of classical Greek culture and society from the collapse of the Mycenaean Empire through the Hellenistic Period (ca. 1200-31 B.C.). Examination of the magnificent (temples, sculpture, athletic monuments, ships) and the mundane (domestic architecture, pottery, crafts, coinage, inscriptions, architecture and artifacts of civic life, burials). Archaeological evidence will be considered in light of contemporary historical sources.

**ANTH 3372. ARCHAEOLOGY OF THE ANCIENT NEAR EAST. 3 Hours.**

Survey of the cultures of Mesopotamia, Syria, Palestine, and Anatolia from the earliest agricultural settlements to the late first millennium B.C. based on the surviving archaeological remains. Among the topics covered: Nature of early urbanism; development of religious and economic hierarchies; origins and impact of writing; interrelationships among early states.

**ANTH 3373. ARCHAEOLOGY OF EGYPT. 3 Hours.**

The culture of ancient Egypt from its earliest occupation until the Arab invasion (7th century A.C.), with emphasis on the first 20 pharaonic dynasties (third and second millennia B.C.). Egyptian social, religious, economic and political development traced through the surviving material culture (architecture, art, industries, artifacts of daily life, funerary remains, etc.) supplemented by historical and literary evidence as pertinent. Egypt's relations with neighboring regions (Crete, Anatolia, Palestine, Nubia and Libya) considered. Offered as AAST 3373 and ANTH 3373; credit will be granted in only one department.

**ANTH 3374. ARCHEOLOGY OF EUROPE. 3 Hours.**

Ancient Europe is a mosaic of archaeological regionalism whose complexity is arguably unparalleled elsewhere in the world. This course surveys the material remains of several prominent ancient cultures from Iberia to the Danube, from Scandinavia to Greece, dating from stone age to medieval times. Emphasis will be on understanding the various regional traditions and their interactions, and on explicating trends in technology, economy and religion in European society during this long period. Among the topics to be examined: Paleolithic hunters and artists; agricultural origins; megalithic monuments; bronze metallurgy and its ramifications; the first high civilizations in the Mediterranean; the rise of the Celts; the coming of iron; impact of Romanization; the nature of Viking exploration and expansion.

**ANTH 3375. NEANDERTHALS AND THE ICE AGE WORLD. 3 Hours.**

Explores the archaeological record of Neanderthals, early modern humans, and their contemporaries. Topics include new genetic and isotopic analyses, ancient environments, early art and symbolism, and how the Paleolithic is imagined in modern society.

**ANTH 3390. SPECIAL TOPICS IN ANTHROPOLOGY. 3 Hours.**

Selected, specialized topics in anthropology. These may be cultural, archaeological, or biological in focus, and vary each semester. Contact the department or click on the course link to find current course title and description. May be repeated for credit with departmental permission as topics vary.

**ANTH 3409. PALEOANTHROPOLOGY. 4 Hours.**

Paleoanthropology: an exploration of fossil evidence for human origins and human evolution. Course focuses on the evolution of humans and our close relatives, from our origins as a distinct lineage to "anatomically modern" Homo sapiens, including the relationship between biological and cultural/behavioral evolution. Offered as BIOL 3409 and ANTH 3409; credit will be granted only once.

**ANTH 4191. CONFERENCE COURSE. 1 Hour.**

Topics assigned on an individual basis covering personal research or study in the designated area. Topics assigned on an individual basis covering personal research or study in the designated area. Prerequisite: permission of the instructor.

**ANTH 4291. CONFERENCE COURSE. 2 Hours.**

Topics assigned on an individual basis covering personal research or study in the designated area. Topics assigned on an individual basis covering personal research or study in the designated area. Prerequisite: permission of the instructor.

**ANTH 4315. GROWTH, DEVELOPMENT, AND EVOLUTION. 3 Hours.**

A survey of topics at the nexus of modern human biological research in growth and development and the evolutionary record of hominid subadults. Offered as BIOL 4316 and ANTH 4315; credit will be granted only in one department. Prerequisite is only required for students registering for ANTH 4315. Prerequisite: ANTH 2307 or permission of the instructor.

**ANTH 4322. PROBLEMS IN ANTHROPOLOGY. 3 Hours.**

Intensive examination of an important problem in anthropological research selected by the instructor. May be repeated for credit whenever the topic varies.

**ANTH 4342. TOPICS IN CULTURAL ANTHROPOLOGY. 3 Hours.**

Selected topics, to include anthropological theory, population and cultural ecology, semiotics, and humanistic anthropology. May be repeated for credit with departmental permission. Also offered as ANTH 4342. Credit will be granted in only one department.

**ANTH 4348. POLITICAL ANTHROPOLOGY. 3 Hours.**

Relationships among power, identity, and culture in cross-cultural perspective. Traditional political systems, political symbols and rituals, gender and power, and the relationship between domination and resistance. How culture influences the ways in which men and women get power, use power, and resist power.

**ANTH 4358. TOPICS IN ARCHAEOLOGY. 3 Hours.**

Selected topics, to include examination of specific archaeological cultures of the Old World, archaeological theory, and archaeology and pseudoscience. May be taken up to four times for a total of 12 hours credit.

**ANTH 4391. CONFERENCE COURSE. 3 Hours.**

Topics assigned on an individual basis covering personal research or study in the designated area. Topics assigned on an individual basis covering personal research or study in the designated area. Prerequisite: permission of the instructor.

**ANTH 4392. PRACTICUM IN ANTHROPOLOGY. 3 Hours.**

Supervised practicum with anthropology faculty in which students apply practical, career-oriented anthropological skills in archaeology, biological anthropology, or cultural anthropology. Prerequisite: ANTH 2307, ANTH 2322, OR ANTH 2339; permission of the instructor; and junior standing.

**ANTH 4393. INTERNSHIP IN ANTHROPOLOGY. 3 Hours.**

Supervised internship program, in which students intern at various companies, non-profit and governmental agencies, and museums in the Metroplex. Applied use of anthropology in a non-academic setting. Students will learn skills of career development in anthropology. Requirements include several short assignments and a final report to the instructor. Prerequisite: ANTH 2307, ANTH 2322, OR ANTH 2339; permission of the instructor; and junior standing.

**ANTH 4394. HONORS THESIS/SENIOR PROJECT. 3 Hours.**

Required of all students in the University Honors College. During the senior year, the student must complete a thesis or project of equivalent difficulty under the direction of a faculty member in the major department.

**ANTH 4398. SUMMER FIELD SCHOOL IN ANTHROPOLOGY. 3 Hours.**

(3 or 6 hours credit). Offered only during the summer session. Experience in methods of field research in ethnography or archaeology. May be repeated for credit if research topic changes.

**ANTH 4406. HUMAN OSTEOLOGY. 4 Hours.**

Detailed examination of human skeletal morphology. Topics include form and function of all skeletal elements in the human body, differentiation of each bone, left and right side identification, identification of fragmented remains, and muscle attachments and articulations. Content useful in forensic anthropology, archaeology, and hominid paleontology. Offered as BIOL 4406 and ANTH 4406; credit will be granted only in one department.

**ANTH 4459. BIOARCHAEOLOGY. 4 Hours.**

The study of human remains in archaeological contexts in order to reconstruct individual identity, life history, and past population characteristics. No formal prerequisites, but familiarity with the human skeleton is helpful. Lab component is required. Offered as BIOL 4459 and ANTH 4459; credit will be granted only in one department.

**ANTH 4460. ZOOARCHAEOLOGY. 4 Hours.**

The study of faunal remains from archaeological contexts to understand past human economic strategies and ecological circumstances. Topics include skeletal and taxonomic identification, taphonomic processes, mortality profiles, biometric analyses, and human behavioral ecology. Lab component is required. Offered as BIOL 4460 and ANTH 4460; credit will be granted only once.

**ANTH 4698. SUMMER FIELD SCHOOL IN ANTHROPOLOGY. 6 Hours.**

(3 or 6 hours credit). Offered only during the summer session. Experience in methods of field research in ethnography or archaeology. May be repeated for credit if research topic changes.

**ANTH 5191. CONFERENCE COURSE. 1 Hour.****ANTH 5307. FORENSIC ANTHROPOLOGY. 3 Hours.**

Estimating age, sex, race, stature, pathology, cause of death, and time since death from human remains. The role of skeletal biology and physical anthropology in criminal investigation. Case studies will be used to demonstrate application of the methods studied. Requires enrollment in the undergraduate lab section.

**ANTH 5310. HISTORY OF ANTHROPOLOGICAL THEORY. 3 Hours.**

This course is a critical examination of major theoretical trends in ethnological theory, from mid-19th century to the present.

**ANTH 5315. ARCHAEOLOGICAL METHODS. 3 Hours.**

An examination of research methods and underlying theory in archaeology and their evolution since the era of European antiquarianism. Origins and development of archaeology as a scholarly discipline. Emphasis on the period 1960-present; consideration of recent trends in analysis and reportage.

**ANTH 5317. ARCHAEOLOGY OF EXPLORATION. 3 Hours.**

Archaeological evidence for travel in antiquity. Technology of travel (horse/camel, wheeled vehicles, boats) and related topics (navigation; development of trade and trade routes; nature of discovery, settlement and colonization in antiquity). Case studies drawn from ancient cultures of the Old World from the Stone Age through Medieval times.

**ANTH 5320. METHODS IN BIOLOGICAL ANTHROPOLOGY. 3 Hours.**

This course covers several topical areas relevant to biological anthropologists specializing in human biology, including osteology and skeletal biology, skeletal maturation (both postcranial and craniofacial), growth and development from birth to biological maturity, and selected topics in forensics, anthropometry, physiology, nutrition, genetics, epidemiology, and demography.

**ANTH 5325. QUALITATIVE METHODS. 3 Hours.**

Students do fieldwork in anthropology. Students practice participant observation, conduct an interview, collect a kinship chart, map blocks, collect life histories and participate in rituals. Course emphasizes methods of data collection, analysis/interpretation of data, and critical writing.

**ANTH 5341. POSTCOLONIAL SOUTH ASIA. 3 Hours.**

It approaches the competing and complementary claims on postcolonial theory by mapping the intersections in historical anthropology, literary theory, and cultural analysis. More broadly it brings to focus the shifts from Marxist to Poststructuralist directions. Though the regional focus is on India, the endeavor is also to assess dialogues among varying strands of cultural perspectives and its impact in other postcolonial contexts, both within and beyond the South Asian subcontinent.

**ANTH 5342. ADVANCED ETHNOLOGY. 3 Hours.**

Seminar based on student reports and critiques of assigned readings. Major emphasis on the areas of ethnology and social anthropology.

**ANTH 5344. CULTURES OF LATIN AMERICA. 3 Hours.**

An ethnological comparison of societies and cultures in Central and South America. Emphasis on gender, ethnicity, and political economy.

**ANTH 5345. RELIGION AND CULTURE. 3 Hours.**

An ethnological comparison of native religions to understand non-western belief systems. Emphasis on rituals, myths, totemic systems, taboos, and cosmology.

**ANTH 5346. MESOAMERICAN ARCHAEOLOGY. 3 Hours.**

An examination of the diversities of several prehistoric Mesoamerican cultures including the Olmec, Maya, Teotihuacan, Zapotec, and the Aztec. Current issues including the beginnings of agriculture, early village life, the rise of complexity and the institution of kingship, warfare, and Mesoamerican ideology and cosmology will be addressed.

**ANTH 5349. TOPICS IN ANTHROPOLOGY. 3 Hours.**

May be repeated for credit as the topic changes.

**ANTH 5351. EMERGENCE OF HUMANKIND. 3 Hours.**

An intensive review of the evidence for, and main outlines of, human biological and cultural evolution up to agricultural origins.

**ANTH 5353. MEDICAL ANTHROPOLOGY. 3 Hours.**

An examination of anthropological concepts for understanding curing practices and attitudes toward health programs in various cultures.

**ANTH 5355. HUNTERS AND GATHERERS. 3 Hours.**

Cross-cultural approach to the ecological, social, and historical contexts of hunters, gatherers, and foragers.

**ANTH 5363. ETHNOGRAPHY AND PERSONAL NARRATIVE. 3 Hours.**

Focus is on anthropology and autobiography, autoethnography, life history, and narrative constructions of selfhood in different cultural contexts. Development of the life history approach in ethnographic research. Methods in the collections and analysis of life stories.

**ANTH 5365. GLOBALIZATION AND INTERNATIONAL MIGRATION. 3 Hours.**

Examines how the expansion of global capitalist economy has contributed to the growth of international migration around the world. Focuses on how transnational migration affects the economic, social, political, and cultural practices of immigrants in both their countries of origin and destination.

**ANTH 5369. FOLKLORE AND MYTHOLOGY. 3 Hours.**

Function, forms, and interpretation of folklore and myth in traditional societies; examination of oral literature as an expression of continuity and change; emphasis on a structural analysis of myth.

**ANTH 5370. APPLIED ANTHROPOLOGY. 3 Hours.**

Examines the application of anthropological knowledge to solve practical problems in today's global world. We learn how anthropological concepts, methods, and insights are applied to understand and solve important problems related to economic development, health, environmental issues, immigration, international business, and others.

**ANTH 5371. RESEARCH PRACTICUM / INTERNSHIP. 3 Hours.****ANTH 5373. ARCHAEOLOGY FIELD SCHOOL. 3 Hours.**

This course, conducted during the summer sessions, consists of on-site and classroom instruction in techniques of archaeological survey, excavation, laboratory, processing, and analysis. Students can receive either three or six hours of credit. Enrollment by permission of instructor only. Prior coursework in anthropology desirable but not necessary.

**ANTH 5389. TEACHING ANTHROPOLOGY. 3 Hours.**

To learn strategies of coping with practical problems of teaching undergraduate anthropology, students confer with one or more professors to discuss preparing syllabi and lectures, constructing and evaluating examinations, etc. Not to be counted toward the degree requirement.

**ANTH 5392. CONFERENCE COURSE IN ANTHROPOLOGY. 3 Hours.****ANTH 5398. THESIS. 3 Hours.****ANTH 5406. HUMAN OSTEOLOGY. 4 Hours.**

Detailed examination of human skeletal morphology. Topics include form and function of all skeletal elements in the human body, differentiation of each bone, left and right side identification, identification of fragmented remains, and muscle attachments and articulations. Content useful in forensic anthropology, archaeology, and hominid paleontology. If taken for undergraduate credit either as ANTH 4306 or ANTH 4406, cannot be repeated for graduate credit.

**ANTH 5673. ARCHAEOLOGY FIELD SCHOOL. 6 Hours.**

This course, conducted during the summer sessions, consists of on-site and classroom instruction in techniques of archaeological survey, excavation, laboratory, processing, and analysis. Students can receive either three or six hours of credit. Enrollment by permission of instructor only. Prior coursework in anthropology desirable but not necessary.

**ANTH 5698. THESIS. 6 Hours.**

## COURSES

**ARAB 1441. BEGINNING ARABIC I. 4 Hours. (TCCN = ARAB 1411)**

Multimedia Immersion in the culture and language of Arabic-speaking countries. Designed to enable students to understand and communicate effectively in Arabic at the beginning level.

**ARAB 1442. BEGINNING ARABIC II. 4 Hours. (TCCN = ARAB 1412)**

Continuation of beginning Arabic. Prerequisite: ARAB 1441 with a grade of C or better.

**ARAB 1491. CONFERENCE COURSE. 4 Hours.**

Independent study; consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: Permission of the instructor.

**ARAB 2310. ARABIC CULTURE IN THE WORLD. 3 Hours.**

An overview of the cultures of the Arabic-speaking world in a global context, examining cultural products such as food, art, music, popular culture, literature, and/or film. Taught in English.

**ARAB 2313. INTERMEDIATE ARABIC I. 3 Hours. (TCCN = ARAB 2311)**

Continued immersion in the culture and language of Arabic-speaking countries. Application of strategies and technology in mastering listening, speaking, reading, and writing at the intermediate level. Prerequisite: ARAB 1442 with a grade of C or better.

**ARAB 2314. INTERMEDIATE ARABIC II. 3 Hours. (TCCN = ARAB 2312)**

Continuation of intermediate Arabic. Prerequisite: ARAB 2313 with a grade of C or better.

**ARAB 2391. CONFERENCE COURSE. 3 Hours.**

Independent study; consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: Permission of the instructor.

**ARAB 3303. ARABIC CONVERSATION & CULTURE. 3 Hours.**

Practice in oral expression with an emphasis on developing conversational skills and improving language proficiency in reading and writing. This course looks at the differences between classical and regional colloquialisms as well as elements of Middle Eastern culture. Prerequisite: ARAB 1442 with a grade of C or better.

**ARAB 3304. ARABIC CONVERSATION & CULTURE II. 3 Hours.**

Students continue to develop conversational skills and cultural knowledge through the use of readings, film, and other media. Extensive conversation practice allows students to develop intermediate high level oral skills in a broad range of communicative and cultural contexts. Students learn to express more abstract ideas through description, comparison, and narration. Prerequisite: ARAB 2314 with a grade of C or better.

**ARAB 3305. ARABIC READING AND COMPOSITION. 3 Hours.**

The analysis of Arabic texts and composition with emphasis on reading comprehension, grammar, writing skills, and compositional techniques. Readings may include newspaper articles, short stories, and essays on various topics of Arabic culture. Prerequisite: ARAB 2314 with a grade of C or better.

**ARAB 3306. ARABIC FOR BUSINESS AND THE PROFESSIONS. 3 Hours.**

This course develops language skills relevant to high-demand sectors in business, healthcare, Arabic translation, and media communication. Emphasis is placed on bridging linguistic and cultural gaps to prepare students for effective communication and engagement in various professional contexts requiring Arabic proficiency. Prerequisite: ARAB 2314 with a grade of C or better.

**ARAB 3310. ARABIC LOCALIZATION AND TRANSLATION. 3 Hours.**

Introduction to cultural and linguistic issues in the translation of Arabic language texts. Students will explore current technologies used in various real-world translation contexts and how to adapt texts, products, and services to the locale for which they are intended. Prerequisite: ARAB 2314 or the equivalent with a grade of B or better. May not be repeated for credit.

**ARAB 3311. ARABIC LOCALIZATION AND TRANSLATION II. 3 Hours.**

Continued study of cultural and linguistic issues in the translation of Arabic and English language texts. Systematic development of advanced skills in localization and computer-aided translation and in using TMX/TBX (international standards for translation memory and terminology exchange) tools. Translation practice, individually and in translation teams, with increasingly longer and more specialized texts. Prepares localization and translation specialists for real-world careers in the language-services industry. May not be repeated for credit. Prerequisite: ARAB 3310 with a grade of B or better.

**ARAB 3312. TOPICS IN ARABIC LITERATURE AND CULTURE. 3 Hours.**

Multimedia immersion in the language and culture of Arabic speaking countries through the study of selected literary texts in various genres and literary structures, with an emphasis on developing language skills of reading, writing, and oral communication. May be repeated for credit as topic changes. Prerequisite: ARAB 1442 with a grade of C or better.

**ARAB 3345. INTRODUCTION TO COMPUTER-ASSISTED TRANSLATION. 3 Hours.**

Introduction to computer-assisted translation (CAT), machine translation (MT), translation memory (TM) and terminology management tools in modern translation and localization workflows. Prepares students for real-world careers in the language services industry. Exclusively for students pursuing a minor in Localization and Translation-Arabic. ARAB 3310 is strongly recommended before ARAB 3345.

**ARAB 3391. CONFERENCE COURSE. 3 Hours.**

Independent study; consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: Permission of Instructor.

**ARAB 3393. ARABIC INTERNSHIP. 3 Hours.**

A combination of field-related experience in the business or service sector with an academic component. Coursework may include journal writing, outside readings, reflection papers, and formal presentations. Prerequisite: Permission of Instructor.

**ARAB 4393. ARABIC INTERNSHIP. 3 Hours.**

This course is a combination of field-related experience in the business or service sector with an academic component. Coursework may include journal writing in Arabic, outside readings, and formal presentations. Prerequisite: Two ARAB 3000 level courses and permission of the instructor.



## COURSES

### **ARCH 1101. ACADEMIC SUCCESS SKILLS IN ARCHITECTURE. 1 Hour.**

This is a required course intended to establish a solid overview of the School of Architecture and the architecture program for all first semester UTA students who intend to declare as an architecture major. Topics for the class include: critical thinking, presentation techniques, internships, attendance of exhibitions and lectures, navigating the advising process, portfolio review and techniques, and using the library and other university resource sources. Other topics may also be discussed. The course be taken only once for credit.

### **ARCH 1191. CONFERENCE COURSE. 1 Hour.**

Independent study guided by an instructor on a regular basis. May be repeated for credit. Permission of the instructor and architecture undergraduate advisor required. Restricted to architecture-intended majors.

### **ARCH 1301. INTRODUCTION TO ARCHITECTURE AND INTERIOR DESIGN. 3 Hours.**

The interrelationships between society, culture, and the built environment. Prerequisite: Department consent.

### **ARCH 1341. DESIGN COMMUNICATIONS I. 3 Hours.**

Design Communications I is an introduction course to analog and digital representation with emphasis on notational techniques of freehand drawing, proportioning strategies, and analysis. Students will also be exposed to physical and digital model-making, craftsmanship, file organization, orthographic and axonometric delineation, line weights, and digital documentation. Prerequisite: Restricted to Architecture-Intended, ARCH\_UNIV, Interior Design-Intended and INTD\_UNIV majors.

### **ARCH 1342. DESIGN COMMUNICATIONS II. 3 Hours.**

Design Communications II is a continuation of ARCH 1341 with emphasis on refined techniques and more complex drawing problems. This course focuses on scale and proportion, relational design strategies, circulation, spatial hierarchy, design narrative, and digital documentation. Students will also be exposed to in-situ notational drawing. This course is offered as INTD 1342; credit will be granted only once. Prerequisites: "C" or better in ARCH 1301 and ARCH 1341. Restricted to Architecture-Intended, ARCH\_UNIV, Interior Design-Intended and INTD\_UNIV majors.

### **ARCH 2300. MASTERWORKS OF WESTERN ARCHITECTURE. 3 Hours.**

Selected architectural complexes as representative of various periods of Western culture. Stresses cultural relevance rather than stylistic analysis. Intended as humanities elective for non-architecture majors.

### **ARCH 2303. HISTORY OF ARCHITECTURE AND INTERIOR DESIGN I. 3 Hours.**

A global survey of architecture emphasizing the material and cultural context for design. Focused primarily on the period from prehistory through 1750. Prerequisite: "C" or better in ARCH 1301, ARCH 1341, and ARCH 1342 or INTD 1342. Restricted to Architecture-intended and Interior Design-intended majors.

### **ARCH 2304. HISTORY OF ARCHITECTURE AND INTERIOR DESIGN II. 3 Hours.**

A global survey of architecture emphasizing the material and cultural context for design. Focused on the period from 1750 to the present. Prerequisites: "C" or better in ARCH 1301, ARCH 1341, ARCH 1342 or INTD 1342, and ARCH 2303. Sophomore standing in the program. Restricted to Architecture-intended and Interior Design-intended majors.

### **ARCH 2341. DESIGN COMMUNICATION FOR ENGINEERS. 3 Hours.**

This course introduces engineering students to design communication skills. Content includes sketching, drawing, graphic layout, diagramming and an introduction to orthographic projections and perspectives. Media will be both analog and digital. Digital tools may include image processing software, graphic design software and computer aided design (CAD) software. Prerequisite: Restricted to AREN students.

### **ARCH 2391. TOPICS IN ARCHITECTURE. 3 Hours.**

Selected topics in concepts, philosophy, and models of architecture and allied arts of design. Prerequisite: Department Consent.

### **ARCH 2551. BASIC DESIGN AND DRAWING I. 5 Hours.**

Basic Design and Drawing I course, the first design studio in the Basic Studies Foundation, is an introduction to architectural design, basic design theory and methodologies relating to spatial abstractions and forms. The course focuses on heuristic thinking with an emphasis on process and making. Two- and three-dimensional studio exercises develop a sensibility to design fundamentals, architectural vocabulary and design decision based on analysis and critique towards process-based learning strategies. As a continuation to the first-year courses, the role of design communications is reiterated in drawing exercises focusing on form, color theory, texture, and spatial determinants, historical precedence, sketching, orthographic projection and modeling. Prerequisite: "C" or better in ARCH 1342 or INTD 1342, credit or concurrent enrollment in ARCH 2303. Sophomore standing in the program. Restricted to Architecture-intended, ARCH\_UNIV, Interior Design-intended, and INTD\_UNIV majors.

### **ARCH 2552. BASIC DESIGN AND DRAWING II. 5 Hours.**

Basic Design and Drawing II, the second design studio in the Basic Studies Foundation builds on disciplinary principles of basic design theory, 2D and 3D projects, with emphasis on visual and verbal representation. The course follows established methodologies that develop an understanding of foundational design principles of space, hierarchy, scale, proportion, circulation, and enclosure. Studio exercises and projects develop individual skills and collectively apply analog and digital processes to understand the design of architectural spaces and forms, their constituent parts, and their conditional relationships to the context, as a coherent, inter-related design process. The study of historical and contemporary masterworks of architecture serves to inform the projects toward the role of historical precedent in design. Design communication focuses on accurate orthographic projections, drawing conventions, graphic sensibility, and the exploration of 2D and 3D representation with physical models using a range of techniques, which exhibit understanding of tectonics, craft, materiality, and the representation of ideas. Prerequisite: "C" or better in ARCH 2303, ARCH 2551, and credit or concurrent enrollment in ARCH 2304. Restricted to Architecture-intended and Interior Design-intended majors.

**ARCH 3312. HISTORY OF CONTEMPORARY THEORY. 3 Hours.**

This course will familiarize students with major intellectual paradigms and themes that have informed postwar architectural practice in Western tradition. Through reading primary theoretical texts that have had major impact on practice, students will hone their skills of critical thinking and be better able to position themselves in their navigation of contemporary theoretical issues. Prerequisite: ARCH 2303 and ARCH 2304 and Junior standing in program. Restricted to Architecture and Interior Design majors.

**ARCH 3323. CONSTRUCTION MATERIALS AND METHODS. 3 Hours.**

This course discusses the nature of materials and structural concepts to be used in the construction process. The principles and fundamentals of building construction materials and methods is evaluated, and the project development process and construction delivery systems are introduced. The course provides an understanding of building standards and codes; the impact of materials and buildings on the environment and human health, safety, and welfare; the material properties including structural properties of materials as well as performance properties and the major materials and construction systems such as light wood frame, mass timber, and steel and concrete frame construction. Prerequisite: ARCH 2552. Junior standing in program. Restricted to Architecture majors. Minimum 2.8 GPAs both cumulative and within the major required.

**ARCH 3324. STRUCTURES I. 3 Hours.**

This course is the foundation for all advanced structures courses in the undergraduate and graduate architecture programs. In an engineering curriculum, this course is offered in two separate courses referred to as: (a) Statics and (b) Strength of Materials, each of one-semester duration. The present course capsules the information yet is rigorous enough and covers all important topics in the two engineering courses including equilibrium of particles and rigid bodies, analysis of important structural load bearing items such as cables, beams and Trusses, Definition of Stress and strain and their role in structural design, cross-sectional properties of structural members and analysis of strength for the beams. Prerequisite: ARCH 3323, PHYS 1441 or PHYS 1443, MATH 1327 or MATH 1426. Junior standing in program. Restricted to Architecture majors. Minimum 2.8 GPAs both cumulative and within the major required.

**ARCH 3336. STRUCTURAL SYSTEMS FOR ARCHITECTURAL ENGINEERS. 3 Hours.**

This course covers the engineering design of various concrete, steel and masonry structural systems used in the construction of buildings. Building types vary from single-story commercial buildings to low-rise and high-rise buildings. Current building codes and project examples are examined from a fundamental structural engineering perspective, in which the rationale for the structural system is analyzed, calculations performed, and systematic construction design processes are developed for gravity loads and lateral loads from start to completion of each project. The project examples culminate with a detailed cost analysis based on current industry trends. Prerequisite: Restricted to CE\_AENUCOL, CE\_ARENINT, CE\_ARENBS, and CE\_AREPROB majors.

**ARCH 3343. ARCHITECTURE COMPUTER GRAPHICS (DESIGN COMMUNICATION III). 3 Hours.**

An advanced course to develop visual sensitivity and awareness of digital techniques to enable the student to study design ideas and present those ideas in the various design disciplines. Emphasis on the relationship of computer graphics with the design process. This course is offered as ARCH 3343 and INTD 2343, credit will only be granted once. Prerequisite: Junior standing in program. Restricted to Architecture majors. Minimum 2.8 GPAs both cumulative and within the major required.

**ARCH 3354. INTRODUCTION TO ENVIRONMENTAL & SUSTAINABILITY STUDIES. 3 Hours.**

Introduces major topics, questions, issues and methods within interdisciplinary and cross-disciplinary environmental studies. Includes a study of some of the most significant texts, studies, practices, and creative works from at least four different fields as they pertain to questions of environment, ecology, and sustainability.

**ARCH 3357. DESIGN TECHNOLOGIES - BUILDING INFORMATION MODELING FOR ARCHITECTS/ENGINEERS. 3 Hours.**

Introduction to Building Information Modeling (BIM); discussions of the roles and impacts of BIM in the design process, energy assessment, and facility management. The course includes creating building elements such as walls, windows, doors, roof, ceiling, stairs, ramp, and structural and MEP systems. Course provides an overview of BIM applications such as daylight and energy analysis. Prerequisite: AREN 2352. Restricted to CE\_AENUCOL, CE\_ARENINT, CE\_ARENBS, and CE\_AREPROB majors.

**ARCH 3361. ARCHITECTURE AND ENVIRONMENT. 3 Hours.**

An overview of sustainable design integrated with natural resource conservation. Prerequisite: ARCH 2552. Junior standing in program. Restricted to Architecture majors. Minimum 2.8 GPAs both cumulative and within the major required.

**ARCH 3364. SITE DESIGN. 3 Hours.**

The related site design process includes site planning pertaining to land use, case studies, siting of structures, codes, and topography. Prerequisite: Junior standing in program. Restricted to Architecture majors. Minimum 2.8 GPAs both cumulative and within the major required.

**ARCH 3551. BASIC DESIGN FOR ENGINEERS. 5 Hours.**

This course is an introduction to design communication (verbal and graphic), the process of design, architectural principles and the process of navigating the relationship between architectural design and engineering. Precedent studies introduce students to Architecture and two- and three-dimensional studio exercises develop a sensibility to design fundamentals and vocabulary. Prerequisite: ARCH 1301 and ARCH 2341 and restricted to AREN students.

**ARCH 3553. DESIGN STUDIO: ARCHITECTURE I. 5 Hours.**

The reiteration of basic design principles, formal ordering systems and spatial concepts toward the synthesis of simple building types, with application of materials, introduction of structural systems, rudimentary building systems, limited program, with preliminary understanding of site design, and environmental issues. Projects will investigate small scale institutional, civic, or cultural buildings set in cities of historical significance that respond directly to their context. Research and analysis of influential precedent buildings and cities, whether historical or contemporary will inform the design process and methodologies. Credit will be given for only one of ARCH 3553 or INTD 3553. Prerequisite: ARCH 2552 or INTD 2552. Credit or concurrent enrollment in ARCH 3323 and ARCH 3343 or ARCH 3364. Junior standing in the program. Restricted to Architecture majors. Minimum 2.8 GPAs both cumulative and within the major required.

**ARCH 3554. DESIGN STUDIO: ARCHITECTURE II. 5 Hours.**

A continuation of ARCH 3553 with an increased complexity and scale of projects which address buildings within urban contexts. Projects will incorporate design theory with technical, site and structural considerations. Research of local specifics as design imperatives will inform building and site integration, which respond to context. Projects will investigate and subsequently integrate rudimentary building systems including those for formal ordering, spatial organization, structural support, materiality, building assembly, envelopes, building services, life safety, and circulation, with a particular attention towards sustainability, accessibility, efficiency, and code compliance. Design communication will demonstrate understanding of project components by developing an encompassing set of orthographic projections Three dimensional models will test and communicate spatial intentions relating to the context addressing, proportion, massing, materiality, environment, and project character. Prerequisite: ARCH 3323, ARCH 3553, and ARCH 3343 or ARCH 3364. Credit or concurrent enrollment in ARCH 3324 and ARCH 3343 and ARCH 3364. Junior standing in program. Restricted to Architecture majors. Minimum 2.8 GPAs both cumulative and within the major required.

**ARCH 3595. SELECTED TOPICS ARCHITECTURE. 5 Hours.**

A transitional studio course to explore and present selected topics in architecture and design. May be repeated for credit as topics change. Prerequisite: Department consent. Junior standing in program. Restricted to Architecture majors.

**ARCH 4191. CONFERENCE COURSE. 1 Hour.**

Independent study guided by an instructor on a regular basis. May be repeated for credit. Prerequisite: Permission of the instructor or the Architecture Undergraduate Advisor.

**ARCH 4305. THE CITY OF ROME. 3 Hours.**

History, topography, and monuments of the city of Rome and its environs from its legendary founding in 753 B.C. until the 20th Century. Urban form and architecture will be inspected in context of contemporaneous culture, with special emphasis on imperial and papal Rome. Prerequisite: Department consent. Restricted to Architecture and Interior Design Majors.

**ARCH 4306. URBAN DESIGN THEORY. 3 Hours.**

Design theory and its application to the urban scale, as applied to historical and contemporary examples. Prerequisite: ARCH 2552. Department consent. Junior standing in program. Restricted to Architecture and Interior Design majors.

**ARCH 4307. THE LIFE OF CITIES. 3 Hours.**

A look at a series of world cities by situating their architectural context, with a particular focus on the impact of 20th century modernism and postmodernism on city fabric. Prerequisite: ARCH 2303 and ARCH 2304 and Junior standing in program. Restricted to Architecture and Interior Design majors, or Department consent.

**ARCH 4308. HISTORY OF URBAN FORM. 3 Hours.**

The history of cities as physical form, influenced by political, economic, and social forces. Prerequisite: Department consent. Restricted to Architecture and Interior Design majors.

**ARCH 4309. MUSEUMS: HISTORY, CULTURE, DESIGN. 3 Hours.**

This course investigates the historical and cultural forces driving the design of museums in the 19th and 20th centuries with special attention to the development of a diverse range of new museum types beyond traditional art and natural science museums. Field trips to local museum sites are required. Prerequisite: ARCH 2303 and ARCH 2304, junior standing in program. Restricted to Architecture and Interior Design majors, or Department consent.

**ARCH 4310. SKYSCRAPER HISTORIES. 3 Hours.**

This course considers the history of the skyscraper from multiple perspectives, seeking consensus about what a skyscraper really is. This course will allow students to begin to develop their skills in reading, writing, critical thinking, visual memory, and visual analysis using the history of architecture as a medium. Students will also develop basic research skills using primary sources to document architecture. Prerequisite: ARCH 2303 and ARCH 2304, junior standing in program. Restricted to Architecture and Interior Design majors, or Department consent.

**ARCH 4311. TOPICS IN ARCHITECTURAL THEORY. 3 Hours.**

Selected topics in concepts, philosophy, and models of architecture and allied arts of design with specific application to 20th Century problems. May be repeated for credit as specific topics vary. Prerequisites: ARCH 2303, ARCH 2304. Junior standing in program. Restricted to Architecture and Interior Design majors.

**ARCH 4312. WHAT MAKES A CITY: CRITICAL ISSUES IN ARCHITECTURE, PLANNING, AND URBAN DESIGN. 3 Hours.**

This class is a critical exploration of the physical environment of the city, looking at a range of issues--mobility, housing, landscape, gentrification, sustainability, health-to understand how the built world shapes the way we live every day. Prerequisite: ARCH 2303, ARCH 2304. Junior standing in program. Restricted to Architecture and Interior Design majors.

**ARCH 4313. THE ARCHITECT IN CONTEMPORARY SOCIETY. 3 Hours.**

Readings on the Culture of Architecture The focus of this course is to examine this social construct in the belief that critical self-reflection can assist in improving success within it. This examination will be conducted through readings in a collection of publications both historical and contemporary that offer critical insight into the professional/social culture of architects. Prerequisite: ARCH 2303, ARCH 2304. Junior standing in program. Restricted to Architecture and Interior Design majors.

**ARCH 4314. HISTORIC PRESERVATION AND RESTORATION. 3 Hours.**

Concepts and implementation of the restoration and preservation of historic structures and places, including archaeological, bibliographic, legislative, institutional, and physical parameters to the retention and adaptive re-use of significant architecture. This course is offered as ARCH 4314 and INTD 4314; credit will be granted only once. Prerequisite: ARCH 2303, ARCH 2304. Junior standing in program. Restricted to Architecture and Interior Design majors.

**ARCH 4315. TOPICS IN THE HISTORY OF ARCHITECTURE AND DESIGN. 3 Hours.**

Selected topics in architecture and the allied arts of design. Some recent topics include: Architecture of Texas, The Life of Cities, History of Architecture Theory, Developing World Slum Housing, Architecture and Politics, and Contemporary Architecture. Certain topics may be offered every second or third year. The course may be repeated up to four times as the topics change. Prerequisite: ARCH 2303 and ARCH 2304, junior standing in program. Restricted to Architecture and Interior Design majors, or Department consent.

**ARCH 4316. MODERN ARCHITECTURE I. 3 Hours.**

Development of 20th Century architecture from the origins of the modern movement in the 1890s until its diffusion in Europe and America in the 1930s. Prerequisite: ARCH 2303, ARCH 2304. Junior standing in program. Restricted to Architecture and Interior Design majors, or Department consent.

**ARCH 4317. MODERN ARCHITECTURE II. 3 Hours.**

Development of 20th Century architecture from the diffusion of modernism in the 1930s to the present day. Prerequisite: ARCH 2303, ARCH 2304. Junior standing in program. Restricted to Architecture and Interior Design majors, or Department consent.

**ARCH 4318. ARCHITECTURE ON SCREEN. 3 Hours.**

How do the things we watch shape our perceptions of architecture and the city? How do the environments in film and on television frame our vision, shape character, and convey themes? How are architects and other design professionals portrayed? What do they suggest about changes in the physical and technological world in which we live? This course explores those questions and others through screen history, from the earliest films to contemporary television and digital productions. Themes will include the dystopian city, suburbia, the evolving depiction of modernism, architecture as documentary subject, and the history of the city on screen. Students will explore these questions and will have to make their own short films. May be repeated for credit as specific topics vary. Prerequisite: ARCH 2303, ARCH 2304. Junior standing in program. Restricted to Architecture and Interior Design majors.

**ARCH 4319. HOUSING PROTOTYPES: 1920s TO PRESENT. 3 Hours.**

An extensive investigation of the many states of housing that architects and educators have encountered in the last 100 years. The course is organized through introduction, research, analysis, and case study of various housing typologies, unit design principles, density concerns, site, relationship of inside and outside, zoning and building codes, and new emerging housing building types. Prerequisite: ARCH 2303 and ARCH 2304. Junior standing in program. Restricted to Architecture and Interior Design majors.

**ARCH 4320. PERFORMANCE-BASED DESIGN IN ARCHITECTURE. 3 Hours.**

An overview of Performance-Based Building Design (PBBD) in architecture and how clients' expectations are translated into performance requirements, how we describe performance objectives, how we define performance indicators, and finally, how we can quantify and assess building performance. Prerequisite: Junior standing in program. Restricted to Architecture and Interior Design majors.

**ARCH 4322. ARCHITECTURE + POLITICS. 3 Hours.**

This course examines how notions of national identity are expressed in parliament buildings and other important buildings of state. Throughout the course, questions about what constitutes national identity, capital cities, and how architecture is used as a manifestation of these political aspects will be addressed. Buildings within nations or subnational regions across six continents are examined, giving students a global understanding of these issues. Prerequisite: ARCH 2303, ARCH 2304. Junior standing in program. Restricted to Architecture and Interior Design majors, or Department consent.

**ARCH 4325. ENVIRONMENTAL CONTROL SYSTEMS I. 3 Hours.**

Acoustics and illumination and their significance in the total design. Prerequisite: PHYS 1442. Junior standing in program. Restricted to Architecture and Interior Design majors.

**ARCH 4326. ENVIRONMENTAL CONTROL SYSTEMS II. 3 Hours.**

Climate controls, mechanical and electrical systems, and their significance in the total design. Prerequisite: ARCH 4325 or AREN 3331. Junior standing in program. Restricted to Architecture, Interior Design, and Architectural Engineering majors.

**ARCH 4329. TOPICS IN COMPUTERS AND DESIGN. 3 Hours.**

Selected topics in the range and potential of digital computer applications in the design professions. May be repeated for credit as specific topics vary. Junior standing in program. Restricted to Architecture and Interior Design majors.

**ARCH 4332. ENERGY USE AND CONSERVATION IN ARCHITECTURE. 3 Hours.**

Basic concepts of the efficient use and conservation of energy related to architectural design principles. Prerequisite: Junior standing in program. Restricted to Architecture and Interior Design majors.

**ARCH 4338. CODES AND REGULATIONS. 3 Hours.**

A study of accessibility, building and energy codes and related regulations including the architects' responsibility for compliance. This course is offered as ARCH 4338 and INTD 3338; credit will be granted only once. Prerequisite: ARCH 2303, ARCH 2304. Junior standing in program. Restricted to Architecture and Interior Design majors.

**ARCH 4339. DIGITAL FABRICATION METHODOLOGY. 3 Hours.**

The history, theory, and methodology framing the discourse for parametric design and digital fabrication with an emphasis on digital fabrication techniques and introduction to parametric modeling software. Prerequisites: Junior standing in program. Open to ARCH and INTD majors.

**ARCH 4340. MODERN + CONTEMPORARY ARCHITECTURE IN MEXICO. 3 Hours.**

This course examines notions of Mexican national identity as expressed through architecture. Part 1 looks at late 19th and early 20th century architecture during the Porfiriato, as well as that occurring shortly after the Mexican Revolution of 1910-20, including the critical role that cement played. Part 2 considers how the so-called First Generation of architects adapted and transformed Modernism in Mexico. Part 3 examines how the Second and Third Generations moved beyond Modernism, including. The course concludes with Mexico's "First Generation" of women architects as issues of gender are addressed. Prerequisite: ARCH 2303, ARCH 2304. Junior standing in program. Restricted to Architecture and Interior Design majors, or Department consent.

**ARCH 4341. NOTATIONAL DRAWING. 3 Hours.**

Seminar concerned with analytical drawing techniques and how to use the sketchbook as a tool and process for architectural production. Emphasis will be on cultivating drawing strategies that will heighten the ability to make observations through first-hand experience and record them with the correct conventions in order to enable recovery for future use in architectural design. Prerequisite: Junior standing in program. Restricted to Architecture and Interior Design majors.

**ARCH 4344. CONCEPTUAL DRAWING. 3 Hours.**

A seminar to explore the aspects of conceptual drawing for the architect and the relationship of design ideas in the drawing process. Prerequisite: Junior standing in program. Restricted to Architecture and Interior Design majors.

**ARCH 4345. DIGITAL CONSTRUCTION. 3 Hours.**

A workshop exploring video cartography using photography, animation, motion graphics and digital video. Prerequisite: Junior standing in program. Restricted to Architecture and Interior Design majors.

**ARCH 4346. CONSTRUCTION DRAWINGS. 3 Hours.**

The techniques of building construction, the communication of technical information, and the process of preparing contract drawings for construction. Prerequisite: ARCH 3343. Junior standing in program. Restricted to Architecture and Interior Design majors.

**ARCH 4347. DIGITAL TECTONICS & PROTOTYPING. 3 Hours.**

The use of digital technology in the architectural design process focusing on the research and fabrication of full-scale production of prototypes. ARCH 4339 Digital Fabrication Methodology is highly recommended. Prerequisite: Junior standing in program. Restricted to Architecture and Interior Design majors.

**ARCH 4348. ARCHITECTURAL PHOTOGRAPHY. 3 Hours.**

Basic photography for architects. The use of photography as an investigative and presentation device in architecture. Emphasis on composition and black and white technique. Prerequisite: ARCH 2552. Junior standing in program. Restricted to Architecture and Interior Design majors.

**ARCH 4349. PORTFOLIO DESIGN. 3 Hours.**

Principles and techniques of producing an architectural/interior design portfolio and resume including graphic design, layout, typography, grid systems, model photography as well as use of layout and photographic software. Prerequisite: ARCH 3553, ARCH 3554. Restricted to Architecture and Interior Design majors.

**ARCH 4350. ARCHITECTURE, ENGAGEMENT + COMMUNITY POWER. 3 Hours.**

Architecture, Engagement and Community Power will unpack the role of the citizen architect. It will examine participatory design processes that center community voice and shift existing power structures. In this country, constructed systems of oppression including racist practices, policies and financial systems have shaped the way our neighborhoods have developed. These acts have created inequities across communities that impact one's ability to thrive. Starting from the notion that all places are designed, and can therefore be undesigned, this course will explore the ways in which design processes can strengthen community power for marginalized communities. This course will encourage activism as an inherent quality in the development of an architect; encourage students to make connections between classroom learning and the larger community; require students to develop the skill to see and hear multiple voices; and encourage the development of visual, written, & oral communication tools. Prerequisite: ARCH 2303, ARCH 2304. Junior standing in program. Restricted to Architecture and Interior Design majors.

**ARCH 4351. WILDERNESS: A CONDITION OF MIND. 3 Hours.**

Changing conceptions of wilderness in Western thought, from ancestral prejudices to recent, revolutionary appreciation. Literary and visual documentation. Prerequisite: Junior standing in program. Restricted to Architecture and Interior Design majors.

**ARCH 4352. HOUSING: FROM CAVES TO MANSIONS IN THE CLOUDS. 3 Hours.**

This course examines the evolution of American urban settlements as they evolved from French, Spanish and English concepts of town-planning. The course begins with the Native American settlements in the American Southwest, particularly Mesa Verde and Hovenweep, followed by examination of the earliest European capital cities of Rome, Paris and London. Since the wholesale transplanting of European principles of town-planning traditions could not take root in the New World, distinctly American housing settlements evolved such as Savannah, Santa Fe, Taos and St. Augustine.

Prerequisite: Junior standing in program. Restricted to Architecture and Interior Design majors.



**ARCH 4353. HISTORY OF LANDSCAPE ARCHITECTURE. 3 Hours.**

Development of landscape design from prehistory through 19th century with emphasis upon rural gardens and urban parks as representative of the social, cultural, and intellectual circumstances of the times and places in which they were created. Prerequisite: ARCH 2303, ARCH 2304. Junior standing in program. Restricted to Architecture and Interior Design majors.

**ARCH 4354. CONVERGENCES: BETWEEN ART AND ARCHITECTURE. 3 Hours.**

This course explores the convergences of artist methods of production with the processes of architectural practices. The course traces the work of leading filmmakers, both artistic and documentarian, whose professional leanings verge on the province of the architect. Prerequisite: Junior standing in program. Restricted to Architecture and Interior Design majors.

**ARCH 4357. BUILDING INFORMATION MODELING & VISUALIZATION. 3 Hours.**

To gain a working knowledge of Building Information Modeling software (Revit) and advanced 3D modeling software. This course is offered as ARCH 4357 and INTD 3357, credit will only be granted once. Prerequisite: ARCH 3343, INTD 2343, or INTD 3343; and Junior standing in program. Restricted to Architecture and Interior Design majors.

**ARCH 4360. POLITICS AND PRACTICE OF PRESERVATION. 3 Hours.**

The history and theory of preservation and of the political context that influence these. Prerequisite: Junior standing in program. Restricted to Architecture and Interior Design majors.

**ARCH 4362. STRUCTURAL SYSTEMS IN BUILDINGS. 3 Hours.**

An overview of various structural systems including those used in long-span and high-rise buildings. Numerical work limited to the explanation of relevant structural concepts. Prerequisite: ARCH 3324. Junior standing in program. Restricted to Architecture majors. Minimum 2.8 GPAs both cumulative and within the major required.

**ARCH 4365. CATALYTIC MAPPING. 3 Hours.**

An advanced theory elective course and workshop using the potential of mapping as a design, analytic and research mechanism for exploring complex contexts. Prerequisite: Junior standing in Architecture, Interior Design or permission of the advisor.

**ARCH 4366. RADICAL URBANISM. 3 Hours.**

An advanced theory course focused on the exposure to and critical analysis of some of the most radical, inspirational, and transformative urban design ideas and projects from Vitruvius to today. Prerequisite: Junior standing in Architecture, Interior Design or permission by the advisor.

**ARCH 4367. HIGH PERFORMANCE FACADE SYSTEMS. 3 Hours.**

Examines the role of the façade and building envelope as it relates to design, indoor comfort, energy and carbon usage, and overall performance through an exploration of materiality, assembly, and construction. The course also introduces the potential of generative technologies, smart materials, passive-active combinations, and integrated systems. Prerequisite: Junior standing in program. Restricted to Architecture and Interior Design majors.

**ARCH 4368. GREEN DESIGN + CONSTRUCTION. 3 Hours.**

Green building design, construction, and operation is an opportunity to reduce negative impacts on the environment, and the health and comfort of building occupants, thereby improving building performance. It provides cost savings to all tax-payers through improved human health and productivity, lower cost building operations, and resource efficiency. Green design and construction focuses on strategies and technologies to improve the energy efficiency and performance of buildings, and to reduce the environmental impact of buildings. The course emphasizes on different aspects of green building during all phases of a building's life-cycle, including design, construction, operation and decommissioning. All LEED categories are covered throughout the course and students get prepared to take LEED Green Associate exam by the end of the semester. Prerequisite: Junior standing in program. Restricted to Architecture and Interior Design majors.

**ARCH 4369. TERRITORIAL STRATEGIES. 3 Hours.**

Territorial Strategies focus on climate resilience of the built environment on the territorial scale. In Territorial Strategies, students explore how macro-level drivers of spatial (trans)formation impact micro-level strategies and actions in distinct climatic regions. Students apply a systems-thinking approach to map, diagram, model, draw, and visualize project outcomes, research findings, and data through various media. Prerequisite: Junior standing in Architecture, Interior Design, Sustainable Urban Design, or permission by the advisor.

**ARCH 4371. FUTURE CITIES. 3 Hours.**

Future Cities focus on climate resilience of the built environment on the urban scale. In Future Cities, students explore historical and contemporary concepts of ecological design and combine mitigative and adaptive strategies and actions for urban landscapes in the age of anthropogenic climate change. Students apply a participatory mixed-methods approach to map, diagram, model, draw, and visualize project outcomes, research findings, and data through various media. Prerequisite: Junior standing in Architecture, Interior Design, Sustainable Urban Design, or permission by the advisor.

**ARCH 4372. ADAPTIVE TYPOLOGIES. 3 Hours.**

Adaptive Typologies focus on climate resilience of the built environment on the architectural object scale. In Adaptive Typologies, students explore architectural objects, their characteristics, and their performative aspects as integrated parts of the urban ecosystem. Students analyze, transform, and develop hybrid typologies merging physical, digital, and biological concepts and apply a digital mixed-methods approach, utilizing analytical, representational, and generative tools. Prerequisite: Junior standing in Architecture, Interior Design, Sustainable Urban Design, or permission by the advisor.

**ARCH 4377. SPATIAL [IN] JUSTICE. 3 Hours.**

Through lectures and discussions, Spatial [in] Justice will provide students with historical perspectives on how American cities became segregated, the creation and lack of inclusivity of 'public space', and the architect's role within a socially engaged practice. The course will begin by studying key philosophies and theories of justice. Students will work with a community partner to produce a community engagement and development plan. They will research publicly available data and organize it into a package for the community and other stakeholders. Prerequisite: ARCH 2303, ARCH 2304. Junior standing in program. Restricted to Architecture and Interior Design majors.

**ARCH 4382. URBAN DESIGN SEMINAR. 3 Hours.**

The Seminar establishes a basic critical understanding, and a critique of urban design by reviewing its past, present and the future as an academic field and an area of practice. The seminar introduces urban design as a transdisciplinary specialization and professional endeavor that encompasses landscape architecture, architecture, city planning, and real estate to shape and influence the built environment primarily within urban context. Students actively present and lead informed discussions on topics such as urban form, urban landscapes, land-use patterns, population density, circulation, legibility, public art, environmental behavior and urban/rural interchange. Field trips are required. Prerequisite: C or better in UDES 4551, ARCH 3554, or approved equivalent. Students must have a minimum cumulative GPA of 2.8 and a minimum major course(s) GPA of 2.8. Department consent.

**ARCH 4391. CONFERENCE COURSE. 3 Hours.**

Independent study guided by an instructor on a regular basis. May be repeated for credit. Prerequisite: Permission of the instructor or the Architecture Undergraduate Advisor.

**ARCH 4395. SELECTED TOPICS ARCHITECTURE. 3 Hours.**

Studio and lecture courses to explore and present selected topics in architecture and design. May be repeated for credit as topics change. Prerequisite: Junior standing in program. Restricted to Architecture and Interior Design majors.

**ARCH 4556. DESIGN STUDIO: ARCHITECTURE III. 5 Hours.**

Advanced architectural design projects integrating research on contemporary issues intrinsic to architecture. Prerequisites: ARCH 3324, ARCH 3343, ARCH 3364, and ARCH 3554. Senior standing in program. Restricted to Architecture majors. Minimum 2.8 GPAs both cumulative and within the major required.

**ARCH 4557. DESIGN STUDIO: ARCHITECTURE IV. 5 Hours.**

Advanced architectural projects focusing on contemporary design issues that address topics extrinsic to the disciplines of architecture. Prerequisite: ARCH 3324, ARCH 3343, ARCH 3364, and ARCH 3554. Restricted to Architecture majors. Minimum 2.8 GPAs both cumulative and within the major required.

**ARCH 4591. CONFERENCE COURSE. 5 Hours.**

Independent study guided by an instructor on a regular basis. May be repeated for credit. Prerequisite: Permission of the instructor or the Architecture Undergraduate Advisor. Senior standing in program. Restricted to Architecture majors.

**ARCH 4595. SELECTED TOPICS ARCHITECTURE. 5 Hours.**

A transitional studio course to explore and present selected topics in architecture and design. May be repeated for credit as topics change. Prerequisite: Department consent.

**ARCH 5191. CONFERENCE COURSE. 1 Hour.**

Special subjects and issues as arranged with individual students and faculty members. May be repeated for credit as topic changes.

**ARCH 5291. CONFERENCE COURSE. 2 Hours.**

Special subjects and issues as arranged with individual students and faculty members. May be repeated for credit as topic changes.

**ARCH 5301. INTRODUCTION TO ARCHITECTURE AND INTERIOR DESIGN. 3 Hours.**

A survey study of the interrelationships between society, culture, and architecture. Concurrent enrollment of ARCH 5591 and ARCH 5342 required.

**ARCH 5303. HISTORY OF ARCHITECTURE AND INTERIOR DESIGN I. 3 Hours.**

A global survey of architecture emphasizing the material and cultural context for design. Focused primarily on the period from prehistory through 1750. Prerequisite: Permission of the instructor.

**ARCH 5304. HISTORY OF ARCHITECTURE AND INTERIOR DESIGN II. 3 Hours.**

A global survey of architecture emphasizing the material and cultural context for design. Focused on the period from 1750 to the present. Prerequisite: ARCH 5303 and permission of the instructor.

**ARCH 5305. CITY OF ROME. 3 Hours.**

History, topography, and monuments of Rome and its environs from its legendary founding in 753 B.C. until the 20th Century, with special emphasis on imperial and papal Rome.

**ARCH 5306. URBAN DESIGN. 3 Hours.**

Urban design theory, method, and implementation using contemporary and historic examples.

**ARCH 5307. THE LIFE OF CITIES. 3 Hours.**

A look at a series of world cities by situating their architectural context, with a particular focus on the impact of 20th century modernism and postmodernism on city fabric. Prerequisites: ARCH 2303 & ARCH 2304 or ARCH 5303 & ARCH 5304.

**ARCH 5308. HISTORY OF URBAN FORM. 3 Hours.**

The history of cities as physical form, influenced by political, economic, and social forces.

**ARCH 5309. MUSEUMS: HISTORY, CULTURE, DESIGN. 3 Hours.**

This course investigates the historical and cultural forces driving the design of museums in the 19th and 20th centuries with special attention to the development of a diverse range of new museum types beyond traditional art and natural science museums. Field trips to local museum sites are required. Prerequisite: ARCH 2303 or ARCH 5303 and ARCH 2304 or ARCH 5304. Department consent.

**ARCH 5310. SKYSCRAPER HISTORIES. 3 Hours.**

This course considers the history of the skyscraper from multiple perspectives, seeking consensus about what a skyscraper really is. This course will allow students to begin to develop their skills in reading, writing, critical thinking, visual memory, and visual analysis using the history of architecture as a medium. Students will also develop basic research skills using primary sources to document architecture. Prerequisite: ARCH 2303 or ARCH 5303 and ARCH 2304 or ARCH 5304. Department consent.

**ARCH 5311. ARCHITECTURAL THEORY. 3 Hours.**

A review and analysis of the concepts, philosophy, ideology, and models that promulgated 20th Century architectural design. May be repeated for credit as topics change. Prerequisite: ARCH 2303 or ARCH 5303, ARCH 2304 or ARCH 5304, and permission of the department.

**ARCH 5312. WHAT MAKES A CITY: CRITICAL ISSUES IN ARCHITECTURE, PLANNING, AND URBAN DESIGN. 3 Hours.**

This class is a critical exploration of the physical environment of the city, looking at a range of issues--mobility, housing, landscape, gentrification, sustainability, health--to understand how the built world shapes the way we live every day. Prerequisite: ARCH 2303 or ARCH 5303, ARCH 2304 or ARCH 5304, and permission of the department.

**ARCH 5313. THE ARCHITECT IN CONTEMPORARY SOCIETY. 3 Hours.**

Readings on the Culture of Architecture The focus of this course is to examine this social construct in the belief that critical self-reflection can assist in improving success within it. This examination will be conducted through readings in a collection of publications both historical and contemporary that offer critical insight into the professional/social culture of architects. Prerequisite: ARCH 2303 or ARCH 5303 and ARCH 2304 or ARCH 5304.

**ARCH 5314. HISTORIC PRESERVATION AND RESTORATION. 3 Hours.**

Concepts and implementation of the restoration and preservation of historic structures and places, including archaeological, bibliographic, legislative, institutional, and physical parameters to the retention and adaptive re-use of significant architecture.

**ARCH 5315. TOPICS IN ARCHITECTURAL HISTORY. 3 Hours.**

Courses to explore and present selected topics in architecture and related fields of the Ancient Mediterranean, the Classical World, the Middle Ages, the 19th Century, and the Non-Western Traditions. May be repeated for credit as topics change. Prerequisite: ARCH 2303 or ARCH 5303 and ARCH 2304 or ARCH 5304. Department consent.

**ARCH 5316. MODERN ARCHITECTURE I 1890 TO 1945. 3 Hours.**

Origins and development of Modern Architecture in Europe from 1890 to World War II, and its further evolution in Europe and America from 1918 to 1945. Prerequisites: ARCH 2303 and ARCH 2304.

**ARCH 5317. MODERN ARCHITECTURE II 1945 TO PRESENT. 3 Hours.**

Architectural developments in Europe, Asia, and America since World War II. Prerequisites: ARCH 2303 and ARCH 2304.

**ARCH 5318. ARCHITECTURE ON SCREEN. 3 Hours.**

How do the things we watch shape our perceptions of architecture and the city? How do the environments in film and on television frame our vision, shape character, and convey themes? How are architects and other design professionals portrayed? What do they suggest about changes in the physical and technological world in which we live? This course explores those questions and others through screen history, from the earliest films to contemporary television and digital productions. Themes will include the dystopian city, suburbia, the evolving depiction of modernism, architecture as documentary subject, and the history of the city on screen. Students will explore these questions and will have to make their own short films. Prerequisite: ARCH 2303 or ARCH 5303, ARCH 2304 or ARCH 5304, and permission of the department.

**ARCH 5319. HOUSING PROTOTYPES: 1920s TO PRESENT. 3 Hours.**

An extensive investigation of the many states of housing that architects and educators have encountered in the last 100 years. The course is organized through introduction, research, analysis, and case study of various housing typologies, unit design principles, density concerns, site, relationship of inside and outside, zoning and building codes, and new emerging housing building types. Prerequisite: ARCH 2303 or ARCH 5303 and ARCH 2304 or ARCH 5304.

**ARCH 5320. PERFORMANCE-BASED DESIGN IN ARCHITECTURE. 3 Hours.**

An overview of Performance-Based Building Design (PBBD) in architecture and how clients' expectations are translated into performance requirements, how we describe performance objectives, how we define performance indicators, and finally, how we can quantify and assess building performance.

**ARCH 5321. ADVANCED COMPUTER APPLICATIONS. 3 Hours.**

The study and application of specialized computer programs in environmental design. Prerequisites: ARCH 3343 or INTD 3343 or ARCH 5343, or the equivalent. Department consent.

**ARCH 5322. ARCHITECTURE + POLITICS. 3 Hours.**

This course examines how notions of national identity are expressed in parliament buildings and other important buildings of state. Throughout the course, questions about what constitutes national identity, capital cities, and how architecture is used as a manifestation of these political aspects will be addressed. Buildings within nations or subnational regions across six continents are examined, giving students a global understanding of these issues. Prerequisite: ARCH 2303 or ARCH 5303 and ARCH 2304 or ARCH 5304. Department consent.

**ARCH 5323. CONSTRUCTION MATERIALS AND METHODS. 3 Hours.**

This course discusses the nature of materials and structural concepts to be used in the construction process. The principles and fundamentals of building construction materials and methods is evaluated, and the project development process and construction delivery systems are introduced. The course provides an understanding of building standards and codes; the impact of materials and buildings on the environment and human health, safety, and welfare; the material properties including structural properties of materials as well as performance properties and the major materials and construction systems such as light wood frame, mass timber, and steel and concrete frame construction. Prerequisite: Permission of the instructor.

**ARCH 5324. STRUCTURES I. 3 Hours.**

This course is the foundation for all advanced structures courses in the undergraduate and graduate architecture programs. In an engineering curriculum, this course is offered in two separate courses referred to as: (a) Statics and (b) Strength of Materials, each of one-semester duration. The present course encapsulates the information yet is rigorous enough and covers all important topics in the two engineering courses including equilibrium of particles and rigid bodies, analysis of important structural load bearing items such as cables, beams and Trusses, Definition of Stress and strain and their role in structural design, cross-sectional properties of structural members and analysis of strength for the beams. Prerequisite: ARCH 5323 or ARCH 3323.

**ARCH 5325. ENVIRONMENTAL CONTROL SYSTEMS I. 3 Hours.**

Illumination, acoustics, climate controls, mechanical and electrical systems, and their significance in the total design.

**ARCH 5326. ENVIRONMENTAL CONTROL SYSTEMS II. 3 Hours.**

Climate controls, mechanical and electrical systems, and their significance in the total design.

**ARCH 5327. STRUCTURES II. 3 Hours.**

This course is a continuation of ARCH 5324 with an emphasis on structural theory and systems in steel construction. It covers the design and investigation of structural steel. The course begins with a general introduction to structural behavior, strength, and modulus of elasticity of steel material. The elastic and plastic behavior of structural steel material is discussed, and the definition of yield strength is addressed as one of the main structural measures of steel material. Loads and load combinations are the next part of the course. This part describes how the gravity and lateral loads are distributed in a steel structure and what combination of loads should be considered for the design. To address the requirements of the design of structural members, simple methods of structural analysis are covered by which the internal moments and shear in members can be found. The course is continued by formulating and step by step description of the design of decks, beams and girders, open-web steel joists and joist girders as well as columns. Prerequisite: ARCH 5324.

**ARCH 5328. STRUCTURES III. 3 Hours.**

This course is a continuation of ARCH 5327 with an emphasis on structural theory and systems in concrete construction. It covers the design and investigation of structural concrete. The course begins with a general introduction to structural behavior, strength, and modulus of elasticity of concrete material. To ensure that the concrete has the required minimum strength, special field sampling and tests are necessary. Loads and load combinations are the next part of the course. This part describes how the gravity and lateral loads are distributed in a concrete structure and what combination of loads should be considered for the design. To address the requirements of the design of structural members, a simplified method of structural analysis is defined by which the internal moments and shear in members can be found. Course is continued by formulating and step by step description of the design of beams, columns, and footings in a concrete structure. Prerequisite: ARCH 5327.

**ARCH 5329. TOPICS IN COMPUTERS AND DESIGN. 3 Hours.**

Computer aided design, drafting and graphic techniques as applied to architecture. May be repeated for credit as topics change.

**ARCH 5330. COMPARATIVE STRUCTURES. 3 Hours.**

Comparative analysis and design of structural systems and construction techniques, including architectural and economic determinants. Prerequisite: ARCH 5328 or permission of the instructor.

**ARCH 5331. PROFESSIONAL PRACTICE. 3 Hours.**

Survey of the administrative functions, and the ethical and legal responsibilities of the architect. Prerequisite: ARCH 5670.

**ARCH 5332. ENERGY USE AND CONSERVATION IN ARCHITECTURE. 3 Hours.**

Basic concepts of the efficient use and conservation of energy related to architectural design principles. Prerequisite: permission of the instructor.

**ARCH 5333. CONSTRUCTION II. 3 Hours.**

Advanced construction assemblies and methods, including the principles of cost control. Prerequisites: ARCH 5670.

**ARCH 5335. ADVANCED PROFESSIONAL PRACTICE II: MARKETING DESIGN SERVICES. 3 Hours.**

A study of the strategies and methods for marketing professional services. Presented as case studies of architecture, interior design, and landscape architecture firms.

**ARCH 5336. PROGRAMMING AND SITE DESIGN II. 3 Hours.**

The course focuses on project programming and the technical aspects of site design. Prerequisite: ARCH 5670.

**ARCH 5337. SOILS AND FOUNDATIONS. 3 Hours.**

Soil classifications, field and laboratory identification, physical properties and load-bearing characteristics, retaining walls and foundations.

**ARCH 5338. CODES AND REGULATIONS. 3 Hours.**

A study of accessibility, building and energy codes and related regulations including the architects' responsibility for compliance. Prerequisite: Permission of Department.

**ARCH 5339. DIGITAL FABRICATION METHODOLOGY. 3 Hours.**

The conceptualizing and making of objects lying outside the traditional scope of architectural practice, including elements of industrial and product design and the development of working prototypes.

**ARCH 5340. MODERN + CONTEMPORARY ARCHITECTURE IN MEXICO. 3 Hours.**

This course examines notions of Mexican national identity as expressed through architecture. Part 1 looks at late 19th and early 20th century architecture during the Porfiriato, as well as that occurring shortly after the Mexican Revolution of 1910-20, including the critical role that cement played. Part 2 considers how the so-called First Generation of architects adapted and transformed Modernism in Mexico. Part 3 examines how the Second and Third Generations moved beyond Modernism, including. The course concludes with Mexico's "First Generation" of women architects as issues of gender are addressed. Prerequisite: ARCH 2303 or ARCH 5303 and ARCH 2304 or ARCH 5304. Department consent.

**ARCH 5341. NOTATIONAL DRAWING. 3 Hours.**

Seminar concerned with analytical drawing techniques and how to use the sketchbook as a tool and process for architectural production. Emphasis will be on cultivating drawing strategies that will heighten the ability to make observations through first-hand experience and record them with the correct conventions in order to enable recovery for future use in architectural design.

**ARCH 5342. DESIGN COMMUNICATIONS. 3 Hours.**

Architectural drawing, perception, projections, and three-dimensional representation. Prerequisite: Concurrent enrollment in ARCH 5591 is required.

**ARCH 5343. ARCHITECTURAL GRAPHICS II. 3 Hours.**

An advanced course to develop visual sensitivity and awareness of digital techniques to enable the student to study design ideas and present those ideas in the various design disciplines. Emphasis on the relationship of computer graphics to the design process. Prerequisite: ARCH 5342 or program approval.

**ARCH 5344. CONCEPTUAL DRAWING. 3 Hours.**

Seminar to explore aspects of conceptual drawing for the architect and the relationship of design ideas in the drawing process.

**ARCH 5345. DIGITAL CONSTRUCTION. 3 Hours.**

A workshop exploring video cartography using photography, animation, motion graphics and digital video.

**ARCH 5346. CONSTRUCTION DRAWINGS I. 3 Hours.**

The techniques of building construction, the communication of technical information, and the process of preparing contract drawings for construction.

**ARCH 5347. DIGITAL TECTONICS & PROTOTYPING. 3 Hours.**

The use of digital technology in the architectural design process focusing on the research and fabrication of full-scale production of prototypes. Completion of ARCH 4339 or ARCH 5339 Digital Fabrication Methodology is highly recommended.

**ARCH 5348. ARCHITECTURAL PHOTOGRAPHY. 3 Hours.**

The use of photography as an investigative and presentation medium in architecture. Emphasis on composition in black and white technique.

**ARCH 5349. ARCHITECTURE PORTFOLIO. 3 Hours.**

Seminar concerned with goal toward the production of a personal design portfolio.

**ARCH 5350. ARCHITECTURE, ENGAGEMENT + COMMUNITY POWER. 3 Hours.**

Architecture, Engagement and Community Power will unpack the role of the citizen architect. It will examine participatory design processes that center community voice and shift existing power structures. In this country, constructed systems of oppression including racist practices, policies and financial systems have shaped the way our neighborhoods have developed. These acts have created inequities across communities that impact one's ability to thrive. Starting from the notion that all places are designed, and can therefore be undesigned, this course will explore the ways in which design processes can strengthen community power for marginalized communities. This course will encourage activism as an inherent quality in the development of an architect; encourage students to make connections between classroom learning and the larger community; require students to develop the skill to see and hear multiple voices; and encourage the development of visual, written, & oral communication tools. Prerequisite: ARCH 2303 or ARCH 5303 and ARCH 2304 or ARCH 5304. Department consent.

**ARCH 5351. WILDERNESS: A CONDITION OF MIND. 3 Hours.**

Changing conceptions of wilderness in Western thought, from ancestral prejudices to recent, revolutionary appreciation. Literary and visual documentation.

**ARCH 5352. HOUSING: FROM CAVES TO MANSIONS IN THE CLOUDS. 3 Hours.**

This course examines the evolution of American urban settlements as they evolved from French, Spanish and English concepts of town-planning.

**ARCH 5354. CONVERGENCES: BETWEEN ART AND ARCHITECTURE. 3 Hours.**

This course explores the convergences of artist methods of production with the processes of architectural practices. The course traces the work of leading filmmakers, both artistic and documentarian, whose professional leanings verge on the province of the architect.

**ARCH 5355. HEMISPHERES. 3 Hours.**

The study and analysis of Japanese arts and contemporary culture. The arts of ceramics, painting, calligraphy, and sculpture are examined. Prerequisite: departmental approval.

**ARCH 5357. BUILDING INFORMATION MODELING & VISUALIZATION. 3 Hours.**

To gain a working knowledge of Autodesk Revit and 3D Studio Max. Prerequisites: ARCH 3343 or ARCH 5343 or INTD 3343.



**ARCH 5361. ARCHITECTURE AND ENVIRONMENT. 3 Hours.**

An overview of sustainable design integrated with natural resource conservation.

**ARCH 5362. STRUCTURAL SYSTEMS IN BUILDING. 3 Hours.**

An overview of various structural systems including those used in long-span and high-rise buildings. Numerical work limited to the explanation of relevant structural concepts. Prerequisite: ARCH 5324.

**ARCH 5363. DESIGN RESEARCH. 3 Hours.**

Seminar directed toward the understanding of research methods and the programming of an independent design project, leading to the thesis substitute. Graded P/F/R. Prerequisite: Permission of Graduate Advisor.

**ARCH 5364. SITE DESIGN. 3 Hours.**

The related site design process includes site planning pertaining to land use, case studies, siting of structures, codes, and topography.

**ARCH 5365. CATALYTIC MAPPING. 3 Hours.**

An advanced theory elective course and workshop using the potential of mapping as a design, analytic and research mechanism for exploring complex contexts.

**ARCH 5366. RADICAL URBANISM. 3 Hours.**

An advanced theory course focused on the exposure to and critical analysis of some of the most radical, inspirational, and transformative urban design ideas and projects from Vitruvius to today.

**ARCH 5367. HIGH PERFORMANCE FACADE SYSTEMS. 3 Hours.**

Examines the role of the façade and building envelope as it relates to design, indoor comfort, energy and carbon usage, and overall performance through an exploration of materiality, assembly, and construction. The course also introduces the potential of generative technologies, smart materials, passive-active combinations, and integrated systems.

**ARCH 5368. GREEN DESIGN + CONSTRUCTION. 3 Hours.**

Green building design, construction, and operation is an opportunity to reduce negative impacts on the environment, and the health and comfort of building occupants, thereby improving building performance. It provides cost savings to all tax-payers through improved human health and productivity, lower cost building operations, and resource efficiency. Green design and construction focuses on strategies and technologies to improve the energy efficiency and performance of buildings, and to reduce the environmental impact of buildings. The course emphasizes on different aspects of green building during all phases of a building's life-cycle, including design, construction, operation and decommissioning. All LEED categories are covered throughout the course and students get prepared to take LEED Green Associate exam by the end of the semester.

**ARCH 5369. TERRITORIAL STRATEGIES. 3 Hours.**

Territorial Strategies focus on climate resilience of the built environment on the territorial scale. In Territorial Strategies, students explore how macro-level drivers of spatial (trans)formation impact micro-level strategies and actions in distinct climatic regions. Students apply a systems-thinking approach to map, diagram, model, draw, and visualize project outcomes, research findings, and data through various media. Prerequisite: Graduate level in Architecture, Landscape Architecture, Urban Planning, and Public Administration and Public Policy majors.

**ARCH 5370. ADVANCED DESIGN STUDIO. 3 Hours.**

Studio course in the generation and development of architectural ideas in formal and environmental contexts. May be repeated for credit. Two of these courses are equivalent to ARCH 5670.

**ARCH 5371. FUTURE CITIES. 3 Hours.**

Future Cities focus on climate resilience of the built environment on the urban scale. In Future Cities, students explore historical and contemporary concepts of ecological design and combine mitigative and adaptive strategies and actions for urban landscapes in the age of anthropogenic climate change. Students apply a participatory mixed-methods approach to map, diagram, model, draw, and visualize project outcomes, research findings, and data through various media. Prerequisite: Graduate level in Architecture, Landscape Architecture, Urban Planning, and Public Administration and Public Policy majors.

**ARCH 5372. ADAPTIVE TYPOLOGIES. 3 Hours.**

Adaptive Typologies focus on climate resilience of the built environment on the architectural object scale. In Adaptive Typologies, students explore architectural objects, their characteristics, and their performative aspects as integrated parts of the urban ecosystem. Students analyze, transform, and develop hybrid typologies merging physical, digital, and biological concepts and apply a digital mixed-methods approach, utilizing analytical, representational, and generative tools. Prerequisite: Graduate level in Architecture, Landscape Architecture, Urban Planning, and Public Administration and Public Policy majors.

**ARCH 5377. SPATIAL [IN] JUSTICE. 3 Hours.**

Through lectures and discussions, Spatial [in] Justice will provide students with historical perspectives on how American cities became segregated, the creation and lack of inclusivity of 'public space', and the architect's role within a socially engaged practice. The course will begin by studying key philosophies and theories of justice. Students will work with a community partner to produce a community engagement and development plan. They will research publicly available data and organize it into a package for the community and other stakeholders. Prerequisite: ARCH 2303 or ARCH 5303 and ARCH 2304 or ARCH 5304. Department consent.

**ARCH 5381. PRACTICUM. 3 Hours.**

Internship program including work done through an approved architect's office, designed to give practical experience leading to a broader knowledge of the profession. Placement in offices must be approved, and in some cases may also be arranged by the school. Students may enroll in ARCH 5381 for half-time employment or ARCH 5681 for full-time employment. Students enrolled in Practicum may also participate in the Intern Development Program of the American Institute of Architects. No more than six total credit hours in Practicum are allowed for degree. Graded P/F/R.

**ARCH 5391. CONFERENCE COURSE. 3 Hours.**

Special subjects and issues as arranged with individual students and faculty members. May be repeated for credit as content changes. Prerequisite: Permission of Graduate Advisor.

**ARCH 5395. TOPICS IN ARCHITECTURE. 3 Hours.**

Studio, lecture or seminar courses to explore and present special topics in architecture and environmental design. May be repeated for credit as topics change.

**ARCH 5591. DESIGN STUDIO I. 5 Hours.**

An intensive studio course in architectonic theory and operations. Emphasis on analytic, conceptual, and manipulation procedures.

**ARCH 5592. DESIGN STUDIO II. 5 Hours.**

Continuation of ARCH 5591. Studio course emphasizing the interrelationship of formal/spatial ideas, use, and the building fabric. Prerequisite: ARCH 5591.

**ARCH 5593. DESIGN STUDIO III. 5 Hours.**

Continuation of ARCH 5592. Studio course emphasizing the interrelationship of formal/spatial ideas, use, and the building fabric with special attention to the urban context. Prerequisite: ARCH 5592.

**ARCH 5594. DESIGN STUDIO IV. 5 Hours.**

Continuation of ARCH 5593. Emphasis on complex building designs in urban environments. Off campus study may be substituted. Prerequisite: ARCH 5593.

**ARCH 5665. INTERMEDIATE DESIGN STUDIO. 6 Hours.**

Advanced architectural design problems in programming, schematic organization, synthesis and design of buildings in their environmental context.

**ARCH 5670. ADVANCED DESIGN STUDIO. 6 Hours.**

Studio course emphasizing the analysis and design of building aggregations within the urban context. May be repeated for credit.

**ARCH 5671. INTEGRATIVE DESIGN STUDIO I. 6 Hours.**

Introduces the design of a small to moderate scaled architectural building program. Focus on pre-design, site design, structural resolution, building assembly, building performance, detailing and materiality will be made through graphical identification, analysis, and evaluation. Additional considerations of codes, regulations, cost analysis, and life-cycle cost, are areas of emphasis informing the design process. Prerequisite: ARCH 5325 or ARCH 4325, ARCH 5327, and ARCH 5670. Credit or concurrent enrollment in ARCH 5357, ARCH 4357, or INTD 3357.

**ARCH 5672. INTEGRATIVE DESIGN STUDIO II. 6 Hours.**

Introduces the design of a larger-scaled architectural project with more complex programming requirements. Focus on the integration of environmental stewardship, accessibility, site conditions, life safety, environmental systems, structural systems, and building envelope systems will be made through graphical identification, analysis, and evaluation, and technical documentation. Project demonstration includes problem identification, contextual evaluative criteria, analyzing solutions, and predicting the effectiveness of implementation. Prerequisite: ARCH 5671 with a grade of C or above.

**ARCH 5681. PRACTICUM. 6 Hours.**

Internship program including work done through an approved architect's office, designed to give practical experience leading to a broader knowledge of the profession. Placement in offices must be approved, and in some cases may also be arranged by the school. Students may enroll in ARCH 5381 for half-time employment or ARCH 5681 for full-time employment. Students enrolled in Practicum may also participate in the Intern Development Program of the American Institute of Architects. No more than six total credit hours in Practicum are allowed for degree. Graded P/F/R.

**ARCH 5691. CONFERENCE COURSE. 6 Hours.**

Special subjects and issues as arranged with individual students and faculty members. May be repeated for credit. Prerequisite: Permission of Graduate Advisor.

**ARCH 5693. DESIGN THESIS. 6 Hours.**

Individual study project conducted by a supervising committee, with program and statement of intent to be filed with the Graduate Advisor during the previous semester. Graded R. Prerequisite: ARCH 5363.

**ARCH 5695. TOPICS IN ARCHITECTURE. 6 Hours.**

Studio, lecture or seminar courses to explore and present special topics in architecture and environmental design. May be repeated for credit as topics change. Prerequisite: Permission of Graduate Advisor.

**ARCH 5698. RESEARCH THESIS. 6 Hours.****COURSES****AREN 1105. INTRODUCTION TO ARCHITECTURAL ENGINEERING. 1 Hour.**

Introduction to basic architectural engineering practice. There are several writing assignments and an oral presentation. Use of spreadsheet and word processor software in solving architectural engineering problems and presenting solutions. Professional engineering licensure and the various specializations within civil engineering are covered.

**AREN 1152. INTRODUCTION TO CONSTRUCTION DRAFTING. 1 Hour.**

This course will introduce students to basic concepts of construction drafting including an introduction to orthographic drawings (plans, sections, elevations), principles of scale, line weight, drawing types and drawing conventions. The course introduces students to 2-dimensional Computer Aided Design tools which they use to produce the construction drawings. Prerequisite: Grade of C or better in MATH 1421; or concurrent enrollment in MATH 1426 or HONR-SC 1426; or grade of C or better in MATH 1426 or HONR-SC 1426.

**AREN 1205. INTRODUCTION TO ARCHITECTURAL ENGINEERING. 2 Hours.**

This course introduces students to the education and practice of architectural engineering, a discipline of engineering that prepares engineers to work effectively on teams that are creating buildings. Course content addresses engineering ethics, professional licensure, sustainability, creative approaches to problem solving and the role of architectural engineering and other engineering disciplines on building construction projects.

**AREN 1252. COMPUTER TOOLS - AUTOCAD. 2 Hours.**

Introduction to computer aided design, using AutoCAD. Creation of precise two-dimensional engineering drawings and solid models. Prerequisite: Grade of C or better in MATH 1421.

**AREN 2152. COMPUTER TOOLS - MATHCAD. 1 Hour.**

Introduction to computer aided mathematics, using Mathcad. Solution of engineering problems involving systems of simultaneous linear and nonlinear equations and elementary calculus, use of the tools for visualization. Prerequisite: Grade of C or better in PHYS 1443.

**AREN 2153. COMPUTER TOOLS - CIVIL 3D. 1 Hour.**

Introduction to civil engineering construction documentation and building information modeling (BIM) using AutoCAD Civil 3D. Prerequisite: Grade of C or better in AREN 1252.

**AREN 2191. PROBLEMS IN ARCHITECTURAL ENGINEERING. 1 Hour.**

Selected problems in architectural engineering on an individual or group basis. Reference material is assigned and progress conferences are held frequently, by arrangement, with a faculty supervisor. Prerequisite: Permission of the department chair.

**AREN 2213. BUILDING SCIENCE. 2 Hours.**

This course introduces the physical phenomena that affect human comfort and building energy performance. The basic principles of thermodynamics applied to building systems are discussed to understand heat and mass transfer analysis techniques. This includes development and application of energy balance equation and psychrometric process with respect to building energy performance. Prerequisite: Grade of C or better in CHEM 1465 and PHYS 1444.

**AREN 2221. DYNAMICS. 2 Hours.**

Planar and spatial kinematics and kinetics of particles and rigid bodies utilizing Newton's Laws of Motion, the principle of work and energy, and the principle of impulse and momentum; introduction to single degree of freedom vibration. Prerequisite: Grade of C or better in AREN 2311; grade of C or better in MATH 2425.

**AREN 2252. INTRODUCTION TO CONSTRUCTION DRAFTING. 2 Hours.**

This course will introduce students to basic concepts of construction drafting including an introduction to orthographic drawings (plans, sections, elevations), principles of scale, line weight, drawing types and drawing conventions. The course introduces students to 2-dimensional Computer Aided Design tools which they use to produce the construction drawings. Prerequisite: Grade of C or better in MATH 1421; or concurrent enrollment in MATH 1426 or HONR-SC 1426; or grade of C or better in MATH 1426 or HONR-SC 1426.

**AREN 2291. PROBLEMS IN ARCHITECTURAL ENGINEERING. 2 Hours.**

Selected problems in architectural engineering on an individual or group basis. Reference material is assigned and progress conferences are held frequently, by arrangement, with a faculty supervisor. Prerequisite: Permission of the department chair.

**AREN 2311. STATICS. 3 Hours.**

Vector algebra; composition and resolution of forces; equivalence of force couple systems; equilibrium of force systems acting on particles, and force - couple systems acting on rigid bodies, and systems of rigid bodies; internal forces in rigid bodies; shear and moment diagrams; centroids and moments of inertia; frictional forces. Prerequisite: Grade of C or better in PHYS 1443.

**AREN 2312. STATICS & DYNAMICS FOR AREN. 3 Hours.**

Principles of forces and force systems, resultants and components of force systems, forces due to friction, condition of equilibrium, forces acting on members of trusses and frame structures, centroids and moments of inertia, review of kinematics and kinetics of particle motion, and two-dimensional motion of rigid bodies. Prerequisite: Grade of C or better in MATH 2425 (or concurrent enrollment) and PHYS 1443 (or concurrent enrollment).

**AREN 2313. MECHANICS OF MATERIALS I. 3 Hours.**

Concepts of stress and strain; stress-strain relationships. Behavior of members subjected to tension, compression, shear, bending, torsion, and combined loading. Deflections and elastic curves, shear and bending moment diagrams for beams, and column theory. Prerequisite: Grade of C or better in AREN 2311; Grade of C or better in MATH 2425.

**AREN 2315. CONSTRUCTION MATERIALS AND METHODS. 3 Hours.**

Materials, methods and sequences of the construction process; emphasis on design, specification, purchase and use of concrete, steel, masonry and wood. An understanding of the uses of construction materials. Prerequisite: Grade of C or better in AREN 1205.

**AREN 2321. BUILDINGS AND THE ENVIRONMENT. 3 Hours.**

A general engineering course on geological materials and processes that interact with the built environment and are critical to architectural engineering including: 1) mineral and rock formation processes; rock mechanics and deformation, weathering, erosion and soils; soil hazards, land subsidence and mass movements; groundwater geology, 2) Interactions between plate tectonics, atmosphere, oceans, and human built environment, 3) Nature and variability of weather and climate, including wind, temperature, clouds and precipitation, droughts, and flooding. Storm systems, fronts, thunderstorms, tornadoes, hurricanes. Relevant topics toward the interactions between buildings and the natural environment are included. Prerequisite: Grade of C or better in AREN 1205.

**AREN 2391. PROBLEMS IN ARCHITECTURAL ENGINEERING. 3 Hours.**

Selected problems in architectural engineering on an individual or group basis. Reference material is assigned and progress conferences are held frequently, by arrangement, with a faculty supervisor. Prerequisite: Permission of the chair of the department.

**AREN 3110. ARCHITECTURAL ENGINEERING COMMUNICATIONS. 1 Hour.**

Technical writing, oral communication, professional presentations, and other related topics. Prerequisite: Grade of C or better in COMS 2302.

**AREN 3143. PROPERTIES AND BEHAVIOR OF SOILS. 1 Hour.**

An introduction to determination of civil engineering properties of soil and their behavior, identification, grain size analysis, Atterberg limits, compaction, permeability, consolidation, and shear strength. Also an introduction to sampling of soil materials. Prerequisite: Concurrent enrollment in AREN 3343.

**AREN 3191. PROBLEMS IN ARCHITECTURAL ENGINEERING. 1 Hour.**

Selected problems in architectural engineering on an individual or group basis. Reference material is assigned and progress conferences are held frequently, by arrangement, with a faculty supervisor. Prerequisite: Permission of the department chair.

**AREN 3218. ARCHITECTURAL ENGINEERING GEOMETRIC DESIGN TOOLS. 2 Hours.**

This course will address principles of Euclidean and non-Euclidean Geometry in the area of architectural engineering. Topics include golden ratio, golden mean, geodesics on surfaces, conic sections, parametric equations with focus on the techniques, skills, and modern engineering tools necessary for architectural engineering practices. Prerequisite: MATH 1421 or equivalent, AREN 1205.

**AREN 3291. PROBLEMS IN ARCHITECTURAL ENGINEERING. 2 Hours.**

Selected problems in architectural engineering on an individual or group basis. Reference material is assigned and progress conferences are held frequently, by arrangement, with a faculty supervisor. Prerequisite: Permission of the department chair.

**AREN 3301. STOCHASTIC MODELS FOR CIVIL ENGINEERING. 3 Hours.**

Basic theory of probability and statistics with practical applications to civil and environmental engineering problems. Emphasis on sampling, distribution functions, tests of significance, and regression modeling. Prerequisite: Grade of C or better in MATH 2425.

**AREN 3305. BASIC FLUID MECHANICS. 3 Hours.**

Fundamentals of fluid statics, kinematics of fluid flow, fluid energy, fluid forces, similitude, and dimensional analysis. Related to steady flow of incompressible fluids in confined and free surface systems. Prerequisite: Grade of C or better in AREN 2311; Grade of C or better in MATH 3319 or concurrent enrollment.

**AREN 3311. CONSTRUCTION ENGINEERING. 3 Hours.**

Principles of construction engineering and the project management process, value engineering, specifications, different construction contracts and delivery methods, estimating and scheduling fundamentals and project control, and management of construction process. Prerequisite: Grade of C or better in IE 2308.

**AREN 3315. BUILDING HYDRAULIC SERVICE SYSTEMS. 3 Hours.**

This course takes a system-based approach to the analysis and design of hydraulic building systems, ensuring they meet the operational requirements of architectural spaces in compliance with the International Building Code. Topics include: 1) stormwater management & collection system design, 2) sewage management & sanitary plumbing system design, 3) domestic water distribution (cold & hot water systems and water heating system design), 4) gas distribution system design, 5) fire suppression & firefighting water distribution systems, 6) design of retention tanks, clear water storage, fire safety tanks, sump tanks, and temporary detention systems during construction. Prerequisite: Grade of C or better in AREN 3305.

**AREN 3330. APPLICATIONS OF BUILDING CODES IN ARCHITECTURE. 3 Hours.**

An engineering-based approach to architecture, space planning, and occupant safety focused on the technical aspects associated to engineering an architectural space per the International Building Code. Topics included are: occupant load calculations and sizing of facilities, space programming aspects (room sizing and window sizing), acoustic, noise control, & thermal considerations in space planning, circulation aspects (vertical and horizontal circulations and ADA, elevator specification and stair design), fire safety aspects (emergency egress, fire resistance of the structure & building envelope/enclosures, suppression, detection and alarm, smoke control, first responder considerations), considerations in engineering architectural finishes (smoke development, flame spread, indoor air quality & volatile organic compounds). Prerequisite: Grade of C or better in AREN 2315.

**AREN 3331. MECHANICAL AND ELECTRICAL SYSTEMS. 3 Hours.**

Mechanical and electrical systems with a major emphasis on estimating and installation, design and control of the electrical, heating, ventilation and cooling system, site planning and acoustical treatments. Prerequisite: Grade of C or better in PHYS 1444.

**AREN 3341. STRUCTURAL ANALYSIS. 3 Hours.**

Structural analysis/design process, structural forms, and basic structural elements. Analysis of statically determinate structures including beams, trusses, frames, and composite structures, shear and moment diagrams, influence lines, and moving loads. Methods to compute deflections including double integration, moment area, and virtual work. Methods of analysis for statically indeterminate structures including consistent deformation, slope deflection and moment distribution. Use of structural analysis programs. Prerequisite: Grade of C or better in AREN 2313.

**AREN 3343. SOIL MECHANICS. 3 Hours.**

An introduction to the significant geophysical and soil science properties and behavior of materials making up the earth's crust as they apply to civil engineering, sources of materials, classification, plasticity, permeability, stress distribution, consolidation, shear strength, and settlement. Also an introduction to basic foundation engineering concepts. Prerequisite: Grade of C or better in AREN 2313; Concurrent enrollment in AREN 3143.

**AREN 3346. ELECTRICAL SYSTEMS & LIGHTING FOR ARCHITECTURAL ENGINEERS. 3 Hours.**

Basic fundamentals of electrical principles and electric lighting principles; application of basic electrical science for the design and specification of electrical systems and lighting for buildings using modern techniques; safety and protection systems in buildings and national electrical code and standards. Prerequisite: Grade of C or better in MATH 2425 (or HONR-SC 2425) and PHYS 1444; Admission to the AREN Professional Program.

**AREN 3391. PROBLEMS IN ARCHITECTURAL ENGINEERING. 3 Hours.**

Selected problems in architectural engineering on an individual or group basis. Reference material is assigned and progress conferences are held frequently, by arrangement, with a faculty supervisor. Prerequisite: Permission of the department chair.

**AREN 4300. ADVANCED TOPICS IN ARCHITECTURAL ENGINEERING. 3 Hours.**

Advanced topics of current interest in any one of the various fields of architectural engineering. The subject title to be listed in the class schedule. May be repeated for credit when topic changes. Prerequisite: Consent of instructor required and Admission to the AREN Professional Program.

**AREN 4301. ADVANCED TOPICS IN ARCHITECTURAL ENGINEERING WITH LAB. 3 Hours.**

Advanced topics of current interest in any one of the various fields of architectural engineering. The subject title to be listed in the class schedule. May be repeated for credit when topic changes. Prerequisite: Consent of instructor required and Admission to the AREN Professional Program.

**AREN 4307. CONSTRUCTION SUSTAINABILITY. 3 Hours.**

Types of construction contracts, contractual relationship between general contractor and owner, contractual relationship between general contractor and subcontractors, legal issues in construction administration, insurance, and concepts in value engineering. Reading and evaluating specifications, CSI Master Format. Credit not granted for both AREN 4307 and CE 5382. Prerequisite: Grade of C or better in AREN 3311; Admission to the AREN Professional Program.

**AREN 4309. THERMODYNAMICS FOR ARCHITECTURAL ENGINEERS. 3 Hours.**

Basic concepts and definitions of thermodynamics, entropy, and introduction to first law of thermodynamics, second law of thermodynamics, and introduction to conductive, convective, and radiative transfer. Application of thermodynamics to building heating, cooling and ventilation (HVAC) systems; use of modern techniques for design and specifications of selected thermal and mechanical systems for buildings. Prerequisite: Grade of C or better in MATH 2425 (or HONR-SC 2425), PHYS 1444, and CHEM 1465 (or concurrent enrollment) or CHEM 1441 and CHEM 1442 (or concurrent enrollment).

**AREN 4314. TECHNOLOGIES FOR HIGH PERFORMANCE BUILDINGS. 3 Hours.**

Post design & construction phase, it is important to continuously monitor, operate, improve building performance for energy efficiency and occupant comfort. This course discusses various topics in high performance buildings with hands-on learning experiences using practical skills, including 1) sensing & control for building environmental systems, 2) post occupancy evaluation for occupant comfort & health, 3) sustainable building retrofits, and 4) smart building systems. Prerequisite: Grade of C or better in AREN 2213. Admission to the AREN Professional Program.

**AREN 4316. BUILDING STRUCTURAL SYSTEMS. 3 Hours.**

Structural system-based approach to analysis & design of steel building structural systems under gravity and lateral loads per American Institute of Steel Construction (AISC 360 & AISC 341 & ACI 318) & American Society of Civil Engineering (ASCE 7) criteria including: 1) Ordinary Concentrically Braced Frames & Tension Elements, 2) Special Concentrically Braced Frames & Compression Elements, 3) Ordinary/Intermediate Moment Frames & Bending Elements, 4) Truss Moment Frames, 5) Eccentrically Braced Frames & Shear Elements, 6) Special Moment Frames & Axial/Moment Interaction, 7) Floor Systems (Diaphragm and Composite Action), 8) Foundations Systems and Integration of Steel Elements with RC Foundation Elements. Prerequisite: Grade of C or better in AREN 3341 and admission to the AREN professional program.



**AREN 4318. MACHINE LEARNING IN CIVIL ENGINEERING. 3 Hours.**

Machine learning is transforming the way we approach problems across all fields of civil and environmental engineering. This course is designed for students across various concentrations to offer a broad perspective on how data science and machine learning can reshape the future of Civil and Environmental engineering. You will learn how machine learning techniques can be applied to analyze and improve a wide range of engineering systems—from smart buildings and geotechnical infrastructure to water resources and transportation networks. Whether working with big data, such as GPS tracking data for traffic flow, satellite images for environmental monitoring, and IoT sensor data in buildings, or small data, such as soil properties for construction site assessment and water distribution system restoration after disasters, machine learning can uncover patterns and insights to improve efficiency, reliability, and resilience of the components or systems. Students will learn how to select and build models for regression, classification, and clustering, and apply them to tackle real-world challenges across various engineering disciplines. Through case studies and practical exercises in Python and Jupyter Notebooks, you will also gain valuable skills in exploratory data analysis, machine learning model construction and validation, and result visualization. Credit not granted for both AREN 4318 and CE 4318. Prerequisite: Grade of A or better in AREN 3301 or consent of instructor and admission to the AREN Professional Program.

**AREN 4320. SYSTEM RESILIENCE, RELIABILITY, & PERFORMANCE IN AREN. 3 Hours.**

This course focuses on risk & reliability aspects of architectural engineering, applied to design & performance of various building systems. Students will explore probabilistic analysis and reliability-based design principles for hydraulic systems (storm drainage, water distribution, sewage), HVAC systems (thermal loads, system reliability), electrical systems (load factors, redundancy), and structural systems (load combinations, vertical & lateral loads, performance expectations). Emphasis is placed on how uncertainty & variability are quantified in each system to ensure resilience, reliability, and performance. Prerequisite: Grade of C or better in AREN 3301, AREN 3315, AREN 3346, AREN 4331, and AREN 4347 and admission to the AREN Professional Program.

**AREN 4326. GIS/HYDROLOGIC & HYDRAULIC MODELING. 3 Hours.**

Use of Geographic Information Systems (GIS) and design of GIS-developed hydrologic/hydraulic models commonly applied in the water resources field. The course will have three main areas of emphasis including: principles and operations of ArcGIS, design and implementation of standard hydrologic and hydraulic models, and the linkage of these models to engineering analysis of current water resources problems including flooding, water quality and water supply. Prerequisite: Grade of C or better in AREN 3305; Admission to the AREN Professional Program.

**AREN 4331. BUILDING HVAC SYSTEMS DESIGN. 3 Hours.**

This course will introduce the fundamental principles and engineering procedures for basic building science; design of heating, ventilating, and air conditioning (HVAC) systems; system and equipment selection; and duct design and layout. This course will also include energy conservation techniques and computer applications, including building energy modeling. Prerequisite: Grade of C or better in PHYS 1444; Admission to the AREN Professional Program.

**AREN 4334. DRONES & ADVANCED CONSTRUCTION TECHNOLOGY. 3 Hours.**

A practical course for technologies and their applications used on construction job sites. Topics include drones (also known as sUAS, or small unmanned aircraft systems), robotics, extended reality, artificial intelligence, blockchain, wearables, etc. Practical sessions are included to train students to operate drones for various construction applications. Credit not granted for both CE 4334 and AREN 4334. Prerequisite: Grade of C or better in AREN 3311; Admission to the AREN Professional Program.

**AREN 4341. SUSTAINABLE BUILDING ENERGY MODELING. 3 Hours.**

This course will introduce a whole process of net-zero energy building design in which students work in teams to design, analyze, and provide full documentation for a net-zero energy building. Students are expected to effectively and affordably integrate principles of building science, construction engineering and management, economic analysis, and architectural design in an integrated design process. The course projects will align with a design competition, typically the Department of Energy's Solar Decathlon Design Challenge. The course prepares the next generation of architects, engineers, and construction managers with skills and expertise to start their careers and generate creative solutions for real-world net zero energy buildings. Prerequisite: Grade of C or better in AREN 3213; Admission to the AREN Professional Program.

**AREN 4343. HUMAN INTERACTION IN THE BUILT ENVIRONMENT. 3 Hours.**

Understanding human interaction in the built environment is critical for assessing comfort levels and system performance. This course would cover theories of human computer interaction, environmental monitoring, and advanced data analytics. Students would be given a hands-on opportunity to build their own data acquisition system to collect and model human behavior. This course meets the emerging trend in a nexus of computer science and facility management. Prerequisite: Admission to the AREN Professional Program.

**AREN 4347. REINFORCED CONCRETE DESIGN. 3 Hours.**

An analysis, design and synthesis course for concrete structures, emphasizing strength design method. Topics include strength and serviceability requirements, design of one way slabs, rectangular beams, flanged sections and columns, for strength, shear, bond, bearing, and serviceability. Building codes, American Concrete Institute (ACI) specifications, material specifications, test methods, and recommended practice documents are involved. Prerequisite: Grade of C or better in AREN 3341 and admission to the AREN Professional Program.

**AREN 4348. STRUCTURAL DESIGN IN STEEL. 3 Hours.**

A design synthesis course for structural steel structures using Allowable Strength Design and Load Resistance Factor Design. Topics include tension members, compression members, flexural members and simple connections. Building codes, American Institute of Steel Construction (AISC) specs, material specs, test methods, and recommended practice documents. Prerequisite: Grade of C or better in AREN 3341 and admission to the AREN Professional Program.

**AREN 4352. PROFESSIONAL PRACTICE. 3 Hours.**

Professional practice issues in the private and public sector are addressed by visiting practitioners. Topics include project management, teamwork, obtaining work, regulatory requirements, specifications, issues in design/build, design alternatives, cost estimation, design and construction drawings, contract and construction law, legal issues, ethics and professionalism, design reports, licensure, lifelong learning, ethical and engineering practice organizations. Learning principles of engineering practice by working as a team is emphasized. Oral and written presentations are required. Prerequisite: Admission to the AREN Professional Program.

**AREN 4356. ADVANCED STEEL DESIGN. 3 Hours.**

Covers torsional design of beams, beams with web holes, composite design of beams, lateral-torsional buckling of beams, plate buckling, column design and behavior, frame stability, bracing requirements for compression members. Prerequisite: Grade of C or better in AREN 4348 and Admission to the AREN Professional Program.

**AREN 4360. DESIGN OF STRUCTURAL MASONRY. 3 Hours.**

Covers masonry unit types and mortar types, reinforcing and connections. Design of beams, columns, pilasters, and walls. Structural behavior and construction practices. Includes plain and reinforced masonry. Building Codes, Masonry Standards Joint Committee (MSJC) specifications, material specifications, test methods, and recommended practice documents. Prerequisite: Grade of C or better in AREN 3341; Admission to the AREN Professional Program.

**AREN 4361. ADVANCED REINFORCED CONCRETE DESIGN. 3 Hours.**

Advanced topics on structural design of concrete structures. Topics include slender columns, shear walls, torsion, deep beams, brackets, retaining walls, strut and tie model for shear torsion, two-way slabs, and shear friction. Building codes, American Concrete Institute (ACI) specifications, material specifications, test methods, and recommended practice documents are involved. Prerequisite: Grade of C or better in AREN 4347 and Admission to the AREN Professional Program.

**AREN 4365. STRUCTURAL WOOD DESIGN. 3 Hours.**

Covers material grade and properties of wood, design criteria using structural lumber, glue laminated lumber and structural panels. Design of bending and compression members, trusses and diaphragms. Building codes, National Design Specification for Wood Construction (NDS) specifications, material specifications, test methods, and recommended practice documents. Prerequisite: Grade of C or better in AREN 3341; Admission to the AREN Professional Program.

**AREN 4383. SENIOR PROJECT. 3 Hours.**

This course will provide architectural engineering students the opportunity to apply tools, skills and principles of architecture engineering towards the planning, analysis of alternatives, and designs of engineering solutions for projects identified by the instructor. Projects will address engineering standards and multiple realistic constraints. Application of computer-aided design and engineering tools will be utilized for analysis and design. Student presentations will address alternative solutions, application of building code and engineering standards within architectural context. Students will work together and submit a team project. Prerequisite: Grade of C or better in AREN 4347 and AREN 4352; Completion of all required 3000 level courses; or permission of instructor.

**AREN 4391. PROBLEMS IN ARCHITECTURAL ENGINEERING. 3 Hours.**

Selected problems in architectural engineering on an individual or group basis. Reference material is assigned and progress conferences are held frequently, by arrangement, with a faculty supervisor. Prerequisite: Permission of the chair of the department.

**AREN 4393. INDUSTRIAL INTERNSHIP. 3 Hours.**

Student to experience industrial internship under supervision of an industrial mentor and internship committee. Prerequisite: Admission to the AREN Professional Program.

**AREN 4394. RESEARCH INTERNSHIP. 3 Hours.**

Student to experience research internship under supervision of a CE faculty. Prerequisite: Admission to the AREN Professional Program.

## COURSES

**ART 1300. FIRST YEAR SEMINAR IN ART. 3 Hours.**

This is a required course intended to establish a solid overview of the Art and Art History Department for all first semester UTA students who intend to declare a studio art or art history major. Topics for the class can include: visiting artist speakers, attendance of exhibitions, writing assignments, surviving the advising process and concentration portfolio review, and library resources. Other topics may be discussed. This course may only be taken once for credit. This course includes student success curriculum and associated content and fulfills the University requirement for either UNIV 1101 or UNIV 1131.

**ART 1301. ART APPRECIATION. 3 Hours. (TCCN = ARTS 1301)**

Intended to develop an understanding, appreciation, and enjoyment of art in its many forms. Recommended as a fine arts elective for non-art majors.

**ART 1305. TWO-DIMENSIONAL DESIGN. 3 Hours. (TCCN = ARTS 1311)**

The principles and elements of two-dimensional design as expressed through concepts and problems with various media and techniques.

**ART 1306. THREE-DIMENSIONAL DESIGN. 3 Hours. (TCCN = ARTS 1312)**

Three-dimensional design principles will be explored to expand knowledge of various materials and develop an awareness of spatial elements as a creative expression.

**ART 1307. DRAWING FUNDAMENTALS. 3 Hours. (TCCN = ARTS 1316)**

Basic drawing principles and elements in varied media including such concepts and skills as hand-eye coordination, perceptual acuity, spatial organization, and interpretation of directly observed subjects.

**ART 1309. INTRODUCTION TO ART HISTORY I: PREHISTORIC THROUGH 16TH CENTURY. 3 Hours. (TCCN = ARTS 1303)**

Major developments in the art of the Mediterranean Basin and Europe from prehistory to the end of the 16th century.

**ART 1310. INTRODUCTION TO ART HISTORY II: 17TH CENTURY TO THE PRESENT. 3 Hours. (TCCN = ARTS 1304)**

The work of major figures in European and American art from the 17th century to the present.

**ART 1317. INTRODUCTION TO ART HISTORY III: AFRICA, ASIA, AMERICAS. 3 Hours.**

Introduces visual arts and cultural traditions of Africa, Asia, Oceania, and the ancient/indigenous Americas, including how bias from colonial narratives has factored into scholarship on these regions.

**ART 2304. DIGITAL MEDIA. 3 Hours. (TCCN = ARTS 2348)**

This course introduces students to a variety of digital software and hardware as applied to design and artistic concepts.

**ART 2308. DRAWING CONCEPTS. 3 Hours. (TCCN = ARTS 1317)**

Application of specific drawing skills with emphasis on personal expression. Course content will focus on conceptual development and media exploration as outlined by instructor. Previous drawing experience strongly recommended. Formerly listed as ART 1348. Credit will not be granted for both ART 1348 and ART 2308. Prerequisite: ART 1305 and ART 1307 or permission of instructor.

**ART 2342. GLASSBLOWING. 3 Hours.**

The manipulation, construction, and experimentation of glass as a sculptural medium. Emphasis will be on developing technical and aesthetic expertise in glassblowing and related techniques. Exploration of the conceptual application of the material will be addressed.

**ART 2353. VISUAL COMMUNICATION FOUNDATION. 3 Hours.**

Introduction to the studio practices in the area of Visual Communications. Focus is on advanced foundation design concepts and exposure to contemporary digital tools. In addition, an introduction to the purpose, industry, and broad history of visual communication will be established. Prerequisite: Art + Art History Major, Permission of Advisor, ART 1305.

**ART 2354. TYPOGRAPHY. 3 Hours.**

Creative problem solving using basic elements of visual communication with an introduction to typography, composition, and materials. Prerequisite: ART 2353 or permission of the instructor.

**ART 2355. LAYOUT. 3 Hours.**

Development and application of concept, layout, and design as related to visual communication. Prerequisite: ART 2353 or permission of advisor.

**ART 2357. DIGITAL PHOTOGRAPHY FOR DESIGNERS. 3 Hours.**

Introduction to the production of visuals through digital photographic imaging as related to the needs of the Visual Communication Design field. Students will study composition, camera function, studio lighting, and photographic proficiency to create compelling imagery. Students will be expected to incorporate these photographic skills and concepts into their design practice.

**ART 2358. CINEMA PRODUCTION 1. 3 Hours.**

Introduction to the video and filmmaking production process, techniques, history and aesthetics through the use of digital video, basic film, and basic digital (computer) video and audio editing. Students will write, produce, and edit a number of short original works.

**ART 2360. INTRODUCTION TO PHOTOGRAPHIC CONCEPTS. 3 Hours. (TCCN = ARTS 2356)**

Introduction to the essentials of photography including digital camera operation, editing software, inkjet printing, and utilizing the principles of photography for artistic expression. Students are encouraged to use their own digital camera; some cameras may be available for check out on a limited basis.

**ART 2371. PAINTING. 3 Hours. (TCCN = ARTS 2316)**

Fundamentals of painting, composition and techniques both traditional and contemporary. Prerequisite: ART 1305 and ART 1307 or permission of the instructor.

**ART 2387. FILM ANALYSIS AND AESTHETICS. 3 Hours.**

Students will critically engage in screenings of selected significant films and learn concepts and approaches to film analysis and criticism. The course will examine the emergence of the film form, the elements of film language, formal approaches and principles of film analysis, and the workings of motion pictures as a means of narrative expression.

**ART 3300. METHODS FOR THE STUDY OF ART HISTORY. 3 Hours.**

Sources and procedures of art historical research. Introduction to methodologies of art historical scholarship. Use of computer and data retrieval is emphasized.

**ART 3302. ART OF ANTIQUITY. 3 Hours.**

Ancient art and architecture of the Mediterranean Basin from the Aegean Bronze Age (3000 BCE) to the Late Roman Empire (4th century CE) with attention to the ritual and political uses of art. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 3304. JAPANESE ART AND ARCHITECTURE. 3 Hours.**

Art and architectural traditions of Japan from the prehistoric to the early modern period. Structured around specific artistic media and techniques that reflect the cultural and social movements informing artistic changes over time. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 3305. MID-RENAISSANCE. 3 Hours.**

Art and architecture in 15th century Italy, beginning with developments in Renaissance Florence. The relation of humanism and science to the visual arts, patronage, and the social and historical contexts of artistic production. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 3306. BYZANTINE AND MEDIEVAL ART. 3 Hours.**

Art and architecture of the Mediterranean Basin and Europe beginning with the Early Christian and Byzantine periods (330 CE) to the Gothic Era (14th century). Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 3307. THE EARLY RENAISSANCE. 3 Hours.**

Art and architecture of the Italian peninsula in the 13th and 14th centuries with attention to cross-cultural exchanges within Europe and across the globe. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 3308. HIGH RENAISSANCE. 3 Hours.**

Art and architecture of the Italian peninsula in the 16th century with attention to cross-cultural exchanges within Europe and across the globe. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 3309. ART OF THE SILK ROADS. 3 Hours.**

Exploration of the empires, cultures, and artistic hubs of the overland Silk Roads from the 3rd-10th centuries. Addresses the legacy of Silk Roads art in contemporary society through questions of the ownership of cultural heritage, repatriation of antiquities, and global trade. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 3310. FILM AS ART. 3 Hours.**

The history and aesthetics of the motion picture from 1895 to the present day. Screening and analysis of film as an artistic medium, focusing on various technical innovations, filmmakers, and landmarks of film history. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 3311. AMERICAN ART. 3 Hours.**

Focuses on the artists and communities that have shaped American art and national identity from the 18th to 21st centuries, including an emphasis on how contemporary artists amend these today. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 3312. NEO-CLASSICISM AND ROMANTICISM. 3 Hours.**

European and American art from 1760 to c.1840. Emphasis is placed on cultural and historical contexts. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 3313. BACKGROUNDS OF MODERN ART. 3 Hours.**

Painting, sculpture, and photography of the period c.1850-1900 in western Europe and the U.S., focusing on Realism, Impressionism, Post-Impressionism, and Symbolism. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 3314. MODERN ART. 3 Hours.**

The history of European and American art from the late 19th century to the mid-20th century. Emphasis on the formal and conceptual evolution of modernism in art and society, and on the rise of the avant-garde. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 3315. IMPRESSIONISM. 3 Hours.**

The history, theory, and aesthetics of Impressionist painting in France from 1860 to 1900. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 3316. ANCIENT EGYPTIAN AND NEAR EASTERN ART. 3 Hours.**

Explores the major art and architectural history of ancient Egypt, including relationships to the Near East and Mesopotamia. Religious, political, economic, and social contexts feature prominently as well as contemporary attitudes toward Egyptian antiquities. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 3317. ART AND ISLAM. 3 Hours.**

Explores the art of regions with significant Muslim populations and/or Muslim political leadership from the period of the Prophet Muhammad's life to the present. Students analyze how culture, religion, and cross-cultural relationships shape arts of these regions. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 3318. THE JAPANESE UKIYO-E WOODBLOCK PRINT. 3 Hours.**

Japanese art and cultural history seen through the Japanese woodblock print from the 17th century to the modern era. Technical developments, genres, and master designers examined within the context of East Asian visual traditions, the publishing industry, urban culture, and colonialism. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 3319. ART AND ARCHITECTURE OF INDIA. 3 Hours.**

Explores the art and architecture of the Indian subcontinent, covering prehistoric periods, the Indus Valley culture, the Vedic Period, early through historic Buddhist and Hindu states, the Islamic states/empires, the Colonial period, and contemporary art of independent India. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 3320. ART OF THE ANCIENT AMERICAS. 3 Hours.**

Explores the art, architecture, and archaeology of the Americas from the Paleoindian period through European colonization across North, Central, and South America. Students critically consider the biases of scholarship, colonial legacies, and contemporary perspectives. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 3321. CHINESE ART AND ARCHITECTURE. 3 Hours.**

Art and architectural traditions of China from the Neolithic to the early modern period. Structured around artistic media and techniques that reflect the cultural and social movements informing artistic changes over time. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 3322. INTRODUCTION TO ART EDUCATION. 3 Hours.**

This course studies the theories and outlines the history of art education and provides undergraduate students with the basic knowledge, skills, and strategies for teaching art. Students will be introduced to current issues in art education including multicultural, visual culture, technological art education, creativity, museum collaborations, and arts for special needs. The course will cover TEKS and national visual arts standards, a child's artistic development, learning styles, and philosophy. Also, students will learn and understand professional development resources. Prerequisites: None.

**ART 3323. PLANNING AND CONSTRUCTING ART CURRICULA. 3 Hours.**

This course reviews and introduces the elements needed to create art education curricula including production, performance and exhibition of visual art and other performing arts practices, historical and cultural contexts as well as critical and aesthetic response. Students will focus on curriculum development for both 2D and 3D artwork for various age levels. Prerequisite: None; however students are highly encouraged to take ART 3322 before, or concurrent with, this course.

**ART 3324. 3D MODELING. 3 Hours.**

An introduction to manipulating three-dimensional polygonal forms in digital space. Studying the complexities of modeling, texture mapping, and rendering solutions. Prerequisite: ART 1307.

**ART 3325. STUDIES IN THE BAROQUE. 3 Hours.**

Developments in European art and architecture in the 17th century with attention to cross-cultural exchanges within Europe and across the globe. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 3326. SEQUENTIAL ILLUSTRATION. 3 Hours.**

The fundamentals of ordering illustrations for both process and finalized works. Focusing on series of images to tell stories and convey the passage of time. Previously offered as ART 2331. Prerequisite: ART 1307.

**ART 3330. 18TH CENTURY ART. 3 Hours.**

A history of European and American art from the end of the Baroque era through the Rococo and Neoclassical styles to the beginning of Romanticism. Emphasis will be on cultural and global contexts in which paintings, prints, sculptures, and architecture were produced. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 3331. BRITISH ART. 3 Hours.**

An overview of British art from prehistory to the present with an emphasis on the period from the 17th century to the present. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 3332. ART OF SUB-SAHARAN AFRICA. 3 Hours.**

An examination of the art and architectural traditions of cultures within and south of the Sahara Desert of Africa. Emphasis is on indigenous visual traditions prior to Muslim and European contact and contextualizing our understanding through anthropological perspectives. This course incorporates critical considerations of the biases involved in the study of sub-Saharan arts. May include participation with local African arts and archival collections and various campus collections to undertake experiential analysis of primary sources. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 3333. ALTERNATIVE PHOTOGRAPHIC PROCESSES. 3 Hours.**

This class explores the use of hand-made, physical photographic processes, both historical and modern. Techniques may include camera obscura, pinhole, cyanotype, VanDyke brownprint, tintype, and inkjet negatives. May be repeated for up to six hours credit. Prerequisite: Six hours to be selected from: ART 1305, ART 2360, ART 2371, or ART 3343; or permission from the instructor.

**ART 3340. KILN FORMED GLASS. 3 Hours.**

The exploration of various non-blowing techniques of glass construction and manipulation. Students will use kilns to explore fusing, slumping, pate de verre, and casting. May be repeated for credit.

**ART 3341. SCULPTURE. 3 Hours.**

An exploration of sculptural forms, concepts, and methods through various media. Emphasis on contemporary processes and individual expression. May be repeated for credit. Prerequisite: ART 1306. For non-art majors, permission of the instructor.



**ART 3342. INTERMEDIATE GLASSBLOWING. 3 Hours.**

Continued technical and aesthetic development, manipulation, construction, and experimentation with glass as a sculptural medium. Other techniques may be introduced in order to explore a stronger conceptual application of glass. Prerequisite: ART 2342 or permission of the academic advisor.

**ART 3343. PRINTMAKING. 3 Hours.**

Development in the technical and conceptual practice of printmaking. Emphasis placed on an understanding of the history, theory and philosophy of independently published prints. Both traditional and nontraditional processes for creating printed images will be explored, including: lithography, relief, intaglio, silk screen, monoprints, book arts, and photomechanical technologies. Prerequisite: ART 1305 and ART 1307 or permission of the instructor.

**ART 3344. NEON AND ILLUMINATED GLASS ART. 3 Hours.**

Basic techniques of luminous glass tube manipulation as a contemporary art form. Emphasis on hot glass bending, design, pattern making and electrical systems. Prerequisite: ART 1306 or permission from the instructor.

**ART 3345. WORKS ON PAPER. 3 Hours.**

The class will focus on works on paper as a finished work of art as opposed to being preliminary study for paintings, sculptures, and other disciplines. Class may work in a variety of media including watercolor, drawing, collage, painting and mixed media. Personal creativity and development is stressed along with critical thinking and analysis. May be repeated for credit. Prerequisite: ART 1306, ART 1307, and ART 2308 or permission of the instructor.

**ART 3346. PAPERMAKING. 3 Hours.**

Procedures for the understanding and development of both Eastern and Western handmade papers. Focus will be on sheet-forming, casting, and marbleizing papermaking processes. Emphasis placed on personal expression, process, and innovation. May be repeated for credit. Prerequisite: ART 1305, ART 1306.

**ART 3347. ADVANCED DRAWING. 3 Hours.**

Conceptual and expressive problems to encourage independent thinking with regard to contemporary drawing issues. May be repeated for credit. Prerequisite: ART 2308.

**ART 3348. LIFE DRAWING. 3 Hours.**

Drawing of the human figure using a variety of media in the solution of figure construction problems with emphasis on perceptual and creative expression. May be repeated for credit. Prerequisite: ART 2308.

**ART 3349. WATER MEDIA PAINTING. 3 Hours.**

Transparent and opaque water color media and techniques. Emphasis on conceptual and manipulative skills. May be repeated for credit. Prerequisite: ART 1305, ART 1307, and ART 2371 or permission of the instructor.

**ART 3350. SCREENWRITING 1. 3 Hours.**

Students will learn the principles of storytelling and will apply these principles to the craft of screenwriting. As part of this process students will learn to evaluate and improve their own and other's original stories, characters, dramatic conflict, dialogue and descriptions. All screenplays must use proper screenwriting formatting and all creative projects must demonstrate the use of content introduced in class. Offered as ENGL 4330 when that course is taught as Screenwriting; credit will be granted in only one department. Prerequisite: ENGL 1301 and ENGL 1302 or permission of instructor.

**ART 3351. ILLUSTRATION FOR DESIGN. 3 Hours.**

Practical approach to concepts, techniques, and problem solving for crafting and integrating illustration with typographic elements for successful layout solutions. Prerequisite: ART 2354 and ART 2355.

**ART 3352. DIGITAL IMAGING. 3 Hours.**

Basic course in computer imaging for art majors. Emphasis is on the introduction and use of the computer as a tool for personal expression. Fundamental principles in electronic media are explored with additional emphasis on experimental and innovative techniques. May be repeated for credit. Prerequisite: ART 2304.

**ART 3354. SIGN AND SYMBOL. 3 Hours.**

Design and problem solving focusing on transformation of visual elements into logos, logotypes, information and environmental graphics. May only be taken once for credit. Prerequisite: ART 2353, or permission of the advisor.

**ART 3355. ADVANCED TYPOGRAPHY. 3 Hours.**

Typographic theory exploring traditional and non-traditional forms, both historical and contemporary typographic achievements. Prerequisite: ART 2354, ART 2355, or permission of the advisor.

**ART 3356. INTERACTIVE DESIGN CONCEPTS. 3 Hours.**

Guides design students to understand and apply fundamental principles that are required to progress through all interactive design courses in our area. Students will become familiar with key concepts and techniques for web-based typographic systems, information hierarchy, navigation strategies, user connection, and grid applications. This course was formerly titled Web Typography. Prerequisite: ART 2355.

**ART 3357. SUSTAINABLE DESIGN. 3 Hours.**

An overview of critical environmental issues that affect the contemporary practice of visual communication. Emphasis on ethics, environmental and society responsibility, and creative visual problem solving. Course may include, but is not limited to, lecture, discussion, reading, and creative design exploration. Prerequisite: ART 2354 and ART 2355.

**ART 3358. CINEMA PRODUCTION 2. 3 Hours.**

Continuation of ART 2358 with emphasis on more advanced concepts, production techniques, film/video history, and aesthetics. May include basic 16mm film production, digital video post-production and studio editing. Students will propose, write, produce and edit a number of short, original works. Prerequisite: ART 2358 or permission from the instructor.

**ART 3359. APPLYING AND TEACHING ART CURRICULA. 3 Hours.**

This course provides art education students with an overview of teaching in the K-12 art classroom through further exploration in curriculum and instructional methods as well as observation in the DFW area public schools. Students are provided opportunities to observe various work situations, to reflect on their own education, and to examine teaching practices within the arts. Emphasis is placed on both 2D and 3D studio issues. Students are expected to develop professional skills in observation and written and oral communication. The material in this course serves to establish a foundation for building professional awareness and a normative philosophy of art education. Prerequisite: ART 3323.

**ART 3360. BLACK AND WHITE PHOTOGRAPHY. 3 Hours.**

This course introduces students to black and white photography as a means to express ideas and become more aware of the potential of photographic art. Some coursework may be digitally based but the emphasis will be on analog black and white processes. Students will learn how to use various film camera formats, process film, and produce black and white darkroom prints. May be repeated for credit. Prerequisite: ART 2360 (or equivalent), or permission of instructor.

**ART 3361. SITUATIONAL LIGHTING. 3 Hours.**

This course is a skills based class that will explore augmenting and improving existing light at photographic locations. Prerequisite: ART 2360 or permission of instructor.

**ART 3362. MOTION GRAPHICS AND ANIMATION. 3 Hours.**

This course will introduce motion graphics and animation techniques using traditional and computer forms. Theoretical and conceptual approaches to motion graphics design and techniques will be explored using international examples. Students will complete several animation projects with increasing complexity during the semester. Prerequisite: ART 2358 or permission from the instructor.

**ART 3363. CLAY. 3 Hours.**

The various methods of construction, manipulation, and decoration of clay. The integration of form, design, and concept, emphasizing clay as an expressive medium. Prerequisite: ART 1306. For non-art majors, permission of the instructor.

**ART 3364. INTERACTIVE STORYTELLING. 3 Hours.**

An exploration of interactive principles and narrative structures. Examining and crafting the flow of consequential decision-making with a non-linear story. Prerequisite: Permission from the instructor.

**ART 3365. CONCEPT ART. 3 Hours.**

The study of ideating environments, characters, and objects through digital painting. These concepts are utilized during the planning phases of complex projects to set the direction of the assets and experiences. Prerequisite: Permission from the instructor.

**ART 3366. 2D ANIMATION. 3 Hours.**

An overview of two-dimensional computer animation utilizing animation principles, pose-to-pose and straight-ahead techniques, and digital workflows for the purpose of creating believable kinematics. Prerequisite: ART 2331.

**ART 3367. 3D ANIMATION. 3 Hours.**

An overview of three-dimensional computer animation utilizing 3-D models, textures, rigging, and key frame animation for the purpose of creating believable kinematics. May be repeated for credit. Prerequisite: ART 2330 and ART 2331.

**ART 3368. DIGITAL PAINTING. 3 Hours.**

This course focuses on digital painting techniques and methods, to expand student vocabulary of painting terms and ideas, and to develop their pictorial, technical and expressive skills. Prerequisite: ART 2371.

**ART 3371. INTERMEDIATE PAINTING. 3 Hours.**

Continued development of painting techniques, composition and exploration of traditional and contemporary media. Specific problem solving assignments, creative thinking, and idea development will be emphasized. Prerequisite: ART 2308, ART 2371 or permission of the instructor.

**ART 3374. PACKAGING & 3D CAD. 3 Hours.**

Packaging structure design, materials, performance, testing and sustainability. The curriculum integrates with the Corrugated Prototype Design and CAD Production Lab (CORRPRO). Students use 3D structural design software, a variety of materials, and a computer-aided design (CAD) table to produce significant packaging solutions. Prerequisite: ART 1306 and ART 2353.

**ART 3383. MOLDMAKING & CASTING IN CLAY. 3 Hours.**

Continuation of ceramic media techniques and forming processes. The introduction of moldmaking, mold forming, slipcasting, tile design, kiln firing, and glaze techniques. Prerequisite: ART 3363 or permission of the instructor.

**ART 3384. CINEMATOGRAPHY. 3 Hours.**

An intense study of the visual language/style of film imagery through cinematography, lighting, gaffing, gripping, and extensive camerawork. Students will use digital equipment to shoot exercises, light sets and locations, and learn to accurately expose, color correct, and manipulate motion picture film. Students will also learn the proper use of advanced lighting equipment, professional production standards, camera crew responsibilities, and how to interpret a scene through visuals. Students will work in digital video and/or 16mm film format. May be repeated once for credit. Prerequisite: ART 2358 and ART 2360 or permission of instructor.

**ART 3386. DIRECTING 1: ACTOR LAB. 3 Hours.**

This course is designed to help student directors understand how actors approach their craft and will study the language of acting and various techniques and approaches for casting. Directors and actors will work together in rehearsal and on set to craft a performance for film and develop confidence in the skills necessary for collaboration. Prerequisite: ART 2358 or permission of instructor.

**ART 3387. DIRECTED SCREENINGS. 3 Hours.**

This course will screen significant films. It will examine the emergence of the film form, the elements of film language and the significance of film form and style. Motion pictures will be screened weekly with commentary or discussion by film faculty in class. This course may be taken only once for credit.

**ART 3388. DIRECTING 2: VISUAL STORYTELLING. 3 Hours.**

This course will cover the relationship of actor performance to the placement and/or movement of the camera and other cinematic techniques. Students will explore approaches to visual style and distinctly cinematic expression and study specific shot compositions, camera movement and blocking dynamics. Prerequisite: ART 3358 or permission from the instructor.

**ART 3389. CONTEMPORARY ART. 3 Hours.**

A focus on the period from 1980 to the present, exploring global contemporary art themes, across aesthetics and identity, considering the legacies of minimalism, pop and conceptual art, and practices of performance and activist art. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 3390. HISTORY OF GRAPHIC DESIGN. 3 Hours.**

A broad overview of the history and evolution of design from prehistory to the present day. Course emphasis is on the cultural and technological contexts that influenced the practice of graphic design in Europe and the United States. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317 and permission of advisor.

**ART 3391. HISTORY OF PHOTOGRAPHY. 3 Hours.**

The history of still photography from its inception to the present. Emphasis on the conceptual and technical evolution of photography as an artistic medium. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 3393. ART AND GENDER. 3 Hours.**

Approaches to the interpretation of art from the stance of gender and feminism. Emphasis is placed on the work of significant female artists and on the gendered representations of art. Offered as ART 3393 and GWSS 3393; credit will be granted only once. Fulfills the Social/Cultural Studies requirement. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 3399. DISABILITY AND ART. 3 Hours.**

Explores the many connections between disability and art, including both art created by people with disabilities and the wide variety of artistic representations about disability. Examines the purposes of art-making by people with disabilities: for therapeutic reasons, as a means of self-expression, to achieve professional goals, or as an act of activism. Investigates historical depictions of disability in art as well as art's role as a visual voice for the disability rights movement. Offered as DS 3399 and ART 3399; credit will only be granted once. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor or Disability Studies.

**ART 4100. SENIOR EXHIBITION. 1 Hour.**

Application of professional practices for graduating BFA art majors. Primary concentration is preparation for BFA exhibition/presentation. Prerequisite: ART 4300 or, for Design students, ART 4356.

**ART 4101. PORTFOLIO PRESENTATION. 1 Hour.**

This course is the capstone of the Bachelor of Arts track. Working with their advisor, students will prepare an artist's talk about their work and deliver this presentation at an advertised public lecture. This course is to be taken in the student's last semester before graduation.

**ART 4191. INDEPENDENT STUDY. 1 Hour.**

Mature, capable students may be permitted to pursue individual art problems. Problems must be stated in writing, a definite conference schedule arranged, and the paperwork must be approved by both the supervising faculty member and the department chair prior to registration. May be repeated for credit for varied subject matter. Prerequisite: B average in art concentration.

**ART 4291. INDEPENDENT STUDY. 2 Hours.**

Mature, capable students may be permitted to pursue individual art problems. Problems must be stated in writing, a definite conference schedule arranged, and the paperwork must be approved by both the supervising faculty member and the department chair prior to registration. May be repeated for credit for varied subject matter. Prerequisite: B average in art concentration.

**ART 4300. PROFESSIONAL PRACTICES. 3 Hours.**

Professional practices for upcoming graduating BFA art majors in studio and media concentration, excluding design students. Exploration of professional capabilities applied to media and studio areas. Emphasis on complex professional skills, knowledge and presentation.

**ART 4302. VISUAL CULTURE & CREATIVITY. 3 Hours.**

A critical investigation of personal, national, and global identities. Personal and communal narratives surrounding visual culture define and construct meaning in our everyday lives. Visual culture is investigated as a site through which social and cultural definitions, norms and values, and expectations are reinforced, constructed as well as challenged. The goals for this course are to develop students' skills in critical thinking that revolve around artwork, writing, reading, and oral expression and foster an understanding of the pluralistic nature of institutions, society, and culture(s) of the United States and beyond. Prerequisite: 6 credits from the following Art Foundations courses: ART 1305, ART 1306, ART 1307, or ART 2304.

**ART 4304. ART AND THE HUMAN CONDITION. 3 Hours.**

A seminar offered to students in majors across campus, undergraduate and graduate. Practice in the analysis of visual information and discussion of topics which relate to medical humanities, disability studies, the impact of race and ethnicity, the representation of aging, narrative medicine, and art therapy. Students engage in research and creative projects and present their works to the class. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor, Medical Humanities, or Disability Studies.

**ART 4307. SPECIAL TOPICS IN ASIAN ART. 3 Hours.**

Special studies seminar dealing with various aspects of the history and development of Asian art, architecture, and archeology. May be repeated for credit. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 4308. FINE ART MUSEUMS AND RESEARCH COLLECTIONS. 3 Hours.**

Examines current issues and developments in museum practice. This course uses area museums, auction houses, and research collections as a learning resource. This course is supplemented by on-site visits and readings. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 4310. TOPICS IN CINEMA STUDY. 3 Hours.**

Historical surveys of nonfiction film, experimental cinema, and genres (e.g., the western, the gangster film, science-fiction films), as well as geographical or national movements (e.g., German expressionism, Italian neo-realism, French new wave) and film theory and criticism. The particular subject will change from year to year. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission of the instructor.

**ART 4311. SCRIPT TO SCREEN. 3 Hours.**

This course for Cinematic Arts majors is a high energy merger of a production class and a short film writing class to both write and produce a film per week during the Summer sessions. Students in this class will have a realistic view of the production consequences of writing for the screen. May be repeated once for credit. Prerequisite: ART 3350 or permission of instructor.

**ART 4312. TOPICS IN 19TH CENTURY ART. 3 Hours.**

Topics from c.1780 to 1900, such as the analysis of an individual movement, medium, or theme. May be repeated for credit as course content changes. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 4313. COLLECTIONS MANAGEMENT. 3 Hours.**

This course will examine the history of museum and research collections, long-term care and sustainability of works, and the concerns of ethics and law in relation to acquisition and management of these collections. This course is enriched by guest speakers and on-site visits to area collections. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 4314. TOPICS IN 20TH CENTURY ART. 3 Hours.**

Topics from c. 1900 to c. 2000, such as analysis of an individual movement, medium, or theme. May be repeated for credit as course content changes. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 4315. ASPECTS OF CONTEMPORARY ART. 3 Hours.**

Topics from c. 1970 to the present, such as performance and conceptual art, art in and about the natural environment, post-modernism and critical perspectives, art in the social context, and the genres of the 1980s. May be repeated for credit. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 4316. COLLECTING ASIA: THE HISTORIOGRAPHY OF COLLECTING ASIAN ART. 3 Hours.**

This seminar explores the complicated history of the collecting of Asian art over the past two centuries. From the 19th century European fascination with Japanese woodblock prints to the rush to remove Buddhist artifacts from Central Asia at the turn of the twentieth century, this course examines significant moments in the collecting of Asian art through case studies drawn from major international museums. Students will have the opportunity to work directly with primary source objects and documents as they learn more about the complex lives of museum artwork. Prerequisite: Any two of these three courses: ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 4317. ART AND ISLAM. 3 Hours.**

This upper level art history course studies Islamic art and architecture from the seventh century to the present, covering arts from the Arabian peninsula, north and west Africa, southern Europe, central Asia, and south Asia. Emphasis may also be given to the cultural and religious aspects that shape Islamic art including sacred architecture, calligraphy, and pilgrimage. Prerequisites: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 4318. ADVANCED DIGITAL IMAGING. 3 Hours.**

Advanced level course in computer imaging for art majors. Conceptual as well as expressive problems are introduced to encourage independent and creative problem solving in digital imaging. Emphasis is placed on both manipulation of photo-based media and creation of two-dimensional animation. May be repeated for credit. Prerequisite: ART 3352.

**ART 4320. EXPERIMENTAL PHOTOGRAPHIC FORMS AND METHODS. 3 Hours.**

Students will explore different approaches to photography that emphasize photographs as objects and/or as projected imagery. Projects may include use of collage, appropriation, installation, found objects, and other techniques. Lectures and discussions will examine experimental uses of photography in historical and contemporary art. Prerequisite: 6 hours to be selected from ART 3333, ART 3360, ART 4359, ART 4360, ART 4363, or ART 4370; or permission of instructor.

**ART 4321. EXHIBITION DESIGN. 3 Hours.**

An overview of exhibition design techniques and practices using hands-on experiential learning in collaborative and individual exhibition tasks. Students will learn how to conceptualize, design, plan, and prepare exhibits in a variety of styles, including, fine art, historical, contemporary, and satellite. Exhibition design will also be explored in a variety of formats, which may include digital design of exhibitions, exhibition and museum presence on social media platforms, online marketing techniques, and interactive engagement of exhibition audiences through digital and electronic media. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 4323. CRITICAL WRITING FOR MUSEUMS AND GALLERIES. 3 Hours.**

Explores the critical writing skills and formats most frequently utilized with museum, gallery, and institutional workplaces. An examination of the styles of writing employed within fine art settings and focus on didactics, exhibition reviews, promotional and publication materials, and museum/gallery research analysis. Alongside a variety of skill-building activities, an intensive artifact/artwork investigation resulting in a written component will be created. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 4324. MONUMENTS AND LIVING HISTORY. 3 Hours.**

Immerses students in broad forms of art historical and museum studies engagement via interactive experiences with "living" history. Students will visit locations of historical and art historical importance and work directly with art historians, artists, reenactors, and specialists who focus on bringing cultural history to life for the public. Includes engagement with Texas-based living historical monuments located in the greater DFW area. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 4325. ART DIRECTION. 3 Hours.**

An advanced workshop researching, exploring, and applying multi-dimensional cinematic visual design concepts used to render and achieve the look, dynamics, and visual style of cinematic work in service of a director's vision. Prerequisite: ART 2358 and ART 2387; or with permission from the instructor.

**ART 4330. 2D GAME CREATION. 3 Hours.**

The principles of 2D game design and production as a multidisciplinary field for creating interactive experiences with an emphasis on win-lose scenarios, cognitive flow, and reward-based systems. Prerequisite: ART 3364 or permission from the instructor.

**ART 4331. TOPICS IN EARLY MODERN ART. 3 Hours.**

An in-depth study of topics in European art from the 14th through the 17th centuries, including cross-cultural exchange. May be repeated for credit as course content changes. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 4332. RACE, GENDER, AND DISABILITY IN EARLY MODERN ART. 3 Hours.**

An in-depth study of the varied ways in which race, gender, and disability find expression in art from the 14th through 17th centuries. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; and permission from the instructor.

**ART 4333. 3D GAME CREATION. 3 Hours.**

This course covers the principles of 3D game design and production as a multidisciplinary field, creating an interactive experience with an emphasis on win-lose scenarios, cognitive flow, and reward-based systems. Prerequisite: ART 3367 3D Animation and ART 3364 Interactive Storytelling.

**ART 4334. UX/UI FOR DESIGNERS. 3 Hours.**

Concentrated study in User Experience Design research and processes as applied to user interfaces and digital products. Students will incorporate the use of recognized industry standards such as Design Thinking (DT) and Human Centered Design (HCD) to deepen their understanding of UX/UI Design principles and processes. Students will create projects showcasing their ability to strategically design user-centric solutions that effectively meet the needs of diverse audiences by bridging the gap between platforms and users. Prerequisite: Art 3356 Interactive Design Concepts.

**ART 4339. MOTION DESIGN & KINETIC TYPE. 3 Hours.**

Introduces students to effective and engaging communication design using motion graphics, including applications in advertising, broadcast, web/app integration, and social media. The integration of moving design elements and dynamic typography are explored and matched to audio cues following the theories of kinetic composition and aesthetics. Students will study the history of pioneers in the field. Prerequisite: ART 2354 & ART 3356.

**ART 4340. ADVANCED KILN FORMED GLASS. 3 Hours.**

Continuation of ART 3340. This class focuses on glass kiln forming techniques and concepts including kiln casting, fusing, slumping, and various cold working processes. Emphasis is on using glass as an expressive and creative art media. Prerequisite: ART 3340 or permission of instructor.

**ART 4341. ADVANCED SCULPTURE. 3 Hours.**

Advanced work in continuation of ART 3341. Students are encouraged to develop a creative style in their own personal direction. A variety of materials and techniques is explored. May be repeated for credit. Prerequisite: ART 3341 or permission of the instructor.

**ART 4342. ADVANCED GLASS. 3 Hours.**

Continued development of ART 3342 with emphasis on advanced technique, manipulation and form development. Course assignments will emphasize personal creativity and exploration. May be repeated for credit. Prerequisite: ART 3342 or permission of instructor.

**ART 4343. ADVANCED CLAY. 3 Hours.**

Further development and focus on techniques and personal expression in sculptural, hand-built, and wheel thrown clay forms. Continuation of kiln firing, moldmaking, slipcasting, and glazemaking. May be repeated for credit. Prerequisite: ART 3363 or permission of the instructor.



**ART 4345. ADVANCED PRINTMAKING. 3 Hours.**

Continued study and development of both conceptual and technical practice of printmaking. Emphasis placed on personal expression of ideas as well as the broader implications of printed images. Explorations and innovations will be encouraged. May be repeated for credit. Prerequisite: ART 1305, ART 1307, and ART 3343 or permission of the instructor.

**ART 4346. GRAPHICS: PORTFOLIO PREPARATION. 3 Hours.**

This course concentrates on the creation, development, and evaluation of the graphic design portfolio. Course work will include advanced level conceptual assignments and various methods of presentation. Prerequisite: ART 3355 and ART 4355 with grades of B or better, or permission of the instructor.

**ART 4347. PUBLICATION DESIGN. 3 Hours.**

Philosophy, concepts, and structures of magazine and book design. Prerequisite: ART 2354 and ART 2355.

**ART 4348. INFORMATION VISUALIZATION. 3 Hours.**

This course is an exploration of the graphic visualization and representation of data driven information sets through the crafting of infographics and varied visual solutions to achieve insights into the cognitive and perceptive complexities of the world around us. Prerequisite: ART 2355.

**ART 4349. ADVANCED CINEMA PRODUCTION (ACP): VIDEO ART & NEW GENRES. 3 Hours.**

Advanced work involving production, postproduction, and distribution with a special emphasis on experimental and innovative applications. Instruction may include video integrated with performance, installation, audio/sound art, and computer graphics appropriate to the medium. Lectures, readings, and screenings will frame video art within an historical and critical survey of new genres. May be repeated once for credit. Prerequisite: ART 3358 or permission of the instructor.

**ART 4350. ADVANCED CINEMA PRODUCTION (ACP): DOCUMENTARY. 3 Hours.**

Using film and video as a tool for creative research, students will produce, write, direct and edit original documentaries or nonfiction films/videos under supervision of the instructor. May be repeated once for credit. Prerequisite: ART 3358 or permission of the instructor.

**ART 4351. ADVANCED CINEMA PRODUCTION (ACP): COMMERCIAL. 3 Hours.**

Commercial and corporate applications of video. Students produce original individual projects integrating concepts and technical skills under supervision of the instructor. May be repeated for credit. Prerequisite: ART 3358 or permission of instructor.

**ART 4352. ADVANCED CINEMA PRODUCTION (ACP): FICTION. 3 Hours.**

Narrative storytelling film/video techniques. Students write, produce, direct and edit original, short narrative film/video projects under supervision of the instructor. May be repeated once for credit. Prerequisite: ART 2358 or ART 3350 or permission of the instructor.

**ART 4353. FOUNDRY. 3 Hours.**

This advanced studio class will explore work in sculpture methods specific to casting and related mold making processes. Students will develop expertise in model preparation, silica-based slurry mold processes, and chasing metal castings.

**ART 4354. SCREENWRITING 2. 3 Hours.**

A continuation of ART 2350 focusing on writing an original (no adaptations), narrative, full-length screenplay through all stages to final draft status primarily focusing on the development of a polished first act. Students study screenplays, view films, conduct actor readings, and complete various other assignments. May be repeated once for credit. Prerequisite: ART 3350 or permission of the instructor.

**ART 4355. VISUAL IDENTITY SYSTEMS. 3 Hours.**

Creative exploration and application of complex visual communication skills to the development of a visual identity system. Prerequisite: ART 2354 and ART 3354.

**ART 4356. PROFESSIONAL PREPARATION. 3 Hours.**

Exploration and development of the visual communication portfolio. Course work includes advanced level conceptual assignments. Emphasis on complex professional skills. Capstone course for Design Area BFA students, required during final semester (graduation semester). Prerequisite: ART 4355 and permission of the advisor.

**ART 4357. ADVERTISING DESIGN. 3 Hours.**

Typography, layout, visualization, and conceptual problem solving as applied to advertising. Prerequisite: ART 3355.

**ART 4358. ADVANCED CINEMA PRODUCTION (ACP): EDITING. 3 Hours.**

An advanced workshop in video editing and post production. Emphasis will be placed on long form editing, the aesthetics of editing, and editing work flow. May be taken 3 times for credit. Prerequisite: ART 3358 or permission of instructor.

**ART 4359. ADVANCED PHOTOGRAPHY. 3 Hours.**

This course encourages students to use a variety of photographic processes (black & white, color, non-silver, computer imaging, etc.) with an emphasis on the development of a personal stance. Students will work on individual projects and present work in an environment of critical discussion. May be repeated for credit. Prerequisite: Three hours to be selected from ART 3333, ART 4360, ART 4363, or permission of the instructor.

**ART 4360. COLOR PHOTOGRAPHY. 3 Hours.**

This course will direct students to an understanding of color photography as a contemporary art medium. Students will utilize various digital photographic techniques including color correction and digital printing. Color theory, use of color as an element in image making, and the psychology of color may be covered. Prerequisite: ART 2360 or permission of the instructor.

**ART 4361. CINEMATIC ANIMATION 1. 3 Hours.**

Intensive exploration of the art and craft of animated cinema. Through directed productions, screenings, readings, and workshops, students develop experience in a range of processes, compositing techniques, as well as digital and traditional methods. Prerequisite: ART 3362 or permission from the instructor.

**ART 4362. CINEMA THESIS PRODUCTION. 3 Hours.**

This capstone course is designed to bring together ideas, processes, practices, and theories in the service of the production of a substantial work of cinema. Students will pursue an entire project from conception to completion, combining intensive preproduction, production, and post-production with in-depth instruction on lab work, distribution, and exhibition. Throughout the course, emphasis is placed on instructor, peer, and self-critique. May be repeated for credit. Prerequisite: ART 3358 or permission of the instructor.

**ART 4363. STUDIO PHOTOGRAPHY. 3 Hours.**

The theory and practice of studio photography. Students will master studio strobe lighting, large format film camera, and digital camera techniques. Prerequisite: ART 2360 or permission from the instructor.

**ART 4364. MOBILE APP DESIGN. 3 Hours.**

An overview of the development and design process for mobile web applications and portable technologies. Exploration of best practices for mobile app design and brand strategy, user experience, concept development, mobile content strategy, information architecture, interaction/interface design, visual design, and rapid prototyping. No coding is required or expected with this course. Prerequisite: ART 3356.

**ART 4365. TECHNOLOGY IN ART EDUCATION. 3 Hours.**

This course provides digital media presentation strategies to enhance teacher effectiveness and explores how to incorporate the use of digital media in curriculum development. It also enables students to develop an electronic teaching portfolio to prepare students for job interviews and to showcase both personal and student artwork. Reading assignments, research, hands-on experiences, and in-class discussion provide students with an understanding of technology and its application to an art education classroom. Students will gain a working knowledge of current best practice digital technology, including the internet and video software. Prerequisite: None; however students are highly encouraged to take ART 3323 before, or concurrent with, this course.

**ART 4366. WEB DESIGN. 3 Hours.**

Concentrated study in the use of design, creation, and strategic planning of websites. Emphasis is placed on creative concepts, information architecture, user experience, and site development. Course work will explore issues of differing perspectives of technology as a tool, a medium, and/or an environment. Prerequisite: ART 3356.

**ART 4367. CINEMATIC ANIMATION 2. 3 Hours.**

Builds on animation fundamentals while giving students an opportunity to develop and create more ambitious animated projects. In the context of these projects, we will continue to discuss industry production methods, watch contemporary animators' work and examine the role technological changes play in production. May be repeated for credit. Prerequisite: ART 4361 or permission from the instructor.

**ART 4368. ADVANCED DARKROOM PHOTOGRAPHY. 3 Hours.**

This advanced level course explores the use of medium and large format film cameras, film development, gelatin silver printing techniques, and archival presentation. May be repeated for up to 6 hours credit. Prerequisite: ART 3360.

**ART 4370. STAGED ENVIRONMENTS. 3 Hours.**

This course concentrates on the conceptualization, development and execution of tableaux designed exclusively for the camera. Lectures, readings and presentations will cover view cameras, studio lighting, set design, scouting locations, using props, and working with models. Prerequisite: ART 2360 or permission of the instructor.

**ART 4371. ADVANCED PAINTING. 3 Hours.**

Students will be encouraged to develop a personal direction which complements their development as visual thinkers. The student will be required to plan a course outline of conceptual development with the instructor at the beginning of each semester. May be repeated for credit. Student must earn a grade of "B" or above in the course to repeat it. Prerequisite: ART 2308, ART 2371 and a grade of B or above in ART 3371 or permission of the instructor. Transfer students will be required to schedule a portfolio review with the painting instructor to gain permission to enroll in the class.

**ART 4373. ADVANCED THREE-DIMENSIONAL STUDIES. 3 Hours.**

Class is designed for students to continue the development of advanced three-dimensional work and engage in a cross section of various media. May be repeated for credit. Prerequisite: 12 hours to be selected from ART 3341, ART 3342, ART 3363, ART 4341, ART 4342, ART 4343, ART 4353, or permission of the instructor. Formerly ART 4366. Credit will be granted for both.

**ART 4374. ADVANCED CONCEPT ART. 3 Hours.**

Advanced topics in character, creature, prop, and environment designs to visualize storytelling of fictional worlds. Students will simulate real-world applications of conceptualized art in preproduction team-based pipelines processes. Prerequisite: ART 3365.

**ART 4375. DESIGN TEXAS. 3 Hours.**

Visual Communication outreach and problem solving. Classroom operates like a design agency to complete real projects for clients and nonprofits as selected by the instructor. Provides advanced undergraduate students an opportunity to interact with clients on the development and completion of complex communication design problems. Prerequisite: ART 3355 and permission from advisor.

**ART 4376. ADVANCED CINEMA PRODUCTION (ACP): SOUND. 3 Hours.**

An advanced workshop in sound recording, sound design, and editing. Through lectures, lab, class demonstrations, and projects, students develop skills and knowledge in the technical and artistic aspects of sound techniques for film. May be repeated once for credit. Prerequisite: ART 3358 or permission from the instructor.

**ART 4377. ADVANCED CINEMA PRODUCTION (ACP): PRODUCING. 3 Hours.**

This course investigates real-world methodologies and best practices used in the art of producing. Topics may include cinematic, episodic, and documentary formats, as well as evolving formats such as VR/AR. Students develop a professional regard for the three vital elements of production: Time, Money, and Labor. With an eye on the intersection of aesthetic, legal, and practical considerations, students take a methodical approach to development and production through distribution and profit participation. May be repeated once for credit. Prerequisite: ART 3358 or permission of the instructor.

**ART 4378. TOPICS IN SCREENWRITING. 3 Hours.**

This course will focus on specialized areas of screenwriting beyond foundational and developmental content. The content covered may include screenwriting adaptation, non-linear storytelling, and serial/episodic screenwriting. May be repeated for credit as topics change. Prerequisite: ART 3350 or permission from the instructor.

**ART 4380. APPLIED INTERACTIVITY. 3 Hours.**

Engaging the principles of interaction to study their impact on user experience across a range of situational activities. Exploring applied user interface for the purpose of service learning or speculative design through the development of informative digital experiences. Prerequisite: ART 3367 3D Animation and ART 3364 Interactive Storytelling.

**ART 4381. THE MURAL. 3 Hours.**

Students are required to complete a variety of mural exercises and projects. This is a hands on art class in which you will develop a visual understanding of history, planning, scaling mediums, materials and documentation of murals. A variety of techniques and materials will be explored and students will be expected to develop a confidence on how to approach this art form. Prerequisite: ART 2371, ART 3371.

**ART 4382. ENTREPRENEURSHIP IN THE ARTS. 3 Hours.**

Students will apply creativity, imagination, and innovation as they explore opportunities for entrepreneurship in the arts. Prerequisite: Student must have completed 60 credit hours or have the permission of the instructor.

**ART 4383. INDEPENDENT CINEMA PRODUCTION. 3 Hours.**

Students will produce a major film or video in the genre of their choosing (narrative, documentary, commercial, or animation). Students may elect to work in a variety of media (including 16 mm film, digital video or installation) to produce original works. Students will be individually mentored as their productions move through preparation, shooting and post-production. May be repeated for credit. Prerequisite: ART 3358 or permission of instructor.

**ART 4384. ADVANCED CINEMA PRODUCTION (ACP): DIGITAL VISUAL EFFECTS. 3 Hours.**

Analysis of the shooting requirements, set and location considerations, and software choices and techniques used for various visual effects treatments. Includes digital compositing and techniques such as matte generation, camera tracking, color correction, roto-scoping, Chroma Key, set extension, and 3D integration. May be repeated once for credit. Prerequisite: ART 2304 and ART 2358, or permission of the instructor.

**ART 4390. CONFERENCE COURSE: ART HISTORY. 3 Hours.**

Independent study or research in an area of art history agreed upon in advance with the instructor. Written permission and the determination of obligations and objectives are required before registration. May be repeated for credit. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 4391. INDEPENDENT STUDY. 3 Hours.**

Mature, capable students may be permitted to pursue individual art problems. Problems must be stated in writing, a definite conference schedule arranged, and the paperwork must be approved by both the supervising faculty member and the department chair prior to registration. May be repeated for credit for varied subject matter. Prerequisite: B average in art concentration.

**ART 4392. SPECIAL STUDIES. 3 Hours.**

Special course work in new or experimental offerings for which there is immediate need and for which special resources are available. May be repeated for credit. Primarily for art majors.

**ART 4394. HONORS THESIS/SENIOR PROJECT. 3 Hours.**

Required of all students in the University Honors College. During the senior year, the student must complete a thesis or a project under the direction of a faculty member in the major department.

**ART 4395. ART INTERNSHIP. 3 Hours.**

An opportunity to apply academic training as participant/observer in a professional organization relevant to a major area of concentration. With permission of advisor, internships may be repeated for up to a maximum of nine hours credit. Internships must be arranged with the internship supervisor in the semester prior to enrolling for this course. Prerequisite: permission of the instructor.

**ART 4396. SPECIAL STUDIES IN ART HISTORY. 3 Hours.**

Subjects of immediate interest in various fields of art history; to complement temporary museum exhibitions and/or faculty research specializations. May be repeated for credit as course content changes. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**ART 4397. ADVANCED CINEMA PRODUCTION (ACP): SPECIAL TOPICS. 3 Hours.**

Topics in this course respond to emerging technologies, immediate needs, and specialized processes. May be repeated for credit. Prerequisite: ART 3358 or permission of the instructor.

**ART 4695. ART INTERNSHIP. 6 Hours.**

An opportunity to apply academic training as participant/observer in a professional organization relevant to a major area of concentration. With permission of advisor, internships may be repeated for up to a maximum of nine hours credit. Internships must be arranged with the internship supervisor in the semester prior to enrolling for this course. Prerequisite: permission of the instructor.

**ART 5000. SUPERVISED TEACHING STUDIO ART. 0 Hours.**

Training in teaching methods and procedures for studio art classes, including weekly group meetings with the instructor and individual consultations. Prerequisite: graduate standing in studio art, or graduate standing and appointment as a teaching assistant. May be repeated.

**ART 5320. ART CRITICISM & THEORY. 3 Hours.**

A discussion of placing art within the context of the history of ideas.

**ART 5321. CREATIVE STRATEGIES. 3 Hours.**

This is a seminar class for graduate students and will focus on exploring research strategies including the collection, interpretation and presentation of visual information. Students will read selected writings by artists, film and video makers, art historians, critics, designers and arts professionals on a weekly basis, contribute to class discussions, and examine their own creative strategies.

**ART 5322. ENTREPRENEURSHIP IN ARTS MANAGEMENT AND ARTS BRANDING. 3 Hours.**

Entrepreneurship in Arts Management and Arts Branding will offer students the opportunity to create, imagine, develop and implement individualized and collaborative entrepreneurial strategies that will strengthen their potential for success in their careers.

**ART 5323. RESEARCH FILM/VIDEO: EAST-WEST CINEMA. 3 Hours.**

Study of the cinema production process using significant works representative of important historic and contemporary ideas and movements from East and West.

**ART 5330. CRITICAL PERSPECTIVE IN THE VISUAL ARTS & VISUAL COMMUNICATION. 3 Hours.**

Seminar course that focuses on graduate student interaction with visiting artists, scholars, curators, critic, designers, and filmmakers.

**ART 5340. RESEARCH IN STUDIO INTERMEDIA. 3 Hours.**

Independent and directed research in the student's area of concentration. Studio hours to be arranged. May be repeated for credit. Prerequisite: graduate standing in studio art and consent of instructor and graduate advisor.

**ART 5341. RESEARCH IN SCULPTURE. 3 Hours.**

Independent and directed research in the student's area of concentration. Studio hours to be arranged. May be repeated for credit. Prerequisite: graduate standing in studio art and consent of instructor and the graduate advisor.

**ART 5342. RESEARCH IN GLASS. 3 Hours.**

Independent and directed research in the student's area of concentration. Studio hours to be arranged. May be repeated for credit. Prerequisite: graduate standing in studio art and consent of instructor and the graduate advisor.

**ART 5343. RESEARCH IN PRINTMAKING. 3 Hours.**

Independent and directed research in the student's area of concentration. Studio hours to be arranged. May be repeated for credit. Prerequisite: graduate standing in studio art and consent of instructor and graduate advisor.

**ART 5347. RESEARCH IN DRAWING. 3 Hours.**

Independent and directed research in the student's area of concentration. Studio hours to be arranged. May be repeated for credit. Prerequisite: graduate standing in studio art and consent of instructor and graduate advisor.

**ART 5355. RESEARCH IN VISUAL COMMUNICATION. 3 Hours.**

Independent and directed research in the student's area of concentration. Studio hours to be arranged. May be repeated for credit. Prerequisite: graduate standing in studio art and consent of instructor and graduate advisor.

**ART 5359. RESEARCH IN PHOTOGRAPHY DIGITAL IMAGING. 3 Hours.**

Independent and directed research in the student's area of concentration. Studio hours to be arranged. May be repeated for credit. Prerequisite: graduate standing in studio art and consent of instructor and graduate advisor.

**ART 5360. TOPICS IN THE HISTORY OF ART & DESIGN. 3 Hours.**

Special seminar/topics course focusing on enhancing the art and design knowledge base of MFA candidates in the areas of film/video, visual communication, intermedia-expanded studio, and glass as art.

**ART 5363. RESEARCH IN CLAY. 3 Hours.**

Independent and directed research in the student's area of concentration. Studio hours to be arranged. May be repeated for credit. Prerequisite: graduate standing in studio art and consent of instructor and the graduate advisor.

**ART 5371. RESEARCH IN PAINTING. 3 Hours.**

Independent and directed research in the student's area of concentration. Studio hours to be arranged. May be repeated for credit. Prerequisite: graduate standing in studio art and consent of instructor and the graduate advisor.

**ART 5383. RESEARCH IN FILM/VIDEO: SCREENWRITING. 3 Hours.**

Independent and directed research in the student's area of concentration. Studio hours to be arranged. May be repeated for credit. Prerequisite: Graduate standing in studio art and consent of instructor and the graduate advisor.

**ART 5384. RESEARCH IN FILM/VIDEO: CINEMATOGRAPHY. 3 Hours.**

Emphasis is given to individual application of technical skills and aesthetic abilities of cinematography to develop students' "creative eye." Prerequisite: Graduate standing in studio art and consent of instructor and the graduate advisor.

**ART 5385. RESEARCH FILM/VIDEO: EDITING. 3 Hours.**

An advanced workshop in video editing and post production. Emphasis will be placed on diverse editing genres and styles and the aesthetics of editing and post-production workflow. Prerequisite: Graduate standing in studio art and consent of instructor and the graduate advisor.

**ART 5386. RESEARCH FILM/VIDEO: SHORT FILM PRODUCTION. 3 Hours.**

This course will concentrate on the narrative form with the goal of directing a 3-5-minute original short film exploring dramatic beats and the use of blocking and camera as narrator. The course involves the planning, production, and post-production of short narrative films. Prerequisite: Graduate standing in studio art and consent of instructor and the graduate advisor.

**ART 5387. RESEARCH IN FILM/VIDEO: PRE THESIS FILM PRODUCTION I. 3 Hours.**

Students will develop scripts or treatment and finish all the major pre-production works and production for pre-thesis films to be edited in pre-thesis Film Production. Prerequisite: Graduate standing in studio art and consent of instructor and the graduate advisor.

**ART 5388. RESEARCH FILM/VIDEO: PRE THESIS FILM PRODUCTION II. 3 Hours.**

Students will finish all the major post-production works for pre-thesis films. The class will work through a number of topics relating to digital post-production including video editing, sound design, basic compositing, color correction, and exporting final projects for various exhibition platforms with an exploration of the aesthetics and guiding principles behind each area. Prerequisite: Graduate standing in studio art and consent of instructor and the graduate advisor.

**ART 5389. RESEARCH FILM/VIDEO: SPECIAL TOPICS TECHNIQUES. 3 Hours.**

The class will provide a foundation for the student in learning the art of Producing and Production Management. It will encompass the four phases of film making: development, production, post production and distribution. Prerequisite: permission of instructor.

**ART 5390. RESEARCH FILM/VIDEO: SPECIAL TOPICS IN FILM STUDIES. 3 Hours.**

Exploration of a specific area of cinema studies, designed to enhance and enrich the traditional production curriculum and provide significant professional research for an ever-changing discipline. Prerequisite: permission of the instructor.

**ART 5391. INDEPENDENT STUDY. 3 Hours.**

Independent and directed research in the area of Studio Intermedia. Studio hours to be arranged. May be repeated for credit. Prerequisite: graduate standing in studio art and consent of instructor and the graduate advisor.

**ART 5392. INDEPENDENT STUDY IN VISUAL COMMUNICATION. 3 Hours.**

Independent and directed research in the study of Visual Communication.

**ART 5393. INDEPENDENT AND DIRECTED RESEARCH IN FILM AND VIDEO. 3 Hours.**

Independent and directed research in Film and Video.

**ART 5394. INDEPENDENT STUDY IN GLASS. 3 Hours.**

Independent and directed research in the study of glass.

**ART 5395. INDEPENDENT STUDY IN ART HISTORY AND CRITICISM. 3 Hours.**

Independent and directed research in art history and criticism.

**ART 5396. SPECIAL TOPICS IN ART HISTORY. 3 Hours.**

Subjects of immediate interest in various fields of art history; to compliment faculty research specializations. May be repeated for credit as course content changes. Permission of the instructor required.

**ART 5397. MASTER OF FINE ARTS EXHIBITION. 3 Hours.**

This course is intended to be the final course in the Master of Fine Arts (M.F.A.) students program of study. Here, students will concentrate their studio activity towards the completion of a body of work to be exhibited, complete the written component of the degree as well as oral examinations. Students must have 30 hours of coursework in the concentration completed in their program of study prior to enrolling for this course.

**ART 5640. RESEARCH IN STUDIO INTERMEDIA. 6 Hours.**

Independent and directed research in the student's area of concentration. Studio hours to be arranged. May be repeated for credit. Prerequisite: graduate standing in studio art and consent of instructor and the graduate advisor.

**ART 5641. RESEARCH IN SCULPTURE. 6 Hours.**

Independent and directed research in the student's area of concentration. Studio hours to be arranged. May be repeated for credit. Prerequisite: graduate standing in studio art and consent of instructor and the graduate advisor.

**ART 5642. RESEARCH IN GLASS. 6 Hours.**

Independent and directed research in the student's area of concentration. Studio hours to be arranged. May be repeated for credit. Prerequisite: graduate standing in studio art and consent of instructor and the graduate advisor.



**ART 5643. RESEARCH IN PRINTMAKING. 6 Hours.**

Independent and directed research in the student's area of concentration. Studio hours to be arranged. May be repeated for credit. Prerequisite: graduate standing in studio art and consent of instructor and the graduate advisor.

**ART 5647. RESEARCH IN DRAWING. 6 Hours.**

Independent and directed research in the student's area of concentration. Studio hours to be arranged. May be repeated for credit. Prerequisite: graduate standing in studio art and consent of instructor and the graduate advisor.

**ART 5655. RESEARCH IN VISUAL COMMUNICATION. 6 Hours.**

Independent and directed research in the student's area of concentration. Studio hours to be arranged. May be repeated for credit. Prerequisite: graduate standing in studio art and consent of instructor and the graduate advisor.

**ART 5659. RESEARCH IN PHOTOGRAPHY DIGITAL IMAGING. 6 Hours.**

Independent and directed research in the student's area of concentration. Studio hours to be arranged. May be repeated for credit. Prerequisite: graduate standing in studio art and consent of instructor and the graduate advisor.

**ART 5663. RESEARCH IN CLAY. 6 Hours.**

Independent and directed research in the student's area of concentration. Studio hours to be arranged. May be repeated for credit. Prerequisite: graduate standing in studio art and consent of instructor and the graduate advisor.

**ART 5671. RESEARCH IN PAINTING. 6 Hours.**

Independent and directed research in the student's area of concentration. Studio hours to be arranged. May be repeated for credit. Prerequisite: graduate standing in studio art and consent of instructor and the graduate advisor.

**ART 5683. RESEARCH IN FILM/VIDEO: FILM PRODUCTION. 6 Hours.**

Independent and directed research in the student's area of concentration. Studio hours to be arranged. May be repeated for credit. Prerequisite: Graduate standing in studio art and consent of instructor and the graduate advisor.

**ART 5697. MASTER OF FINE ARTS EXHIBITION. 6 Hours.**

This course is intended to be the final course in the Master of Fine Arts (M.F.A.) student's program of study. Here, students will concentrate their studio activity towards the completion a body of work to be exhibited, complete the written component of the degree as well as oral examinations. Students must have 30 hours of coursework in the concentration completed in their program of study prior to enrolling for this course.

## COURSES

**AS 1121. FOUNDATION OF THE UNITED STATES AIR FORCE. 1 Hour.**

(AS 1121 in the fall and AS 1122 in the spring) AS 100 is a survey course designed to introduce students to the U.S. Air Force and Air Force ROTC. Featured topics include: mission and organization of the Air Force, officership and professionalism, military customs and courtesies, Air Force officer opportunities, and an introduction into communication skills. Leadership Laboratory (AS 1001) complements this course by providing cadets with followership experiences.

**AS 1122. FOUNDATION OF THE UNITED STATES AIR FORCE. 1 Hour.**

(AS 1121 in the fall and AS 1122 in the spring) AS 100 is a survey course designed to introduce students to the U.S. Air Force and Air Force ROTC. Featured topics include: mission and organization of the Air Force, officership and professionalism, military customs and courtesies, Air Force officer opportunities, and an introduction into communication skills. Leadership Laboratory (AS 1001) complements this course by providing cadets with followership experiences.

**AS 1181. LEADERSHIP LABORATORY. 1 Hour.**

(LLAB) (Every semester). The AS 100 and AS 200 LLabs include a study of Air Force customs and courtesies, drill and ceremonies, and military commands. The LLAB also includes studying the environment of an Air Force officer and learning about areas of opportunity available to commissioned officers. The AS 300 and AS 400 LLAB consist of activities classified as leadership and management experiences. They involve the planning and controlling of military activities of the cadet corps; and the preparation and presentation of briefings and other oral and written communications. LLAB also include interviews, guidance, and information that will increase the understanding, motivation, and performance of other cadets.

**AS 2121. TEAM AND LEADERSHIP FUNDAMENTALS. 1 Hour.**

(AS 2121 in the fall and 2122 in the spring): A survey course designed to provide a basic understanding of both leadership and team building fundamentals. In this course, students will apply learned leadership perspectives while completing team building activities and discussing various leadership topics (i.e., conflict management, motivation, ethical decision-making, etc.). Additionally, students will be introduced to, and practice, basic verbal and written communication skills to develop effective thinking, writing, and speaking proficiencies. Students are taught from the beginning that there are many layers to leadership, including aspects that are not typically associated with these topics. Such aspects include listening, self-assessment/self-reflection, being a good follower, and problem solving efficiently. As a whole, this course provides the student with a knowledge level understanding of the general elements of leader development and effective teamwork. Furthermore, students will continue to discuss the importance of the Air Force Core Values with the use of operational examples and historical Air Force leaders. Leadership Laboratory (AS 1001) is mandatory for Air Force ROTC cadets and complements this course by providing cadets with followership experiences.

**AS 2122. TEAM AND LEADERSHIP FUNDAMENTALS. 1 Hour.**

(AS 2121 in the fall and 2122 in the spring): A survey course designed to provide a basic understanding of both leadership and team building fundamentals. In this course, students will apply learned leadership perspectives while completing team building activities and discussing various leadership topics (i.e., conflict management, motivation, ethical decision-making, etc.). Additionally, students will be introduced to, and practice, basic verbal and written communication skills to develop effective thinking, writing, and speaking proficiencies. Students are taught from the beginning that there are many layers to leadership, including aspects that are not typically associated with these topics. Such aspects include listening, self-assessment/self-reflection, being a good follower, and problem solving efficiently. As a whole, this course provides the student with a knowledge level understanding of the general elements of leader development and effective teamwork. Furthermore, students will continue to discuss the importance of the Air Force Core Values with the use of operational examples and historical Air Force leaders. Leadership Laboratory (AS 1001) is mandatory for Air Force ROTC cadets and complements this course by providing cadets with followership experiences.

**AS 3301. LEADERSHIP STUDIES. 3 Hours.**

(AS 3301 in the fall and AS 3311 in the spring). AS 300 is a study of leadership, management fundamentals, professional knowledge, Air Force personnel and evaluation systems, leadership ethics, and communication skills required for an Air Force junior officer. Case studies are used to examine Air Force leadership and management situations as a means of demonstrating and exercising practical application of the concepts being studied. A mandatory Leadership Laboratory (AS 1001) complements this course by providing advanced leadership experiences in officer-type activities, giving students the opportunity to apply leadership and management principles of this course.

**AS 3311. LEADERSHIP STUDIES. 3 Hours.**

(AS 3301 in the fall and AS 3311 in the spring). AS 300 is a study of leadership, management fundamentals, professional knowledge, Air Force personnel and evaluation systems, leadership ethics, and communication skills required for an Air Force junior officer. Case studies are used to examine Air Force leadership and management situations as a means of demonstrating and exercising practical application of the concepts being studied. A mandatory Leadership Laboratory (AS 1001) complements this course by providing advanced leadership experiences in officer-type activities, giving students the opportunity to apply leadership and management principles of this course.

**AS 4301. NATIONAL SECURITY AFFAIRS/PREPARATION FOR ACTIVE DUTY. 3 Hours.**

(AS 4301 in the fall and 4311 in the spring). AS 400 examines the national security process, regional studies, advanced leadership ethics, and Air Force doctrine. Special topics of interest focus on the military as a profession, officership, military justice, civilian control of the military, preparation for active duty, and current issues affecting military professionalism. Within this structure, continued emphasis is given to refining communication skills. An additional Leadership Laboratory (AS 1001) complements this course by providing advanced leadership experiences, giving students the opportunity to apply the leadership and management principles of this course.

**AS 4311. NATIONAL SECURITY AFFAIRS/PREPARATION FOR ACTIVE DUTY. 3 Hours.**

(AS 4301 in the fall and AS 4311 in the spring). AS 400 examines the national security process, regional studies, advanced leadership ethics, and Air Force doctrine. Special topics of interest focus on the military as a profession, officership, military justice, civilian control of the military, preparation for active duty, and current issues affecting military professionalism. Within this structure, continued emphasis is given to refining communication skills. An additional Leadership Laboratory (AS 1001) complements this course by providing advanced leadership experiences, giving students the opportunity to apply the leadership and management principles of this course.

## COURSES

**ASA 1191. AFFILIATED STUDY ABROAD. 1 Hour.**

For students participating in an affiliated program.

**ASA 1291. AFFILIATED STUDY ABROAD. 2 Hours.**

For students participating in an affiliated program.

**ASA 1391. AFFILIATED STUDIES ABROAD. 3 Hours.**

For students participating in an affiliated program.

**ASA 1491. AFFILIATED STUDIES ABROAD. 4 Hours.**

For students participating in an affiliated program.

**ASA 1591. AFFILIATED STUDIES ABROAD. 5 Hours.**

For students participating in an affiliated program.

**ASA 2191. AFFILIATED STUDY ABROAD. 1 Hour.**

For students participating in an affiliated program.

**ASA 2291. AFFILIATED STUDY ABROAD. 2 Hours.**

For students participating in an affiliated program.

**ASA 2391. AFFILIATED STUDIES ABROAD. 3 Hours.**

For students participating in an affiliated program.

**ASA 2491. AFFILIATED STUDIES ABROAD. 4 Hours.**

For students participating in an affiliated program.

**ASA 2591. AFFILIATED STUDIES ABROAD. 5 Hours.**

For students participating in an affiliated program.

**ASA 3191. AFFILIATED STUDY ABROAD. 1 Hour.**

For students participating in an affiliated program.

**ASA 3291. AFFILIATED STUDIES ABROAD. 2 Hours.**

For students participating in an affiliated program.

**ASA 3391. AFFILIATED STUDIES ABROAD. 3 Hours.**

For students participating in an affiliated program.

**ASA 3491. AFFILIATED STUDIES ABROAD. 4 Hours.**

For students participating in an affiliated program.

**ASA 3591. AFFILIATED STUDIES ABROAD. 5 Hours.**

For students participating in an affiliated program.

**ASA 4191. AFFILIATED STUDY ABROAD. 1 Hour.**

For students participating in an affiliated program.

**ASA 4291. AFFILIATED STUDIES ABROAD. 2 Hours.**

For students participating in an affiliated program.

**ASA 4391. AFFILIATED STUDIES ABROAD. 3 Hours.**

For students participating in an affiliated program.

**ASA 4491. AFFILIATED STUDIES ABROAD. 4 Hours.**

For students participating in an affiliated program.

**ASA 4591. AFFILIATED STUDIES ABROAD. 5 Hours.**

For students participating in an affiliated program.

**ASA 4691. AFFILIATED STUDY ABROAD. 6 Hours.**

For students participating in an affiliated program.

**ASA 5291. AFFILIATED STUDIES ABROAD. 2 Hours.**

For students participating in an affiliated program.

**ASA 5391. AFFILIATED STUDIES ABROAD. 3 Hours.**

For students participating in an affiliated program.

**ASA 5491. AFFILIATED STUDIES ABROAD. 4 Hours.**

For students participating in an affiliated program.

**ASA 5591. AFFILIATED STUDIES ABROAD. 5 Hours.**

For students participating in an affiliated program.

**ASA 5691. AFFILIATED STUDIES ABROAD. 6 Hours.**

For students participating in an affiliated program.

## COURSES

**ASDS 5100. INDEPENDENT STUDY. 1 Hour.**

This course provides students with the opportunity to develop and execute individualized research projects in collaboration with faculty mentors. Students will engage in hands-on, faculty-guided research across various disciplines, learning to design studies, collect and analyze data, and present their findings effectively. Through a combination of independent work and structured mentorship, students will gain practical experience in research methodologies, critical thinking, and academic writing. The course emphasizes skill development in project management, problem-solving, and interdisciplinary collaboration, preparing students for advanced studies and professional careers. Students will showcase their research in presentations or written reports, contributing to a deeper understanding of their chosen field and fostering meaningful academic connections with faculty members.

**ASDS 5301. STATISTICAL THEORY AND APPLICATIONS. 3 Hours.**

An introduction to statistical theory and applications using R/SAS software. Topics may include descriptive statistics, numeracy, statistical concepts in estimation and testing, basic principles of design of experiments, analysis of variance, analysis of covariance, and some nonparametric statistical methods. Prerequisite: MATH 3330.

**ASDS 5302. PRINCIPLE OF DATA SCIENCE. 3 Hours.**

An introduction to the end-to-end process of going from unstructured, messy data to knowledge and actionable insights. Provides a broad overview of what data science means and systems and tools commonly used for data science and illustrates the principles of data science through several case studies, including business, marketing, medical imaging, and biology, among others. Prerequisite: MATH 3330.

**ASDS 5303. STATISTICAL AND SCIENTIFIC COMPUTING I. 3 Hours.**

Statistical and scientific computing focusing on programming in Python or R. Concepts in statistical computing include Monte Carlo techniques, Jackknife, Bootstrapping, Cross-Validation, and others. Concepts in scientific computing include computational and randomized linear algebra, principal component analysis, and applications. Prerequisite: MATH 3330.

**ASDS 5304. APPLIED MULTIVARIATE STATISTICAL ANALYSIS. 3 Hours.**

Statistical analysis for data collected in several variables. Topics include sampling from the multivariate normal distribution, multivariate analysis of variance, discriminant analysis, principal components, and factor analysis. Basic knowledge of programming in SAS or R is required. Prerequisite: ASDS 5301, ASDS 5302, ASDS 5303.

**ASDS 5305. DEEP LEARNING AND ARTIFICIAL NEURAL NETWORKS. 3 Hours.**

Introduction to artificial neural networks and deep learning. Topics include DL basics, history, and introduction to Pytorch; Perceptrons and their inspiration from neuroscience; Gradients, Autograd, designing deep linear systems; Training and testing neural networks, backpropagation, stochastic gradient descent; Applying Optimization and regularization to neural nets; Convolutional Neural Networks (ConvNets/CNNs); Recurrent Neural Networks (RNNs); and Modern Networks and their applications. Prerequisite: ASDS 5301, ASDS 5302, ASDS 5303.

**ASDS 5306. APPLIED TIME SERIES ANALYSIS IN DATA ANALYTICS. 3 Hours.**

An introduction to the theory and applications of time series modeling with an emphasis on modeling and forecasting using the software. Topics include stationarity and autocorrelation, autoregressive, moving average, ARMA and ARIMA; forecasting and estimation; spectral analysis. Computational implementation in R. Basic programming skills is preferred. Prerequisite: ASDS 5301, ASDS 5302, ASDS 5303.

**ASDS 6300. SPECIAL TOPICS. 3 Hours.**

Special Topics in Data Science offers students a dynamic learning experience through a series of guest lectures by industry leaders and practitioners. The course explores the latest trends, challenges, and innovations in data science across various industries. Through interactive lectures, case studies, and industry-sponsored projects, students will gain exposure to real-world data science applications, learn how to tackle complex business problems, and understand the tools and technologies shaping the future of the field. The course emphasizes collaboration, critical thinking, and problem-solving while providing students with networking opportunities to connect with professionals in the industry. Prerequisite: ASDS 5301, ASDS 5302, ASDS 5303.

**ASDS 6301. ADVANCE REGRESSION ANALYSIS. 3 Hours.**

Topics include multiple linear regression, ordinary and generalized least squares, partial and multiple correlation, regression diagnostics, collinearity, model building, and nonlinear regression. The course provides an extended introduction to the computer package widely used for statistical analysis. Basic knowledge of programming is required. Prerequisite: MATH 3330.

**ASDS 6302. MACHINE LEARNING WITH APPLICATIONS. 3 Hours.**

Topics include but are not limited to supervised learning methods: linear model, generalized linear model, logistic regression, linear discriminant analysis (LDA), quadratic discriminant analysis (QDA), nearest neighbor classifier, support vector machines, tree-based methods (decision tree, random forest, XGBoost), and neural networks; and unsupervised learning methods: clustering, principal component analysis, and independent component analysis. The course provides an extended introduction to tools widely used for statistical machine learning. Basic programming skills are preferred. Prerequisite: MATH 3330.

**ASDS 6303. DATA MINING WITH INFORMATION VISUALIZATION. 3 Hours.**

Introduction to statistical pattern recognition. The main topics include Bayes decision theory, discriminant functions, maximum likelihood estimation, PCA, LDA, semi-supervised kernel learning, and graph embedding. This course will discuss some applications of data mining in different application fields, such as business, marketing, medical imaging, biology. Prerequisite: MATH 3330.

**ASDS 6304. OPTIMIZATION AND BIG DATA ANALYTICS. 3 Hours.**

Topics include an introduction to big data analysis, real-world applications of data science, linear system solutions, linear programming, duality theory, convex sets, convex functions, optimality conditions, unconstrained Optimization, constraint optimization, conjugate direction methods, alternating direction method of multipliers, classification/regression models and algorithms, dimensionality reduction for visualization and projects on real data. Prerequisite: ASDS 5301, ASDS 5302, ASDS 5303.

**ASDS 6305. STATISTICAL AND SCIENTIFIC COMPUTING II. 3 Hours.**

Advanced topics in statistical and scientific computing, emphasizing complex data analysis, such as high-dimensional and functional data. Topics include Expectation-Maximization (EM), Stochastic and Monte Carlo EM, Metropolis-Hastings algorithm, Gibbs sampling, functional principal component analysis, tensors, and tensor decompositions. Prerequisite: ASDS 5301, ASDS 5302, ASDS 5303.

**ASDS 6306. INTERNSHIP/CAPSTONE RESEARCH PROJECT. 3 Hours.**

The capstone project aims to give students a "hands-on" experience in analyzing interesting datasets with cutting-edge techniques of their interest. While students are encouraged to get feedback and mentoring from faculty, they should work as independently as possible with their teams. Progress will be monitored by completing the following quarterly milestones: (1) Acquisition of dataset, data pre-processing, and clear statement/justification of the proposed analysis. (2) Preliminary results and discussion of the plausibility of the results, (3) Refinement of codes, analysis, and results. (4) Submission of a written 5+ page report including introduction, background, methods, results, discussion, and conclusion. (5) Final oral presentation chaired by an ASDS faculty who read the written report. The project team members are expected to answer project-related questions from faculty and peers satisfactorily. Prerequisite: ASDS 5301, ASDS 5302, ASDS 5303, ASDS 6301, ASDS 6302, ASDS 6303.

**COURSES****ASL 1441. BEGINNING AMERICAN SIGN LANGUAGE I. 4 Hours.**

Introduction to the basic production (expressive skills) and comprehension (receptive skills) of American Sign Language (ASL). Includes the manual alphabet and numbers, develops conversational ability, introduces Deaf culture, and exposes students to ASL grammar.

**ASL 1442. BEGINNING AMERICAN SIGN LANGUAGE II. 4 Hours.**

Builds on production (expressive skills) and comprehension (receptive skills) of American Sign Language (ASL) developed in ASL 1441. Includes the manual alphabet and numbers, conversational skills, in-depth discussion of Deaf culture, and continuous exposure to ASL grammar. Prerequisite: ASL 1441, or the equivalent, with a grade of C or better.

**ASL 1491. CONFERENCE COURSE. 4 Hours.**

Independent study; consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: Permission of the instructor.

**ASL 2313. INTERMEDIATE AMERICAN SIGN LANGUAGE I. 3 Hours.**

Expands on expressive and receptive skills of American Sign Language (ASL) developed in ASL 1442, adding more complex grammatical features, vocabulary, and communicative activities, as well as continued discussion of Deaf culture. Prerequisite: ASL 1442, or the equivalent, with a grade of C or better.

**ASL 2314. INTERMEDIATE AMERICAN SIGN LANGUAGE II. 3 Hours.**

Expands on the expressive and receptive skills, grammar, and vocabulary of American Sign Language (ASL) developed in ASL 2313, including more complex communicative activities and discussion of the use of culturally significant topics relating to the Deaf Community. This course satisfies the University of Texas at Arlington core curriculum requirement in language, philosophy and culture. Prerequisite: ASL 2313, or the equivalent, with a grade of C or better.

**ASL 2391. CONFERENCE COURSE. 3 Hours.**

Independent study; consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: Permission of the instructor.

**ASL 3301. AMERICAN DEAF CULTURE AND COMMUNITY. 3 Hours.**

This course provides a multidisciplinary overview of Deaf Culture and C/community, exploring concepts and issues such as language, identity, and cultural norms. Taught in English.

**ASL 3315. ADVANCED AMERICAN SIGN LANGUAGE. 3 Hours.**

This course expands on the expressive and receptive skills, grammar, and vocabulary of American Sign Language (ASL) developed in ASL 2314, including increasingly complex communicative activities, discussion of culturally significant topics relating to the Deaf Community, and exploring a wide range of ASL nuances. Prerequisite: ASL 2314 with a grade of C or better.

**ASL 3333. ASL DEPICTION. 3 Hours.**

This course examines the use of ASL classifiers, visual vernacular, mime, gesture, role shifting, eye gaze, non-manual markers, location, embodiment, and performativity to communicate visually. Students will learn to go beyond using conventional vocabulary and better use their bodies and the signing space around them to depict the concepts they convey and stories they tell. Prerequisite: ASL 2313 with a grade of C or better, or concurrent enrollment in ASL 2313.

**ASL 4330. LINGUISTICS OF ASL. 3 Hours.**

This course explores the linguistic structure and features of American Sign Language (ASL). Students will study the phonology, morphology, syntax, semantics, and pragmatics of ASL. Variation, code-switching, historical change, language contact signing, and related phenomena will also be examined. Prerequisite: ASL 2314 with a grade of C or better.

## COURSES

**ASTR 1345. INTRODUCTORY ASTRONOMY I. 3 Hours. (TCCN = ASTR 1303)**

ASTR 1345 and ASTR 1346 constitute a one-year sequence for any student who is interested in learning his/her place within the astronomical universe. The first semester consists of an essentially descriptive treatment of the apparent motions and properties of members of the Solar System including the Sun, the planets and their moons, comets and rockets, and satellites as well as the mechanics and evolution of the Solar System. The laboratory work includes the use of astronomical telescopes for observation.

**ASTR 1346. INTRODUCTORY ASTRONOMY II. 3 Hours. (TCCN = ASTR 1304)**

Follows ASTR 1345 and focuses on the science of stars and galaxies. Properties of light are applied to the understanding and classification of stars and to determining their distances. Topics include nuclear reactions, binary stars, variable stars, exploding stars, black holes, and star clusters. The course concludes with the structure of the Milky Way and the role galaxies play in modern cosmological theories. The laboratory work includes telescopic observations.

**ASTR 2345. ARCHAEOASTRONOMY. 3 Hours.**

This is a one semester course on astronomy and archaeology intertwining with an emphasis on the interesting relationship between ancient constructions and the sky. It provides a better understanding of the ideas of the architects of the past and of their religious and symbolic worlds. Many examples show how ancient astronomy still related to current astronomy in so many ways and events, such as the total lunar eclipse that led to the Athenian defeat at Syracuse, or the relation of the Easter/Passover/Chinese New Year to lunar cycles, or Polynesian sailors who populated the Pacific with the stars as a guide. This course is divided into three sections, the first of which explores the past relations between astronomy and people, power, the afterworld, architecture, and landscape. Secondly, the fundamentals of archaeoastronomy are then addressed in detail, with coverage of the celestial coordinates; the apparent motion of the Sun, Moon, stars, and planets; observation of celestial bodies at the horizon; the use of astronomical software in archaeoastronomy; and current methods for making and analyzing measurements. The final section reviews what archaeoastronomy can now tell us about the nature and purpose of such sites and structures as Stonehenge, the Pyramids of Giza, Chichen Itza, the Campus Martius, and the Valley of the Temples of Agrigento. Prerequisite: high school math.



## COURSES

### **BANA 3308. INTRODUCTION TO BUSINESS ANALYTICS. 3 Hours.**

This course introduces students to data mining and business analytics techniques that will enable them to draw actionable insights from data. In addition to tracing the evolution of ideas in Artificial Intelligence (AI), Machine Learning (ML), and Deep Learning (DL), the course provides hands-on exposure to state-of-the-art machine learning algorithms-such as linear, ensemble, and neural network models-that organizations rely on to derive business value. Prerequisite: BSTAT 3321 and INSY 3300.

### **BANA 3309. DATA VISUALIZATION AND BUSINESS INTELLIGENCE. 3 Hours.**

This course introduces students to cutting-edge techniques for visualizing data and creating dashboards to facilitate data-driven decision making. Topics include fundamentals of SQL, preprocessing of data, examining principles and concepts underlying visual characteristics of data, exploring graphs and charts to draw insight from data, assessing the quality of datasets, and performing exploratory analysis. Creating dashboards and storytelling to communicate business insight will also be emphasized. Prerequisite: BSTAT 3321 and INSY 3300.

### **BANA 4308. ADVANCED DATA SCIENCE. 3 Hours.**

This course provides an in-depth understanding of machine learning concepts and algorithms using Python. Students will receive hands-on training on supervised learning algorithms such as KNN, Naïve Bayes, Linear and Logistic Regression, Support Vector Machines, Decision Trees and Ensembles, and Artificial Neural Networks (ANNs). The course will also cover foundations of Natural Language Processing (NLP) and unsupervised learning algorithms such as K-Means, Hierarchical Clustering, and DBSCAN. Prerequisite: BANA 3308 and BANA 3309.

### **BANA 4311. ETHICAL AND SOCIAL ISSUES IN DATA SCIENCE. 3 Hours.**

This course discusses ethical concerns and social issues related to the creation, storage, analysis, use, and dissemination of data arising from business applications of machine learning, artificial intelligence, predictive analytics and data science. Topics include fairness, validity, anonymity, privacy, ownership, human subject research and societal consequences of data analysis and use by business organizations. Prerequisite: BANA 3308.

### **BANA 4326. CAPSTONE IN BUSINESS ANALYTICS. 3 Hours.**

This course covers advanced analytics techniques, such as Natural Language Processing, Deep Learning, and Reinforcement Learning. It also provides students an opportunity to apply their analytics skills to solve a real-world problem and present the efficacy of their solution from a business perspective. Communication and presentation skills will be emphasized. Prerequisite: BANA 4308.

### **BANA 4331. SEMINAR IN BUSINESS ANALYTICS. 3 Hours.**

The course will be taught in a seminar style and will involve readings and discussions on advanced/special topics in Business Analytics. It may be repeated for credit with the consent of the department. Prerequisite: 60 or 90 credit hours and consent of instructor.

### **BANA 4393. BUSINESS ANALYTICS INTERNSHIP. 3 Hours.**

The course will allow students to apply analytics concepts and principles to problems in a real-world setting. The course may be used as an advanced business elective only and will be graded on a pass/fail basis. No credit will be given for previous experience or activities. The course may not be repeated for credit. Prerequisite: Junior standing and consent of department internship advisor.

## COURSES

### **BCMN 2347. BROADCAST WRITING AND REPORTING. 3 Hours. (TCCN = COMM 2339)**

Writing non-dramatic scripts for radio and television. Emphasis is on writing for time and under deadline pressure as well as writing in active voice.

### **BCMN 2357. RADIO PRODUCTION I. 3 Hours. (TCCN = COMM 2303)**

The fundamentals of radio broadcasting. The techniques of announcing, interviewing, script writing, programming, types of radio production, audience analysis, and vocational opportunities. Students participate in typical broadcasting activities.

### **BCMN 2358. VIDEO PRODUCTION. 3 Hours. (TCCN = COMM 1336)**

Fundamentals of video production and television broadcasting, including camera operation, video editing, writing, and lighting.

### **BCMN 2360. INTRODUCTION TO BROADCASTING. 3 Hours. (TCCN = COMM 1335)**

A survey of historical and contemporary operations and functions of broadcasting. How radio, television, podcasting, and streaming media operate, including understanding of stations, distribution methods and facilities, regulation and the FCC, networks, advertising agencies, audience ratings, and new technologies.

### **BCMN 2366. AERIAL VIDEOGRAPHY AND PHOTOGRAPHY. 3 Hours.**

Producing aerial photography and videography using drones. Preparation for the Federal Aviation Administration's remote pilot certification process. Prerequisite: 30 hours earned.

### **BCMN 3319. BROADCAST MANAGEMENT. 3 Hours.**

Management procedures, policies, and responsibilities in the successful operation of telecommunication industries. Areas covered are planning, problem-solving, personnel, facilities, government, financial resources, and public service. Prerequisite: A grade of C (2.0/4.0 scale) or better in BCMN 3340.

### **BCMN 3340. ELECTRONIC NEWS. 3 Hours.**

News writing and gathering for radio, television, podcasting and streaming media; studio production and switching practices; use of basic audio and video electronic equipment; editing of news stories for analysis and criticism. Prerequisite: Three hours of Math, COMM 2311 (or concurrent enrollment), and a grade of C or better in the following courses: BCMN 2347, BCMN 2357, BCMN 2358, and BCMN 2360.

**BCMN 3350. SPECIALIZED TELEVISION REPORTING. 3 Hours.**

Producing and reporting of news information for the television media on specialized topics. Students will participate in news gathering, writing, and shoot packages for television. Prerequisite: A grade of C or better in BCMN 3340.

**BCMN 3355. BROADCAST ANNOUNCING. 3 Hours.**

Concentrated study of phrasing, timing, voice modulation, pronunciation and articulation. Analysis and interpretation of all types of broadcast copy. Integration of current industry standard announcing and performance into radio, television, podcasting and other digital productions. Prerequisite: COMM 2311 and a grade of C or better in the following courses: BCMN 2347, BCMN 2357, BCMN 2358, BCMN 2360.

**BCMN 3360. SPORTS REPORTING. 3 Hours.**

Reporting on sports across multiple platforms. Credit will not be given for both BCMN 3360 and JOUR 3360. Prerequisite: COMM 2311 (previously listed as JOUR 1345) and a grade of C or better (2.0/4.0 scale) in both BCMN 2347 and BCMN 2358.

**BCMN 3370. MULTIMEDIA PRODUCTION. 3 Hours.**

Digital audio and video production applicable to various communication professions. This course is for non-broadcast majors and may not be substituted for BCMN 2357 or BCMN 2358.

**BCMN 3380. PODCAST PRODUCTION. 3 Hours.**

The fundamentals of podcast production including show design and content, audio-video recording and editing techniques, distribution, market analysis and promotion. Prerequisite: 45 hours earned.

**BCMN 4191. MEDIA WORKSHOP. 1 Hour.**

Contemporary activities in broadcasting. Topics will vary. May be repeated up to three times. Prerequisite: Permission of the instructor.

**BCMN 4192. VIDEO PRODUCTION WORKSHOP. 1 Hour.**

Studio production for news, entertainment, and original shows. Can be repeated for credit up to three times. Prerequisite: BCMN 2358.

**BCMN 4193. TELEVISION PRODUCTION WORKSHOP. 1 Hour.**

Television production for Spanish language audiences. Can be repeated for credit up to three times. Prerequisite: BCMN 2358.

**BCMN 4194. AUDIO PRODUCTION WORKSHOP. 1 Hour.**

Producing radio and other audio projects. Can be repeated for credit up to three times.

**BCMN 4320. CURRENT ISSUES IN TELECOMMUNICATIONS. 3 Hours.**

Recent and current literature in radio and television broadcasting, cablecasting, industrial video, satellite distribution, and national and international telecommunications policies. Current problems and possible solutions. Prerequisite: COMM 3315, a grade of C or better in BCMN 3319, and BCMN 3340.

**BCMN 4322. CORPORATE VIDEO PRODUCTION. 3 Hours.**

Producing video for nonprofit, municipal, and corporate community partners. Includes professional client interaction, project proposals and contracts, team dynamics and leadership, and video distribution guidelines. Prerequisite: COMM 3315 and a grade of C or better in BCMN 3340.

**BCMN 4350. ADVANCED TELEVISION REPORTING. 3 Hours.**

Production and evaluation of news programs for transmission on electronic media. Students will participate in production of newscasts for airing via broadcast and cable systems. Prerequisite: COMM 3315, a grade of C or better in BCMN 3340.

**BCMN 4391. CONFERENCE COURSE. 3 Hours.**

Topic assigned on an individual basis, covering individual research or study in the designated areas. May be repeated when topic changes. Prerequisite: 60 or more hours earned and permission of the department.

**BCMN 4393. SPECIAL TOPICS. 3 Hours.**

Special studies in broadcasting. Topic varies from semester to semester. May be repeated when topics change, for a maximum of six credit hours. Prerequisite: BCMN 3340 and 60 hours earned, and permission of department.

**BCMN 4395. PROFESSIONAL INTERNSHIP. 3 Hours.**

Individual research in broadcasting while working with business and industry. Individual conference to be arranged. Prerequisite: 60 or more hours earned and permission of department.

## COURSES

**BCOM 3360. EFFECTIVE BUSINESS COMMUNICATION. 3 Hours.**

Principles and practice of effective communication with business organizations. Students will be exposed to theories of persuasion, argumentation and advocacy. Techniques to achieve group compromise and conflict resolution are also emphasized. A business professionalism lab is required. The grade for this course requires the completion of both the lecture component and the professionalism lab. Prerequisite: 30 credit hours.

**BCOM 4380. ADVANCED COMMUNICATIONS FOR BUSINESS. 3 Hours.**

Students develop written and oral communication skills. Multiple individual professional writing projects will be produced and critiqued. Grammar, sentence structure, and word choice in the business setting will be developed. Students will deliver multiple oral presentations and learn their strategy, techniques, and tips for succinct communications. Non-verbal communication will be reviewed. Prerequisite: BCOM 3360.

**BCOM 5175. BUSINESS COMMUNICATIONS. 1 Hour.**

Course focuses on effective oral and written communication skills for business leaders. Discusses advanced techniques for improved business writing and presentation skills. Also stresses presentation media and computer graphics for reports and presentations.

**BCOM 5375. ADVANCED BUSINESS COMMUNICATION THEORY & PRACTICE. 3 Hours.**

Examines theories of effective oral and written communication for managers, including conflict resolution, emotional intelligence, and others. Discusses techniques for improved research, report writing and presentation. Integrates presentation media and computer graphics for reports and presentations.

**COURSES****BE 1000. UNDERGRADUATE RESEARCH. 0 Hours.**

Freshman level undergraduate research. Prerequisite: Departmental good standing and permission of instructor. May be taken a maximum of 3 times.

**BE 1105. MEDICAL APPLICATIONS OF ENGINEERING. 1 Hour.**

Introduction to basic biology and engineering problems associated with living systems and health care delivery. Examples will be used to illustrate how basic concepts and tools of science & engineering can be brought to bear in understanding, mimicking and utilizing biological processes.

**BE 1325. INTRODUCTION TO BIOENGINEERING. 3 Hours.**

Topics include introduction to basic engineering principles and quantitative methods, their applications in analyzing and solving problems in biology and medicine. Also includes new trends in the development of bioengineering and biotechnology.

**BE 2000. UNDERGRADUATE RESEARCH. 0 Hours.**

Sophomore level undergraduate research. Prerequisite: Departmental good standing and permission of instructor. May be taken a maximum of 3 times.

**BE 2300. SPECIAL TOPICS IN BIOENGINEERING. 3 Hours.**

A study of selected topics in Bioengineering. May be repeated when topics vary.

**BE 2310. ENGINEERING APPROACHES TO SOLVING CLINICAL CHALLENGES. 3 Hours.**

In this sophomore course, students will apply engineering principles to find solutions to current clinical problems presented to the class. As small groups, students will work as teams to design a process or system to meet the desired needs of the given clinical challenges based on the necessary constraints. As a final project presentation, students will use what they have learned to identify a new clinical challenge and work to define a meaningful set of manufacturing, fiscal, safety, ethical, and health-related constraints associated with the problem. Students will be highly encouraged to identify solutions to these newly derived clinical problems and to integrate this clinical challenge as part of their future senior design project. Prerequisite: C or better in BE 1105, BE 1325, MATH 2425, CHEM 1442, and BE 2315 or consent of BE undergraduate advisor.

**BE 2315. INTRODUCTORY COMPUTATIONAL TOOLS FOR BIOENGINEERS. 3 Hours.**

Students learn programming concepts (variable, array, command, logics, do-loop, etc.) through the use of SolidWorks, MatLab, and Image J, etc. Students learn to use these computational tools by working on problems and exercises of biological, physiological relevance and clinical applications. Prerequisite: A course grade of C or better in BE 1325, and MATH 1426 or consent of BE undergraduate advisor.

**BE 3000. UNDERGRADUATE RESEARCH. 0 Hours.**

Junior level undergraduate research. Prerequisite: Departmental good standing and permission of instructor. May be taken a maximum 3 times.

**BE 3101. SEMINAR IN BIOENGINEERING. 1 Hour.**

University and guest lecturers speak on topics of current research interest in the field of bioengineering. Prerequisite: Accepted into the BE Professional Program or consent of the BE undergraduate advisor.

**BE 3180. INTRODUCTION TO MEDICAL DEVICE REGULATORY REQUIREMENTS AND QUALITY STANDARDS. 1 Hour.**

Topics include introduction to fundamentals of regulatory requirements for medical devices, broadly defined as mechanical and electronic equipment or tissue-implantable constructs. Familiarization with national and international regulatory agencies, and presentation of the processes of securing regulatory approvals for medical devices. Emphasis will be on the U.S. Food and Drug Administration, but examples from other regulatory agencies will also be presented. The course also introduces students to the U.S. National Institute of Standards and Technology as well as various professional engineering societies that provide quality standards for bioengineering design. Prerequisite: Accepted into the BE Professional Program or consent of the BE undergraduate advisor.

**BE 3191. DIRECTED RESEARCH IN BIOENGINEERING. 1 Hour.**

Student participates in a research project under the individual instruction of a faculty supervisor. Prerequisite: Accepted into the BE Professional Program or consent of the BE undergraduate advisor and the instructor.

**BE 3195. INTERNSHIP IN BIOENGINEERING. 1 Hour.**

Students receive training in a bioengineering company or a hospital to gain firsthand industrial or clinical engineering experience. The company or hospital assign projects and a faculty member monitors the student's progress. Prerequisite: Completion of at least 70 undergraduate credit hours in BE and good standing in the undergraduate program. Permission of Undergraduate Academic Advisor.

**BE 3280. INTRODUCTION TO MEDICAL DEVICE REGULATORY REQUIREMENTS & QUALITY STANDARDS. 2 Hours.**

Topics include introduction to fundamentals of regulatory requirements for medical devices, broadly defined as mechanical and electronic equipment or tissue-implantable constructs. Familiarization with national and international regulatory agencies, and presentation of the processes of securing regulatory approvals for medical devices. Emphasis will be on the U.S. Food and Drug Administration, but examples from other regulatory agencies will also be presented. The course also introduces students to the U.S. National Institute of Standards and Technology as well as various professional engineering societies that provide quality standards for bioengineering design. Prerequisite: Accepted into the BE Professional Program or consent of the BE undergraduate advisor.

**BE 3295. INTERNSHIP IN BIOENGINEERING. 2 Hours.**

Students receive training in a bioengineering company or a hospital to gain first hand industrial or clinical engineering experience. The company or hospital assigns projects and a faculty member monitors the student's progress. Prerequisite: Completion of at least 70 undergraduate credit hours in BE and good standing in the undergraduate program. Permission of Undergraduate Academic Advisor.

**BE 3301. CELL PHYSIOLOGY FOR BIOENGINEERS. 3 Hours.**

This course will cover principles of molecular omics (i.e., genomics, transcriptomics, proteomics and synthetic biology); the field of molecular bioengineering and processes involving inducible transcription and chimeric proteins; the composition of cell membranes, ion transport and the application of optogenetics in cell physiology regulation; the way cells communicate and integrate signals and translate them in intracellular metabolic cascades through the understanding of phosphoproteomics, energy metabolism, metabolomics, cellular motility, and molecular motors; the processes involved in cell proliferation, abnormal cell division dysregulation in cancer, and nanotechnology techniques for tumor treatment. Preferred background: basic understanding of general biology and general chemistry. Prerequisite: Accepted into the BE Professional Program or consent of the BE undergraduate advisor.

**BE 3310. BIOMECHANICS AND FLUID FLOW WITH COMPUTATIONAL LABORATORY. 3 Hours.**

Following an introduction to the basics of solid, fluid mechanics, student learn the fundamental behavior of various biological materials, flow properties of blood, viscoelastic properties of cells, tissue matrix, as well as their roles in human physiology at normal and disease states. Examples also include the design aspects of medical prosthetic devices. The course will cover biomechanics across a wide range of scales from organism, organ, tissue, cell and to protein levels. Students learn computational modeling to formulate and solve bioengineering problems. Preferred background: basic understanding of general physics, general biology and basic calculus. Prerequisite: Accepted into the BE Professional Program or consent of the BE undergraduate advisor.

**BE 3317. LINEAR SYSTEMS IN BIOENGINEERING. 3 Hours.**

Time-domain transient analysis, convolution, Laplace Transforms, Fourier Series, Transforms and their applications, transfer functions, signal flow diagrams, Bode plots, stability criteria, sampling, filter designs, and Discrete-time signals and systems. Examples with applications in bioengineering will be emphasized. Preferred background: basic understanding of general physics, general biology and basic calculus. Prerequisite: Accepted into the BE Professional Program or consent of the BE undergraduate advisor.

**BE 3320. BIOMEDICAL SIGNAL ACQUISITION AND ANALYSIS. 3 Hours.**

This course introduces basic technical skills for the acquisition and analysis of biomedical signals in living systems. Students will explore the principles of sensors, signal transformation, and simple signal processing with physiological signal applications. The course also includes hands-on programming in computer-based data acquisition platforms, focusing on sensor integration for experimental data collection, processing, and analysis. Key topics include error analysis, repeatability, resolution, and the interpretation of data from living systems, emphasizing clinical applications. Prerequisite: A grade of C or better in MATH 2326, BE 2315, and PHYS 1444 (PHYS 1444 may be taken concurrently) or consent of the BE undergraduate advisor.

**BE 3325. FLUORESCENCE MICROSCOPY. 3 Hours.**

Introduction to the anatomy of fluorescence microscopy and the physical principles of its operation; confocal and multi-photon microscopy; molecular imaging applications based on Forster Resonance Energy Transfer (FRET), Fluorescence Lifetime Imaging (FLIM), Fluorescence Correlation Spectroscopy (FCS), Fluorescence Recovery After Photobleaching (FRAP) and Total Internal Reflection Fluorescence (TIRF) Microscopy. Preferred background: basic understanding of general physics, general chemistry, general biology and basic calculus. Prerequisite: Accepted into the BE Professional Program or consent of the BE undergraduate advisor.

**BE 3327. TISSUE OPTICS. 3 Hours.**

Introduction to the science and technology behind tissue optical imaging systems and their design requirements for different clinical applications; diffuse optical tomography; fluorescence tomography; bioluminescence tomography; multi-modality imaging. Preferred background: basic understanding of general physics, general chemistry, general biology and basic calculus. Prerequisite: Accepted into the BE Professional Program or consent of the BE undergraduate advisor.

**BE 3343. MATLAB AND APPLICATIONS FOR BIOENGINEERS. 3 Hours.**

This course consists of two parts: the first part teaches students how to use MATLAB for engineering computation, quantitative analysis, scientific plotting/graphing presentation, and numerical modeling in solving real-world problems. After enabling students to generate arrays, files, functions, and to write MATLAB programs, the course will focus on using MATLAB for bioengineering applications, including 2D and 3D graphing for biological images, data processing for time-varying signals, and 2D Fourier transform for medical image processing. A variety of examples often encountered in the biological, biomedical engineering field will be used as class demonstration, presentation and project assignments. Preferred background: basic programming skills. Prerequisite: Accepted into the BE Professional Program or consent of the BE undergraduate advisor.

**BE 3344. BIOINSTRUMENTATION. 3 Hours.**

Fundamental principles of bioinstrumentation, including operational amplifiers and instrumentation amplifiers; measurements of biopotentials; signals and noise in biological systems; mechanical transducers; resistive, inductive, capacitive transducers; measurement of temperature, blood pressure and flow; electrical safety. Prerequisite: C or better in EE 2440 or CSE 2440; accepted in BE Professional Program or consent of the BE undergraduate advisor.

**BE 3346. MEDICAL IMAGING. 3 Hours.**

This course introduces basic medical imaging modalities, including X-ray Computed Tomography (CT), Nuclear Medicine Imaging (PET and SPECT), Magnetic Resonance Imaging (MRI), and image-guided interventions. Through this course, the students will learn fundamental knowledge on how medical images are obtained and how they can be used for diagnosis, therapy, and surgery. Preferred background: basic understanding of general physics, general biology and basic calculus. Prerequisite: Accepted into the BE Professional Program or consent of the BE undergraduate advisor.

**BE 3352. DIGITAL PROCESSING OF BIOLOGICAL SIGNALS. 3 Hours.**

Fundamental techniques for extraction of useful information from signals acquired from biological systems. Topics include time and frequency domain analysis, cross correlation, spectrum analysis, and convolution. Design of finite impulse response (FIR) and infinite impulse response (IIR) filters for processing biological signals are described. Examples include cardiac, respiratory, and biomechanical movements. Preferred background: basic understanding of general physics and differential equations. Prerequisite: Accepted into the BE Professional Program and BE 3317 (or equivalent course) or consent of the BE undergraduate advisor.

**BE 3367. CELL CULTURE AND BIOMATERIAL LABORATORY. 3 Hours.**

This course will cover common techniques used in cell culture including aseptic techniques, culture media preparation, cell culture/subculture, cell counting, cell freezing, as well as transfection techniques. The course will also include synthesis of biodegradable polymeric nanoparticles for drug delivery and study of the drug releasing profile. Preferred background: satisfactory completion of BE 3380 (may be taken concurrently). Prerequisite: Accepted into the BE Professional Program or consent of the BE undergraduate advisor.

**BE 3380. HUMAN PHYSIOLOGY IN BE. 3 Hours.**

An introduction to human physiology emphasizing biomedical engineering related topics. The course focuses on understanding basic function with the relationships on the cellular as well as organ level in both healthy and diseased states. Preferred background: basic understanding of general biology. Prerequisite: Accepted into the BE Professional Program or consent of the BE undergraduate advisor.

**BE 3395. INTERNSHIP IN BIOENGINEERING. 3 Hours.**

Students receive training in a bioengineering company or a hospital to gain first hand industrial or clinical engineering experience. The company or hospital assigns projects and a faculty member monitors the student's progress. Prerequisite: Completion of at least 70 undergraduate credit hours in BE and good standing in the undergraduate program. Permission of Undergraduate Academic Advisor.

**BE 3415. FUNDAMENTALS OF BIOMOLECULAR ENGINEERING. 4 Hours.**

The course will introduce the principles of engineering living systems at the atomic, molecular, and cellular levels. Fundamentals covered in the course will include topics such as chemical bonding and reactions; synthesis, structure and function of carbohydrates, polypeptides, nucleic acids, and lipids; as well as analytical and engineering tools for characterization, design, and production of synthetic biological systems. A laboratory component will provide hands on experience including methods important to synthetic biochemistry, protein engineering, cellular reprogramming, and metabolic engineering. Knowledge of college level general chemistry is required. Prerequisite: C or better in BE 1105, BE 1325, BIOL 1441, CHEM 1442, and MATH 2425, or consent of the BE undergraduate advisor.

**BE 4000. UNDERGRADUATE RESEARCH. 0 Hours.**

Senior level undergraduate research. Prerequisite: Departmental good standing and permission of instructor. May be taken a maximum of 3 times.

**BE 4191. DIRECTED RESEARCH IN BIOENGINEERING. 1 Hour.**

Student participates in a research project under the individual instruction of a faculty supervisor.

**BE 4291. DIRECTED RESEARCH IN BIOENGINEERING. 2 Hours.**

Student participates in a research project under the individual instruction of a faculty supervisor.

**BE 4300. SPECIAL TOPICS IN BIOENGINEERING. 3 Hours.**

A study of selected topics in Bioengineering. May be repeated when topics vary. Prerequisite: Consent of instructor and undergraduate advisor.

**BE 4312. TISSUE BIOMECHANICS AND BIOENGINEERING. 3 Hours.**

This course introduces biomechanics as a means to describe mechanical behavior of biological tissues. A comprehensive course, it covers the fundamental concepts, experimental and theoretical approaches of biomechanics, and their applications in modern bioengineering, including mechano signal transduction, pathophysiology, tissue engineering and regeneration, medical implants, surgical intervention. Structural-mechanical properties of specific tissues, such as heart valves, cardiac tissues, blood vessels, tendon/ligament, skeletal muscles, cartilage, and meniscus will be discussed in great details. This course integrates the concepts of biomechanics, the underlying structural and biological mechanisms, illustrates how experimental, analytical and computational methods have been used to address clinical needs in enhancing the quality of health care delivery. Preferred background: satisfactory completion of BE 3380. Prerequisite: Accepted into the BE Professional Program or consent of the BE undergraduate advisor.



**BE 4314. BIOMEDICAL IMPLANTS. 3 Hours.**

A comprehensive course covers the essential knowledge in biomedical implants. The goal is to provide students with the knowledge and skills to understand the clinical needs, the engineering principles, methodologies used in implant design, the resulting host-implant interaction, and the constraints, limitations on engineering design optimization, as well as the evaluation and assessment of the implant performance and clinical outcomes. Case studies include mechanical, bio-prosthetic and trans-catheter heart valves, vascular grafts, stents, pacemakers, orthopedic implants, dental implants, etc. The course also covers topics on regulatory issues, patent protection, design validation in animal models and clinical trials, IACUC, IRB, Good Manufacture Practice (GMP), and FDA regulations and approvals. Students are expected to be able to apply the learning to solve problems in the rapidly growing field of biomedical engineering. Preferred background: satisfactory completion of BE 3380. Prerequisite: Accepted into the BE Professional Program or consent of the BE undergraduate advisor.

**BE 4318. MEDICAL DEVICE PROTOTYPING. 3 Hours.**

The course will introduce the laboratory techniques commonly used for designing and prototyping medical devices and implants. The course will also cover the incorporation of tissue bioengineering scaffold into the medical implant design and explore the use of 3D printing technology for medical device prototyping. The design of medical devices and implants will be taught using SolidWorks, one of the most popularly used software for computer-aided 3D modeling. Prerequisite: Accepted into the BE Professional Program or consent of the BE undergraduate adviser.

**BE 4324. BIOMEDICAL OPTICS LABORATORY. 3 Hours.**

The primary objective of this course is to provide students hands-on experience with fundamental optical techniques and instrumentation used in modern biomedical research and applications. The skills learned will be valuable to anyone who intends to work in an experimental setting that requires working knowledge of optical instrumentation and techniques. The course is divided into ten core lab modules that cover topics ranging from basic optical techniques to advanced imaging and spectroscopy techniques. Preferred background: satisfactory completion of BE 3320. Prerequisite: Accepted into the BE Professional Program or consent of the BE undergraduate advisor.

**BE 4325. FUNDAMENTALS OF BIOENGINEERING. 3 Hours.**

Topics cover fundamentals of biosensors, bio-signal processing, and bioinstrumentation. An introduction to various imaging modalities such as ultrasound, magnetic resonance, optical tomography, and x-ray radiography is also presented. Other bioengineering topics may be included as time allows or as is appropriate. Preferred background: satisfactory completion of BE 3380. Prerequisite: Accepted into the BE Professional Program or consent of the BE undergraduate advisor.

**BE 4326. TISSUE ULTRASOUND-OPTICAL IMAGING. 3 Hours.**

This course will introduce the fundamental principles of ultrasound and optical related imaging techniques, such as ultrasonic, tissue optical, and photoacoustic imaging techniques. Some topics related to the new progresses and applications in the related fields will be introduced. Students are expected to know the principles of these imaging techniques, and use mathematical, numerical simulation and experimental methods to understand these technologies and their biomedical applications. Preferred background: satisfactory completion of PHYS 1443, PHYS 1444 and BE 3380. Prerequisite: Accepted into the BE Professional Program or consent of the BE undergraduate advisor.

**BE 4329. NEURAL ENGINEERING. 3 Hours.**

This course consists of both lecture/discussion and laboratory. Lecture topics include central and peripheral nervous system injury and regeneration, brain/machine interfacing, primary culture of neural cells, neuroinflammatory and neurodegenerative disease. Laboratories include embryonic and neonatal rat derived neuronal culturing, immunostaining and quantitative analysis. Preferred background: satisfactory completion of BE 3367 and BE 3380. Prerequisites: Accepted into the BE Professional Program or consent of the BE undergraduate advisor.

**BE 4330. MEDICAL IMAGE PROCESSING. 3 Hours.**

Principles and computational methods in digitally processing medical images are presented. Topics include image reconstruction, two and three dimensional visualization, image registration, quantitative image analysis, image enhancement, and statistical processing methods including Monte Carlo methods. Prerequisites: Accepted into the BE Professional Program or consent of the BE undergraduate advisor.

**BE 4331. BIOPOLYMERS AND BIOCOMPATIBILITY. 3 Hours.**

The course introduces fundamental knowledge in biomaterials, structure-property-function relationships of the polymers, and their interactions with the host in-vitro and in-vivo. Specific topics include polymer-based biomaterials, polymer synthesis, property characterization, types of biodegradable polymer, their processes, and the evaluation for biocompatibility and host responses. Prerequisite: Accepted into the BE Professional Program or consent of the BE undergraduate advisor.

**BE 4333. NANO BIOMATERIALS AND LIVING-SYSTEMS INTERACTION. 3 Hours.**

The course introduces basic and applicable knowledges in nanoparticle design and their applications in biomedicine. Specific topics include basic knowledge of nanomaterials, nano-polymer, nanoparticle design, manufacturing, property characterizations, and their applications in drug delivery, tissue repair, cancer treatment, among others. Through course requirement, students learn the skills in project design, proposal writing, and results presentation. Prerequisite: Accepted into the BE Professional Program or consent of the BE undergraduate advisor.

**BE 4337. TRANSPORT PHENOMENA IN BIOMEDICAL ENGINEERING. 3 Hours.**

Principles of momentum, mass and heat transfer; description of blood flow, trans-capillary, interstitial, lymphatic fluid transport and pulmonary gas exchange. Applications in the design of blood oxygenator, dialysis devices, and strategies in drug delivery, hyperthermia treatment. Preferred background: basic understanding of general physics, biology and calculus, and successful completion of BE 3380. Prerequisite: Accepted into the BE Professional Program or consent of the BE undergraduate advisor.

**BE 4345. BIOSENSORS. 3 Hours.**

The course will cover major classes of bio-sensing technologies currently used in practice and the emerging ones that are currently being evaluated. The basic operating principle behind bio-sensing technologies will be explained and its implementation in medical devices will be discussed. Explanation of biosensor operation will involve understanding the mechanism of bio-signal transduction (bio-parameter to biomechanical, electrical, optical or chemical signal), detection method, and their analysis. Methodology for device calibration and data interpretation of physiological parameters will be discussed. The course material will be derived from book chapters and review papers. Course includes hand-on learning experience in laboratory by deconstructing commercially available biosensors and using experimental bio-sensing instruments. Students will be required to design and implement a point-of-care biosensor. Preferred background: satisfactory completion of EE 2440 or CSE 2440. Prerequisite: Accepted into the BE Professional Program or consent of the BE undergraduate advisor.

**BE 4350. SENIOR DESIGN PROJECT I. 3 Hours.**

First of two courses in design of biomedical systems and processes. Major design project in biomedical engineering, incorporating engineering standards and realistic design constraints. This course prepares students through a major design experience incorporating engineering principles and realistic constraints that include most of the following considerations: economic, environmental, sustainability, manufacturability, ethical, health and safety, and social consideration. Prerequisite: C or better in BE 3317, BE 3380 and BE 4382; accepted into the BE Professional Program, and consent of the BE undergraduate advisor.

**BE 4355. SENIOR DESIGN PROJECT II. 3 Hours.**

Second in two courses in design of biomedical systems. Proposals approved in BE 4350 will be completed. Teams will address, resolve limitations in the design and present final results through an oral presentation. Teams are required to submit a final project report with their design notebooks to the course instructors. Prerequisite: C or better in BE 4350.

**BE 4360. FUNDAMENTALS OF ULTRASOUND IN BIOENGINEERING. 3 Hours.**

This course instructs the students in the physics of ultrasound transducers, their operation, and their biomedical applications. The material includes modeling of the interaction of acoustic waves with various types of tissue and cells. Mathematical methods for analyzing the reflected and refracted waves as well as constructing images from the waves will be covered. Prerequisite: Accepted into the BE Professional Program and EE 2440 or CSE 2440, BE 3344, or consent of the BE undergraduate advisor.

**BE 4364. TISSUE ENGINEERING. 3 Hours.**

Tissue engineering research continues to make significant progress in the field of regenerative medicine. The advanced course will provide practical knowledge related to the designs, fabrications, and enabling technologies for engineered tissue and organs currently under development for regenerative medicine applications. The lecture content will also cover patent development, clinical trial design, and FDA regulation of tissue engineering devices and products required for the commercialization of these products. Prerequisite: Accepted into the BE Professional Program or consent of the BE undergraduate advisor.

**BE 4365. TISSUE ENGINEERING LABORATORY. 3 Hours.**

Each student will be given the opportunity to perform the techniques commonly used in tissue engineering and biomaterial research. These techniques are culture media preparation, cell culture/subculture, degradable scaffold preparation, scaffold modification, histological sections and staining, and cell imaging analyses. Prerequisite: Accepted into the BE Professional Program or consent of the BE undergraduate advisor.

**BE 4366. PROCESS CONTROL IN BIOTECHNOLOGY. 3 Hours.**

Principles and methods and measurement, data acquisition, and analysis. Application of control theory in biological systems and in biotechnology processes; control of pressure, flow, temperature, and pH. Prerequisite: Accepted into the Professional Program and BE 3317 (or equivalent course) or consent of the BE undergraduate advisor.

**BE 4368. AN INTRODUCTION TO TISSUE ENGINEERING AND REGENERATIVE MEDICINE. 3 Hours.**

This course introduces the fundamentals of scaffold-based tissue engineering techniques including cellular signaling, ECM bio-scaffolds, polymer scaffolds, cell-material interactions, soft and hard tissue wound healing, and nerve regeneration. Preferred background: satisfactory completion of BE 3380 (may be taken concurrently). Prerequisite: Accepted into the BE Professional Program or consent of the BE undergraduate advisor.

**BE 4372. DRUG DELIVERY SYSTEM. 3 Hours.**

This class will introduce students to the concept of drug delivery systems that provide pharmaceutical agents at target tissues, the mechanism of pharmacokinetic regulation, the basics, technology, and applications of drug delivery systems. The emphasis is on understanding the principles of pharmacokinetics and drug delivery systems to improve clinical efficacy as well as to reduce side effects and on realizing the importance of the field, drug delivery. Preferred background: satisfactory completion of BE 3380. Prerequisite: Accepted into the BE Professional Program or consent of the BE undergraduate advisor.

**BE 4373. FORMULATION AND CHARACTERIZATION OF DRUG DELIVERY SYSTEMS. 3 Hours.**

This class will provide students with hands-on experience in developing drug delivery systems such as hydrogels, liposomes, microparticles and/or nanoparticles that can be loaded with and release pharmaceutical agents to effectively treat various diseases. The emphasis is synthesis, characterization, and pharmacokinetic studies of these drug delivery systems. Preferred background: satisfactory completion of BE 4372. Prerequisite: Accepted into the BE Engineering Professional Program or consent of the BE undergraduate advisor.

**BE 4382. LABORATORY PRINCIPLES. 3 Hours.**

Introduction to fundamental biomedical engineering laboratory procedures including human studies and animal surgery; includes clinical laboratory projects, data collection, analysis, and interpretation. Preferred background: satisfactory completion of BE 3320 and BE 3380. Prerequisite: Accepted into the BE Professional Program or consent of the BE undergraduate advisor.

**BE 4385. STEM CELL TISSUE ENGINEERING. 3 Hours.**

Students will gain experience and expertise in stem cell culture and differentiation, and engineering stem cell-based 2D and 3D tissue constructs. Using phenotypic markers and appropriately integrating with biocompatible scaffolds, the engineered tissue constructs will be differentiated to several tissue types and functionally validated. Lectures will cover stem cells, designing scaffolds and multimodal imaging techniques. The final projects may include acquisition of big data images, data mining and development of pattern recognition algorithms. Prerequisite: Accepted into the BE Professional Program and BE 3380, BE 3301, BE 3367, or consent of the undergraduate advisor.

**BE 4388. MEDICAL PRODUCT DESIGN AND DEVELOPMENT. 3 Hours.**

This course aims to provide, 1) A comprehensive knowledge of biomedical product design and development life cycle, 2) Basic knowledge on developing business plan, securing funding, designing product and process, conducting preclinical and clinical studies, 3) Basic training and classroom exercises on various biomedical product design and development tools, 4) Basic knowledge of FDA regulation and quality control, 5) Basic training on intellectual property and industrial project management. Prerequisite: Accepted into the BE Professional Program or consent of the BE undergraduate advisor.

**BE 4390. UNDERGRADUATE RESEARCH PROJECT. 3 Hours.**

Student works on an independent, individual research or development project under supervision of faculty instructor. A final project report is required. Prerequisite: Permission from Instructor.

**BE 4391. DIRECTED RESEARCH IN BIOENGINEERING. 3 Hours.**

Student participates in a research project under the individual instruction of a faculty supervisor.

**BE 5101. SEMINAR IN BIOENGINEERING. 1 Hour.**

University and guest lecturers speak on topics of current interest in the field of bioengineering.

**BE 5191. DIRECTED RESEARCH IN BIOENGINEERING. 1 Hour.**

Student participates in a research project under the individual instruction of a faculty supervisor.

**BE 5193. MS COMPREHENSIVE EXAMINATION. 1 Hour.**

Individual instruction, directed study, consultation, and comprehensive examination over coursework leading to the Thesis-Substitute Master of Science degree in bioengineering. Graded P/F/R. Required of all Thesis-Substitute MS students.

**BE 5201. SEMINAR IN BIOENGINEERING. 2 Hours.**

University and guest lecturers speak on topics of current research interest in the field of bioengineering. Students are expected to write a report for each topic to summarize the presentation and to offer critiques. Prerequisite: Graduate admission to the BE MS program.

**BE 5281. BEST PRACTICES IN TEACHING AND LEARNING. 2 Hours.**

Introduction to approaches and activities that can facilitate learning. Students gain insight into specific challenges of teaching, basics of designing a course, role of assessments and evaluations, good presentation skills and comparisons of various engagement levels. Students teach mock lessons and are given feedback.

**BE 5291. DIRECTED RESEARCH IN BIOENGINEERING. 2 Hours.**

Student participates in a research project under the individual instruction of a faculty supervisor.

**BE 5293. MASTERS COMPREHENSIVE EXAMINATION. 2 Hours.**

Individual instruction, directed study, consultation, and comprehensive examination over coursework leading to the Master of Science degree in bioengineering. Required of all MS students.

**BE 5300. SELECTED TOPICS IN BIOENGINEERING. 3 Hours.**

Material may vary from semester to semester. May be repeated for credit if different topics are covered for each registration. Prerequisite: permission of the instructor.

**BE 5301. CELL PHYSIOLOGY FOR BIOENGINEERS. 3 Hours.**

This course will cover principles of molecular omics (i.e., genomics, transcriptomics, proteomics and synthetic biology). The field of Molecular bioengineering and processes involving inducible transcription and chimeric proteins. The composition of cell membranes, ion transport and the application of optogenetics in cell physiology regulation. The way cells communicate and integrate signals and translated them in intracellular metabolic cascades through the understanding of phosphoproteomics, energy metabolism, metabolomics, cellular motility, and molecular motors. The processes involved in cell proliferation, abnormal cell division dysregulation in cancer, and nanotechnology techniques for tumor treatment. Prerequisite: Graduate Level or Instructor Permission.

**BE 5309. HUMAN PHYSIOLOGY IN BIOENGINEERING. 3 Hours.**

An introduction to human physiology emphasizing biomedical engineering related topics. The course focuses on understanding basic function with the relationships on the cellular as well as organ level both in healthy and diseased states.

**BE 5310. BIOMECHANICS AND FLUID FLOW WITH COMPUTATIONAL LAB. 3 Hours.**

Follow an introduction to the basics of solid, fluid mechanics, student learn the fundamental behavior of various biological materials, flow properties of blood, viscoelastic properties of cells, tissue matrix, as well as their roles in human physiology at normal and disease states. Examples also include the design aspects of medical prosthetic devices. The course will cover biomechanics across a wide range of scales from organism, organ, tissue, cell and to protein levels. Students learn computational modeling to formulate and solve bioengineering problems. Prerequisite: Undergraduate solid and fluid mechanics courses or consent of the instructor.

**BE 5312. TISSUE BIOMECHANICS AND BIOENGINEERING. 3 Hours.**

This course introduces biomechanics as a means to describe mechanical behavior of biological tissues. A comprehensive course, it covers the fundamental concepts, experimental and theoretical approaches of biomechanics, and their applications in modern bioengineering, including mechano signal transduction, pathophysiology, tissue engineering and regeneration, medical implants, surgical intervention. Structural-mechanical properties of specific tissues, such as heart valves, cardiac tissues, blood vessels, tendon/ligament, skeletal muscles, cartilage, and meniscus will be discussed in great details. This course integrates the concepts of biomechanics, the underlying structural and biological mechanisms, illustrates how experimental, analytical and computational methods have been used to address clinical needs in enhancing the quality of health care delivery.

**BE 5314. BIOMEDICAL IMPLANTS. 3 Hours.**

A comprehensive course covers the essential knowledge in biomedical implants. The goal is to provide students with the knowledge and skills to understand the clinical needs, the engineering principles, methodologies used in implant design, the resulting host-implant interaction, and the constraints, limitations on engineering design optimization, as well as the evaluation and assessment of the implant performance and clinical outcomes. Case studies include mechanical, bio-prosthetic and trans-catheter heart valves, vascular grafts, stents, pacemakers, orthopedic implants, dental implants, etc. The course also covers topics on regulatory issues, patent protection, design validation in animal models and clinical trials, IACUC, IRB, Good Manufacture Practice (GMP), and FDA regulations and approvals. Students are expected to be able to apply the learning to solve problems in the rapidly growing field of biomedical engineering.

**BE 5315. FUNDAMENTALS OF BIOMOLECULAR ENGINEERING. 3 Hours.**

The course will introduce the principles of engineering living systems at the atomic, molecular, and cellular levels. Fundamentals covered in the course will include topics such as chemical bonding and reactions; synthesis, structure and function of carbohydrates, polypeptides, nucleic acids, and lipids; as well as analytical and engineering tools for characterization, design, and production of synthetic biological systems.

**BE 5316. FUNDAMENTAL MATH AND PHYSICS FOR BIOENGINEERING. 3 Hours.**

This course introduces the basic physics concepts such as introduction to electromagnetism, Maxwell's equations, computation of Fresnel coefficients, interference and diffraction of light, waveguides and optical fibers, photon counting statistics, and Beer-Lambert law. It also covers basic mathematical concepts such as curvilinear coordinates, vector calculus, Stokes theorem and solving differential equations with initial conditions and the diffusion equation.

**BE 5318. MEDICAL DEVICE PROTOTYPING. 3 Hours.**

The course will introduce the laboratory techniques commonly used for designing and prototyping medical devices and implants. The course will also cover the incorporation of tissue bioengineering scaffold into the medical implant design and explore the use of 3D printing technology for medical device prototyping. The design of medical devices and implants will be taught using SolidWorks, one of the most popularly used software for computer-aided 3D modeling.

**BE 5323. INTRODUCTION TO BIOPHOTONICS. 3 Hours.**

Introduction to properties of light, light-cell/tissue interactions, optical techniques, and optical instrumentation, in the context of biophotonic medical applications. Topics that will be covered include fundamental properties of optical wave fields, basic properties and characterization of laser sources and detectors used in modern biomedicine, interferometry, linear and nonlinear light-tissue interactions exploited for biomedical imaging and sensing applications, and spectroscopy.

**BE 5324. BIOMEDICAL OPTICS LABORATORY. 3 Hours.**

The primary objective of the Biomedical Optics Laboratory course is to provide students hands-on experience with fundamental optical techniques and instrumentation used in modern biomedical research and applications. The skills learned will be valuable to anyone who intends to work in an experimental setting that requires working knowledge of optical instrumentation and techniques. The course is divided into ten core lab modules that cover topics ranging from basic optical techniques to advanced imaging and spectroscopy techniques.

**BE 5325. FLUORESCENCE MICROSCOPY. 3 Hours.**

Introduction to the anatomy of a fluorescence microscope and the physical principles of its operation. Confocal and multi-photon microscopy. Molecular imaging applications based on Forster Resonance Energy Transfer (FRET), Fluorescence Lifetime Imaging (FLIM), Fluorescence Correlation Spectroscopy (FCS), Fluorescence Recovery After Photobleaching (FRAP) and Total Internal Reflection Fluorescence (TIRF) Microscopy.

**BE 5326. TISSUE ULTRASOUND OPTICAL IMAGING. 3 Hours.**

This course will introduce the fundamental principles of ultrasound and optical related imaging techniques, such as ultrasound, tissue optical, photo-acoustic and ultrasound-modulated optical imaging techniques. Lectures, laboratories, simulations, and paper presentations and discussion will be adopted in this course. Some topics related to the new progresses and applications in the related fields will be introduced. Prerequisite: Graduate level or instructor permission.

**BE 5327. TISSUE OPTICS. 3 Hours.**

Introduction to the science and technology behind tissue optical imaging systems and their design requirements for different clinical applications. Diffuse optical tomography, fluorescence tomography, bioluminescence tomography, multi-modality imaging.

**BE 5329. NEURAL ENGINEERING. 3 Hours.**

This course consists of both lecture/discussion and laboratory. Lecture topics include central and peripheral nervous system injury and regeneration, brain/machine interfacing, primary culture of neural cells, neuroinflammatory and neurodegenerative disease. Laboratories include embryonic and neonatal rat derived neuronal culturing, immunostaining and quantitative analysis.

**BE 5331. POLYMERS AND BIOCOMPATIBILITY. 3 Hours.**

The course introduces fundamental knowledge in biomaterials, structure-property-function relationships of the polymers, and their interactions with the host in-vitro and in-vivo. Specific topics include polymer-based biomaterials, polymer synthesis, property characterization, types of biodegradable polymer, their processes, and the evaluation for biocompatibility and host responses.

**BE 5333. NANO BIOMATERIALS AND LIVING-SYSTEMS INTERACTIONS. 3 Hours.**

The course introduces basic and applicable knowledges in nanoparticle design and their applications in biomedicine. Specific topics include basic knowledge of nanomaterials, nano-polymer, nanoparticle design, manufacturing, property characterizations, and their applications in drug delivery, tissue repair, cancer treatment, among others. Through course requirement, students learn the skills in project design, proposal writing, and results presentation.

**BE 5335. BIOLOGICAL MATERIALS, MECHANICS, & PROCESSES. 3 Hours.**

Typical functional behavior of various biological materials, flow properties of blood, bioviscoelastic fluids and solids, mass transfer in cardiovascular and pulmonary systems.

**BE 5337. TRANSPORT PHENOMENA IN BIOMEDICAL ENGINEERING. 3 Hours.**

Principles of momentum, mass and heat transfer; description of blood flow, trans-capillary, interstitial, lymphatic fluid transport and pulmonary gas exchange. Applications in the design of blood oxygenator, dialysis devices, and strategies in drug delivery, hyperthermia treatment. Prerequisite: undergraduate courses in CE 2312 Statics/Dynamics, MAE 2314 Fluid Mechanics I or CE 3305 and MAE 3310 Thermodynamics I or CHEM 3321.

**BE 5340. FINITE ELEMENT APPLICATIONS IN BIOENGINEERING. 3 Hours.**

The course describes the fundamental principles of the finite element method and various numerical modeling techniques. Topics include variational and Galerkin formulations, linear and Hermitian elements, accuracy and convergence. Applications in biological systems and to the design of prosthetic devices are emphasized. Topic areas include linear elasticity, fluid dynamics, heat transfer, and mass transport processes.

**BE 5343. IMAGE PROCESSING WITH MATLAB: APPLICATIONS IN MEDICINE AND BIOLOGY. 3 Hours.**

This course focuses on introduction to image processing for applications in medicine and biology. After a review of how to use MATLAB arrays, files, functions, and to write MATLAB programs for quantitative computation and graphing, students will learn the fundamental tools in image processing, image analysis, and two-dimensional Fourier transform, using MATLAB functions available in the textbook. Topics also include image segmentation. Real-world research-based examples will be presented, and discussed in the course. With hands-on exercises, students will learn the basic skills, knowledge on MATLAB usage and the problem-solving techniques required for medical image processing.

**BE 5344. BIOINSTRUMENTATION I. 3 Hours.**

Fundamental principles of bioinstrumentation, including operational amplifiers and instrumentation amplifiers; measurements of biopotentials; signals and noise in biological systems; mechanical transducers; resistive, inductive, capacitive transducers; measurement of temperature, blood pressure and flow; electrical safety.

**BE 5345. BIOSENSOR. 3 Hours.**

The course will cover major classes of bio-sensing technologies currently used in practice and the emerging ones that are currently being evaluated. The basic operating principle behind bio-sensing technologies will be explained and its implementation in medical devices will be discussed. Explanation of biosensor operation will involve understanding the mechanism of bio-signal transduction (bio-parameter to biomechanical, electrical, optical or chemical signal), detection method, and their analysis. Methodology for device calibration and data interpretation of physiological parameters will be discussed. The course material will be derived from book chapters and review papers. Course includes hands-on learning experience in laboratory by deconstructing commercially available biosensors and using experimental bio-sensing instruments. Students will be required to design and implement a point-of-care biosensor. Prerequisite: Undergraduate instrumentation courses or consent of the instructor.

**BE 5346. MEDICAL IMAGING. 3 Hours.**

This course introduces basic medical imaging modalities, including X-ray Computed Tomography (CT), Nuclear Medicine Imaging (PET and SPECT), Magnetic Resonance Imaging (MRI), and image-guided interventions. Through this course, the students will learn fundamental knowledge on how medical images are obtained and how they can be used for diagnosis, therapy, and surgery.

**BE 5347. PRINCIPLES OF FUNCTIONAL MAGNETIC RESONANCE IMAGING. 3 Hours.**

This course introduces basic principles of Magnetic Resonance Imaging (MRI) and functional MRI (fMRI) for brain functional imaging. After taking this course, the students will gain basic knowledge on how functional brain images are obtained from MRI and fMRI as well as how they can be used for diagnosis, therapy, and surgery. The emphasis in this course is on fMRI. This course will include lecture and some laboratory exercises involving actual fMRI measurement data.

**BE 5350. MODELING AND CONTROL OF BIOLOGICAL SYSTEMS. 3 Hours.**

Introduction to fundamental methods of modeling, analysis and control of biological systems. Linear system modeling, state space modeling, stability analysis, basic identification techniques. Examples from cardiopulmonary, visual, and motor control systems. Prerequisite: an undergraduate course in linear systems, control theory, or consent of the instructor.

**BE 5352. DIGITAL PROCESSING OF BIOLOGICAL SIGNALS. 3 Hours.**

Fundamental techniques for extraction of useful information from signals acquired from biological systems. Topics include time and frequency domain analysis, cross correlation, spectrum analysis, and convolution. Design of FIR and IIR filters for processing biological signals are described. Examples include cardiac, respiratory, and biomechanical movements. Prerequisite: an undergraduate engineering course in signals and systems analysis or consent of the instructor.



**BE 5360. DESIGN AND APPLICATION OF ARTIFICIAL ORGANS. 3 Hours.**

Fundamental principles of fluid mechanics, mass transfer and chemical reaction in engineered biological systems. Simple solutions are developed for the design of artificial ventricular assist devices, total artificial hearts, lungs and kidneys.

**BE 5361. BIOMATERIALS AND BLOOD COMPATIBILITY. 3 Hours.**

This course is an introduction to polymer structure and fabrication methods. Blood and tissue interactions with materials, and methods to improve the biocompatibility of materials are discussed.

**BE 5364. TISSUE ENGINEERING. 3 Hours.**

Tissue engineering research continues to make significant progress in the field of regenerative medicine. The advanced course will provide practical knowledge related to the designs, fabrications, and enabling technologies for engineered tissue and organs currently under development for regenerative medicine applications. The lecture content will also cover patent development, clinical trial design, and FDA regulation of tissue engineering devices and products required for the commercialization of these products.

**BE 5365. TISSUE ENGINEERING LAB. 3 Hours.**

Each student will be given the opportunity to perform the techniques commonly used in tissue engineering and biomaterial research. These techniques are culture media preparation, cell culture/subculture, degradable scaffold preparation, scaffold modification, histological sections and staining, and cell imaging analyses.

**BE 5366. PROCESS CONTROL IN BIOTECHNOLOGY. 3 Hours.**

Principles and methods of measurement, data acquisition and analysis. Application of control theory in biological systems and in biotechnology processes; control of pressure, flow, temperature, and pH. Prerequisite: an undergraduate course in control theory or consent of the instructor.

**BE 5370. BIOMATERIAL - LIVING SYSTEMS INTERACTION. 3 Hours.**

This course describes current developments in molecular structure and organization at synthetic material interfaces with tissues and the subsequent influences on cells and cell membranes. It is designed to lay the groundwork for an improved understanding of events at the biomaterial-living system interface.

**BE 5372. DRUG DELIVERY SYSTEM. 3 Hours.**

This class will introduce students to the concept of drug delivery systems that provide pharmaceutical agents at target tissues, the mechanism of pharmacokinetic regulation, the basics, technology, and applications of drug delivery systems. The emphasis is on understanding the principles of pharmacokinetics and drug delivery systems to improve clinical efficacy as well as to reduce side effects and on realizing the importance of the field, drug delivery.

**BE 5373. FORMULATION AND CHARACTERIZATION OF DRUG DELIVERY SYSTEMS. 3 Hours.**

This class will provide students with hands-on experience in developing drug delivery systems such as hydrogels, liposomes, microparticles and/or nanoparticles that can be loaded with and release pharmaceutical agents to effectively treat various diseases. The emphasis is synthesis, characterization, and pharmacokinetic studies of these drug delivery systems.

**BE 5382. LABORATORY PRINCIPLES. 3 Hours.**

Introduction to fundamental biomedical engineering laboratory procedures including human studies and animal surgery; includes clinical laboratory projects; data collection, analysis, and interpretation. Prerequisite: permission of the instructor.

**BE 5385. STEM CELL TISSUE ENGINEERING. 3 Hours.**

Students will gain experience and expertise in stem cell culture and differentiation, and engineering stem cell-based 2D and 3D tissue constructs. Using phenotypic markers and appropriately integrating with biocompatible scaffolds, the engineered tissue constructs will be differentiated to several tissue types and functionally validated. Lectures will cover stem cells, designing scaffolds and multimodal imaging techniques. The final projects may include acquisition of big data images, data mining and development of pattern recognition algorithms.

**BE 5386. MEDICAL PRODUCT DESIGN CONTROL AND RISK MANAGEMENT. 3 Hours.**

This course presents a thorough description of the design control for medical device development, starting with documenting the product requirements and concluding with design verification and validation that the design output meets the design meets product specifications and user needs. The role and scope of standard operating procedures (SOP) and representative content of an SOP are described. The students are introduced to elements of design history file and documentation.

**BE 5387. MEDICAL DEVICE PROTOTYPE DEVELOPMENT. 3 Hours.**

Students in this course are grouped in small teams to practice the design and development of a medical device that strictly adheres to the needed controls for regulatory affair approval of the product. The teams will be provided with a typical medical device manufacturer's standard operating procedure (SOP) and will be asked to apply that to their design. The teams demonstrate their understanding and implementation of design input, history file documentation, verification, and validation.

**BE 5388. MEDICAL PRODUCT DESIGN AND DEVELOPMENT. 3 Hours.**

This course aims to provide 1) A comprehensive knowledge of biomedical product design and development life cycle, 2) Basic knowledge on developing business plan, securing funding, designing product and process, conducting preclinical and clinical studies, 3) Basic training and classroom exercises on various biomedical product design and development tools, 4) Basic knowledge of FDA regulation and quality control, 5) Basic training on intellectual property and industrial project management.

**BE 5390. RESEARCH PROJECT. 3 Hours.**

Taken by students enrolled in the non-thesis option for the MS degree. Individual instruction in research and/or instrumentation development and evaluation conducted under supervision of the instructor. A final report required. Prerequisite: Permission of the instructor.

**BE 5391. DIRECTED RESEARCH IN BIOENGINEERING. 3 Hours.**

Student participates in a research project under the individual instruction of a faculty supervisor.

**BE 5395. INTERNSHIP IN BIOENGINEERING. 3 Hours.**

Students receive training in a Bioengineering company or a hospital to gain firsthand industrial or clinical engineering experience. The company or hospital assigns projects, and a faculty member monitors the student's progress. Prerequisite: Completion of at least 9 graduate credit hours in BE with good standing in the graduate program. International students need to complete at least 2 full semesters and comply with OIE/CPT rules to enroll. Prerequisite: Completion of at least 9 graduate credit hours in BE with good standing in the graduate program. Permission of Graduate Academic Advisor.

**BE 5398. THESIS. 3 Hours.**

Prerequisite: graduate standing in biomedical engineering.

**BE 5691. DIRECTED RESEARCH IN BIOENGINEERING. 6 Hours.**

Student participates in a research project under the individual instruction of a faculty supervisor.

**BE 5698. THESIS. 6 Hours.**

Graded P/F/R. Prerequisite: Graduate standing in Biomedical Engineering.

**BE 6101. PhD SEMINAR IN BIOENGINEERING. 1 Hour.**

University and guest lecturers speak on topics of current research interests in the field of bioengineering. Prerequisite: Graduate admission to BE PhD program.

**BE 6102. PhD SEMINAR IN BIOENGINEERING. 1 Hour.**

University and guest lecturers speak on topics of current research interests in the field of bioengineering. Prerequisite: Graduate admission to BE PhD program.

**BE 6103. PhD SEMINAR IN BIOENGINEERING. 1 Hour.**

This course serves as a forum to present recent scientific and technological topics in Bioengineering and as a practical guide to organize and deliver proper and effective scientific oral presentations. Prerequisite: PhD student status.

**BE 6194. DOCTORAL DIAGNOSTIC EXAMINATION. 1 Hour.**

Individual instruction, directed study, consultation, and diagnostic examination. Required of all doctoral students in the semester when they take any portion of the diagnostic examination.

**BE 6195. DOCTORAL COMPREHENSIVE EXAMINATION. 1 Hour.**

Individual instruction, directed study, consultation, and comprehensive examination on a detailed prospectus of proposed dissertation research as well as an oral examination. Required of all doctoral students in the semester when they take the comprehensive examination. Prerequisite: BE 6194.

**BE 6197. RESEARCH IN BIOENGINEERING. 1 Hour.**

Individually approved research projects leading to a doctoral dissertation in the area of biomedical engineering.

**BE 6297. RESEARCH IN BIOENGINEERING. 2 Hours.**

Individually approved research projects leading to a doctoral dissertation in the area of biomedical engineering.

**BE 6395. INTERNSHIP IN BIOENGINEERING. 3 Hours.**

Students receive training in a bioengineering company or a hospital to gain firsthand industrial or clinical engineering experience. The company or hospital assigns projects, and a faculty member monitors the student's progress. Prerequisite: Completion of at least 9 graduate credit hours in BE with good standing in the graduate program. International students need to complete at least 2 full semesters and comply with OIE/CPT rules to enroll. Prerequisite: Completion of at least 9 graduate credit hours in BE and good standing in the graduate program.

**BE 6397. RESEARCH IN BIOENGINEERING. 3 Hours.**

Individually approved research projects leading to a doctoral dissertation in the area of bioengineering.

**BE 6399. DISSERTATION. 3 Hours.**

Preparation and submission of a doctoral dissertation in an area of bioengineering. Graded R/F only. Prerequisite: Admission to candidacy for the Ph.D. in Biomedical Engineering.

**BE 6499. DISSERTATION. 4 Hours.**

Preparation and submission of a doctoral dissertation in an area of bioengineering. This course is only to be taken by students preparing a dissertation for submission that is supervised primarily by a University of Texas Southwestern Medical School faculty member and must be taken concurrently with a 5-hour dissertation course at that institution. To satisfy requirement that a P be awarded in a 9-hour dissertation course in their final semester of enrollment, a student must be concurrently enrolled in this course and the 5-hour dissertation course at the University of Texas Southwestern Medical School and receive a P in both courses at the end of that semester. If a P is not awarded in both classes, the two classes must be repeated until P grades are concurrently awarded.

**BE 6695. INTERNSHIP IN BIOENGINEERING. 6 Hours.**

Students receive training in a bioengineering company or a hospital to gain firsthand industrial or clinical engineering experience. The company or hospital assigns projects, and a faculty member monitors the student's progress. Prerequisite: Completion of at least 9 graduate credit hours in BE with good standing in the graduate program. International students need to complete at least 2 full semesters and comply with OIE/CPT rules to enroll. Prerequisite: Completion of at least 9 graduate credit hours in BE and good standing in the graduate program.

**BE 6697. RESEARCH IN BIOENGINEERING. 6 Hours.**

Individually approved research projects leading to a doctoral dissertation in the area of bioengineering.

**BE 6699. DISSERTATION. 6 Hours.**

Preparation and submission of a doctoral dissertation in an area of bioengineering. Graded R/F only. Prerequisite: Admission to candidacy for the Ph.D. in Biomedical Engineering.

**BE 6995. INTERNSHIP IN BIOENGINEERING. 9 Hours.**

Students receive training in a bioengineering company or a hospital to gain firsthand industrial or clinical engineering experience. The company or hospital assigns projects, and a faculty member monitors the student's progress. Prerequisite: Completion of at least 9 graduate credit hours in BE with good standing in the graduate program. International students need to complete at least 2 full semesters and comply with OIE/CPT rules to enroll. Prerequisite: Completion of at least 9 graduate credit hours in BE and good standing in the graduate program.

**BE 6997. RESEARCH IN BIOENGINEERING. 9 Hours.**

Individually approved research projects leading to a doctoral dissertation in the area of bioengineering.

**BE 6999. DISSERTATION. 9 Hours.**

Preparation and submission of a doctoral dissertation in an area of bioengineering. Graded P/R/F. Prerequisite: admission to candidacy for the Ph.D. in Biomedical Engineering.

**BE 7399. DOCTORAL DEGREE COMPLETION. 3 Hours.**

This course may be taken during the semester in which a student expects to complete all requirements for the doctoral degree and graduate. Enrolling in this course meets minimum enrollment requirements for graduation, for holding fellowships awarded by The Office of Graduate Studies and for full-time GTA or GRA positions. Students should verify that enrollment in this course meets other applicable enrollment requirements. To remain eligible in their final semester of study for grants, loans or other forms of financial aid administered by the Financial Aid Office must enroll in a minimum of 5 hours as required by the Office of Financial Aid. Other funding sources may also require more than 3-hours of enrollment. Additional hours may also be required to meet requirements set by immigration law or by the policies of the student's degree program. Students should contact the Financial Aid Office, other sources of funding, Office of International Education and/or their graduate advisor to verify enrollment requirements before registering for this course. This course may only be taken twice. Students who do not complete all graduation requirements while enrolled in this course must enroll in a minimum of 6 dissertation hours (6699 or 6999) in their graduation term. Graded P/F/R.

## COURSES

**BEEP 3381. INTRODUCTION TO SPECIAL LANGUAGE PROGRAMS. 3 Hours.**

Legal foundations and historical development of bilingual education, dual language, and special language programs will be introduced. Various models of bilingual education and English as a Second Language will be examined. An overview of special education, gifted and talented, and compensatory education legislation and its impact on the implementation of special language programs will be examined.

**BEEP 4302. IMPLEMENTATION OF EC-6 DUAL LANGUAGE CURRICULUM MODELS. 3 Hours.**

This course addresses programmatic, cultural, academic and linguistic considerations for the creation, implementation and maintenance of dual language curriculum models in EC-6 settings. In the course students will explore and implement various research-based teaching methods and strategies used in effective programs. It will also cover key components of dual language teaching and learning, including curriculum alignment (e.g., horizontal, vertical, spiral), language separation, and parent collaboration. Prerequisite: BEEP 4305.

**BEEP 4305. BILITERACY DEVELOPMENT IN DUAL LANGUAGE PROGRAMS. 3 Hours.**

Analysis of the structure of English and Spanish including phonology, morphology, syntax, semantics, lexicon, and pragmatics. Topics also include language interference and cross-linguistic transfer to promote biliteracy.

**BEEP 4306. FAMILY LITERACY AND SECOND LANGUAGE ACQUISITION. 3 Hours.**

Examines the relationships among family literacy, second-language acquisition, and literacy development in children. The course provides opportunities for students to explore a variety of home-school literacy programs designed to facilitate the development of literacy skills in parents and support reading and writing at home. Specific focus on theories regarding the relationship between first and second language acquisition and early education. Prerequisite: BEEP 3381.

**BEEP 4311. MATH IN DUAL LANGUAGE SETTINGS. 3 Hours.**

Integration of mathematic concepts in relation to the cognitive and linguistic development of English learners (ELs). Analysis of the State curriculum for mathematics in K-6. Design and implementation of instruction in dual language settings. Field experience required. Prerequisite: BEEP 3381.

**BEEP 4312. SCIENCE AND HEALTH EDUCATION IN DUAL LANGUAGE SETTINGS. 3 Hours.**

Integration of science and health concepts in relation to the cognitive and linguistic development of English learners (ELs). Analysis of the State curriculum for health and science in K-6. Design and implementation of instruction in dual language settings. Field experience required.

**BEEP 4314. CREATIVE ARTS AND SOCIAL STUDIES IN DUAL LANGUAGE SETTINGS. 3 Hours.**

Integration of visual arts, music, and social studies with a focus on instructional processes and skills for increasing children's understanding and appreciation of aesthetics. Implementation of the Texas Curriculum in Social Studies and Art Education in EC-6 dual-language classrooms; field experience required.

**BEEP 4319. ASSESSMENT OF CULTURALLY AND LINGUISTICALLY DIVERSE STUDENTS IN EC-6 SETTINGS. 3 Hours.**

Study of formal and informal assessment instruments and techniques for assessing the language development and literacy of English Learners(ELs) in EC-6 classrooms. Also, focus on diagnosing literacy learning strengths and needs.

**BEEP 4366. SPANISH FOR TEACHERS IN DUAL LANGUAGE PROGRAMS: AN IMMERSION APPROACH. 3 Hours.**

Development of Spanish proficiency for bilingual education teacher candidates through an immersion approach. Emphasis on concepts, functions and the scenarios used in the Spanish proficiency examination required for bilingual education teacher candidates.

**BEEP 4382. LITERACY INSTRUCTION IN SPANISH FOR THE BILINGUAL CLASSROOM. 3 Hours.**

Focuses on the development of literacy for bilingual children. Specific emphasis will be placed on the rationale, methods, and materials for literacy instruction in Spanish. The successful transition from first-language literacy instruction to literacy instruction in English will also be addressed. The course will be delivered in Spanish and students will be exposed to content and techniques to master the oral and written components of the Spanish language proficiency test required to become certified in bilingual education. Prerequisite: BEEP 4305, BEEP 4302.

**BEEP 4384. LITERACY METHODS FOR ESL/BILINGUAL CLASSROOMS. 3 Hours.**

The rationale and implementation of various instructional methods for English learners (ELs) will be discussed. Examination of language instruction for students at different stages of development. Sheltered English instruction for the teaching of content areas will also be presented. Students will be assigned to a special language program to examine methods of instruction and modifications for language minority children. Prerequisite: BEEP 3381, BEEP 4306.

**BEEP 4385. SHELTERED ENGLISH INSTRUCTION. 3 Hours.**

Analysis of the linguistic, cognitive, academic and cultural considerations required to provide meaningful and developmentally appropriate content area instruction to English language learners (ELLs) in PK-6. Prerequisite: BEEP 3381.

**BEEP 4687. CLINICAL TEACHING IN EC-6 BILINGUAL/ESL CLASSROOMS. 6 Hours.**

Full-time supervised and directed clinical teaching in EC-6 bilingual and ESL classrooms. Clinical teaching must immediately follow the field experience semester. Prerequisites: BEEP 4311, BEEP 4312, and BEEP 4314.

**BEEP 5315. CLINICAL TEACHING. 3 Hours.**

Clinical teaching in candidate's certification area(s). This semester-long experience will help candidates apply theory and research to practice.

**BEEP 5318. FOUNDATIONS IN BILINGUAL EDUCATION. 3 Hours.**

Analyzes the development of bilingual education in the United States. Introduces bilingual education program models and discusses research findings on their effectiveness.

**BEEP 5321. ESL METHODS FOR EC-6 LEARNERS. 3 Hours.**

Compares first and second-language acquisition processes. Identifies effective teaching practices to meet the needs of English learners (ELs). Analyzes elements from Spanish that can affect the acquisition of literacy in English. Offered as BEEP 5321 and LIST 5361. Credit will only be counted towards one program.

**BEEP 5361. LANGUAGE LEARNING: EDUCATIONAL PERSPECTIVES PRACTICUM II. 3 Hours.**

The practicum provides opportunities to apply effective instructional practices in teaching ESL students. Deals with the relationship between first and second language acquisition and literacy, dialect, linguistics, culture; nature and definition of language; overview of linguistic science and language with pedagogical applications.

**BEEP 5362. LITERACY INSTRUCTION IN ESL/BILINGUAL SETTINGS. 3 Hours.**

This course bridges theory to practice, stressing how the relationship between first and additional language acquisition and development can inform teaching ESL/bilingual students. Provides opportunities to apply effective instructional practices in teaching students to foster development in speaking, listening, reading, and writing within a framework of cultural understanding.

**BEEP 5363. LITERACY DEVELOPMENT IN ENGLISH AND SPANISH. 3 Hours.**

Focuses on the development of literacy in bilingual students with specific emphasis on the rationale, methods, and materials for literacy instruction in the student's home language. Attention to evaluating and supplementing first-language literacy materials and supporting the successful transition from first-language literacy instruction to literacy instruction in English.

**BEEP 5364. LITERACY INSTRUCTION IN SPANISH IN THE CONTENT AREAS. 3 Hours.**

Focuses on methods and materials for teaching content-area subjects in the student's home language. Additional focus on supporting the transition from home-language instruction to English-language instruction.

**BEEP 5365. ORGANIZATION & ADMINISTRATION OF DUAL LANGUAGE PROGRAMS. 3 Hours.**

Analysis of the research background and implementation of various models of dual language instruction. Insight of the process, data collection, and reporting requirements of the state and federal special populations legislation. This course requires an internship with the office of Federal Programs and/or the office of Bilingual/ESL Education in local school districts. Prerequisite: BEEP 5318.

**BEEP 5366. SPANISH FOR SCHOOL ADMINISTRATORS & TEACHERS. 3 Hours.**

Development of Spanish proficiency for teachers and administrators through an immersion approach. Emphasis on concepts and terminology related to education, program administration, community involvement, and communication with Spanish-speaking parents. This course can be repeated.

**BEEP 5391. INDEPENDENT RESEARCH. 3 Hours.**

Research for course substitution or a topic agreed upon between the student and instructor. May be repeated for credit with permission.

## COURSES

### **BHNR 4330. RESEARCH METHODOLOGY AND PRACTICE. 3 Hours.**

Designed for undergraduate students from a variety of disciplines. Goals: to understand the commonalities of research across disciplinary boundaries, to develop research skills. Topics: framing a research question, literature review, introductory statistical skills, organization and presentation of results. Using a computer for bibliographic searches, word processing, and statistical analysis.

### **BHNR 4393. BUSINESS HONORS INTERNSHIP. 3 Hours.**

Supervised practical training in the student's major or concentration in business. May be used as an advanced business elective only and is letter graded. No credit will be given for previous experience or activities. Prerequisites: Honors College student, declared business major with junior standing, and approval of their respective department internship coordinator and Honors College advisor.

### **BHNR 4394. HONORS THESIS/SENIOR PROJECT. 3 Hours.**

Required of all undergraduate Business Administration students in the University Honors College. During the senior year, the student must complete a thesis or project of equivalent difficulty under the direction of a faculty member in the major department.

## COURSES

### **BIOL 1131. BIOLOGY FOUNDATIONS. 1 Hour.**

This onboarding course is designed to help you navigate your first year by introducing you to the department, key resources, and an overview of what you'll learn in your biology courses. Through engaging workshops and small-group discussions, you'll meet faculty, learn about research opportunities, and build connections with fellow students. You'll also gain valuable insights into college study skills, lab expectations, and career pathways in biology, setting you up for a confident and successful start in your program.

### **BIOL 1301. NUTRITION. 3 Hours. (TCCN = BIOL 1322)**

This course offers a foundation in nutrition science and explores how food relates to the overall health of an individual. The curriculum includes functions of nutrients, food sources, digestion, absorption, and metabolism. Food labels and nationally established nutrition guidelines are addressed. By understanding classes of nutrients and their respective guidelines, students will gain the skills to make informed dietary choices that promote a healthy lifestyle. May not be used for biology grade point calculation or biology credit toward a degree in biology, microbiology, or medical technology. Credit will be granted in only one department.

### **BIOL 1333. BIOLOGY FOR NON-SCIENCE MAJORS: CELLS AND DISEASE. 3 Hours. (TCCN = BIOL 1308)**

Scientific literacy is crucial for navigating health-related issues in today's society. In this lecture and lab course, non-science majors will learn about the molecules of life, the cell, energy and metabolism, cell division, genetics and inheritance and diseases, such as cancer and diabetes. This course will satisfy the laboratory science requirements for students in the Colleges of Liberal Arts and Business Administration, and in the School of Social Work. Formerly listed as BIOL 1433, credit will not be given for both.

### **BIOL 1334. BIOLOGY FOR NON-SCIENCE MAJORS: LIFE ON EARTH. 3 Hours. (TCCN = BIOL 1309)**

Scientific literacy is crucial for understanding the natural world and our relationship to it. In this lecture and lab course, non-science majors will learn about biologically-based problems facing today's society. Course themes include evolution, antibiotic resistance, genetic diversity, animal and bacterial and plant diversity, ecosystems, ecology and global change. This course will satisfy the laboratory science requirements for students in the Colleges of Liberal Arts and Business Administration, and in the School of Social Work. Formerly listed as BIOL 1434, credit will not be given for both.

### **BIOL 1345. INTRODUCTION TO CELL BIOLOGY. 3 Hours.**

This course focuses on the chemical and molecular basis of life, including metabolism, cell structure and function, and genetics to provide knowledge of these subjects for those pursuing degrees in nursing and health. Note: This course cannot be applied for credit toward a degree in Biology.

### **BIOL 1441. BIOLOGY I FOR SCIENCE MAJORS: CELL AND MOLECULAR BIOLOGY. 4 Hours. (TCCN = BIOL 1406)**

(BIOL 1406) This course focuses on the chemical and molecular basis of life, including metabolism, cell structure and function, and genetics. Laboratory experiments are designed to complement theory presented in lecture. Formerly listed as BIOL 1449; credit will not be given for both.

### **BIOL 1442. BIOLOGY II FOR SCIENCE MAJORS: ECOLOGY AND EVOLUTION. 4 Hours. (TCCN = BIOL 1407)**

Reviews significant aspects of organismal biology and presents current hypotheses concerning the origin and diversification of life on earth. The ecological and behavioral interactions between organisms and their biotic/abiotic environments are considered from an evolutionary perspective. The laboratory will examine evolution, ecology and the diversity of life using hands-on observational and experimental approaches. Prerequisite: BIOL 1441.

### **BIOL 2317. BASIC CONCEPTS IN HUMAN SEXUALITY. 3 Hours.**

The physiological, psychological, and sociological aspects of human sexuality. Offered as BIOL 2317, HEED 2317, PSYC 2317, and GWSS 2317. Credit will be granted for one of these courses only. Students seeking certification in Health Education must enroll in HEED 2317. Students seeking credit toward their science requirement must enroll in BIOL 2317. May not be used for biology grade point calculation or biology credit toward a BS degree in biology, microbiology, medical technology, psychology, or sociology.

### **BIOL 2444. GENERAL MICROBIOLOGY. 4 Hours. (TCCN = BIOL 2421)**

Fundamental principles of microbiology including the structure and function of microbial cells and their activities in nature. Bacteria will be used in the laboratory to provide training and experimental methodology. Formerly listed as BIOL 3444; credit will not be granted for both. Prerequisite: BIOL 1441, CHEM 1441 or CHEM 1341.



**BIOL 2457. HUMAN ANATOMY AND PHYSIOLOGY I. 4 Hours. (TCCN = BIOL 2401)**

Functional morphology of humans, cellular function, principles of support and movement, and neural control systems. Laboratory exercises involve both anatomical and physiological aspects of principles introduced in the lecture. This class is designed for students in sport activities (EXSA), nursing, and health. Prerequisite: BIOL 1345 or BIOL 1441 or equivalent, or approval of the department. May not be used for biology grade point calculation or biology credit toward a degree in biology or microbiology.

**BIOL 2458. HUMAN ANATOMY AND PHYSIOLOGY II. 4 Hours. (TCCN = BIOL 2402)**

Functional morphology of humans, maintenance of the human body, and continuity of life. Topics will include the endocrine, cardiovascular, respiratory, digestive, urinary, immune, and reproductive systems. Laboratory exercises explore both anatomical and physiological aspects of principles introduced in the lecture. This class is designed for students in sport activities (EXSA), nursing, and health. Prerequisite: BIOL 2457 or equivalent. May not be used for biology grade point calculation or biology credit toward a degree in biology or microbiology.

**BIOL 2460. MICROBIOLOGY FOR NON-SCIENCE MAJORS. 4 Hours. (TCCN = BIOL 2420)**

This course covers basic microbiology and immunology and is primarily directed at pre-nursing, pre-allied health, and non-science majors. It includes the nature of microorganisms, microbial diversity, the importance of microorganisms and acellular agents in the biosphere, and their roles in human and animal diseases. Major topics include microorganism structure, growth, physiology, pathogenesis, and biochemistry. Emphasis is on medical microbiology, infectious diseases, and public health. The laboratory component covers essential microbiology laboratory skills including aseptic technique, assessment of antimicrobial agents, microscopy, and staining techniques. This course cannot be applied for credit toward a degree in Biology. Prerequisite: BIOL 1345, or BIOL 1441 or equivalent.

**BIOL 3101. CURRENT TOPICS IN BIOLOGY. 1 Hour.**

Seminar on significant topics and issues in modern biology. Students will attend seminars on selected topics. Topics will vary each semester. May be repeated once for biology credit.

**BIOL 3131. SERVICE LEARNING. 1 Hour.**

Service learning is a credit-bearing learning experience; therefore, credit is awarded for academic learning and not for service hours. Students engage in classroom activities, assignments, and discussions and in addition, integrate course content and learning outcomes with genuine community needs or issues. Collaborations with the community result in relationship-building and partnerships through intentional, structured service experiences. Students are required to analyze and evaluate these experiences by engaging in reflective activities, such as discussion and journaling. This process of structured service and learning in the community promote a sense of civic responsibility and commitment to others. Students commit to serve weekly time resulting in at least fifteen hours during one semester. This time is agreed upon by student, faculty, and community agency. Prerequisite: Permission of the Instructor.

**BIOL 3149. COOPERATIVE PROGRAM IN BIOLOGY. 1 Hour.**

The purpose of this course is to allow students to earn college credit for relevant field work in the areas of biology and microbiology. Students must apply for the program and be cleared for registration during the semester prior to enrollment.

**BIOL 3231. SERVICE LEARNING. 2 Hours.**

Service learning is a credit-bearing learning experience; therefore, credit is awarded for academic learning and not for service hours. Students engage in classroom activities, assignments, and discussions and in addition, integrate course content and learning outcomes with genuine community needs or issues. Collaborations with the community result in relationship-building and partnerships through intentional, structured service experiences. Students are required to analyze and evaluate these experiences by engaging in reflective activities, such as discussion and journaling. This process of structured service and learning in the community promote a sense of civic responsibility and commitment to others. Students commit to serve weekly time resulting in at least fifteen hours during one semester. This time is agreed upon by student, faculty, and community agency. Prerequisite: Permission of the Instructor.

**BIOL 3249. COOPERATIVE PROGRAM IN BIOLOGY. 2 Hours.**

The purpose of this course is to allow students to earn college credit for relevant field work in the areas of biology and microbiology. Students must apply for the program and be cleared for registration during the semester prior to enrollment.

**BIOL 3300. BIOSTATISTICS. 3 Hours.**

Introduction to the collection, description, and analysis of data with statistical methods appropriate for biological sciences. Specific topics covered include but are not limited to: descriptive statistics, frequency distributions, random sampling, probabilities, binomial distribution, normal distribution theory and calculations, confidence intervals, t-tests (independent sample and paired designs), Chi-square tests (one-way and two-way analysis), analysis of variance, correlation and linear regression. Prerequisite: BIOL 1441.

**BIOL 3301. CELL PHYSIOLOGY. 3 Hours.**

An introduction to the basic physical, chemical, and biological principles which govern function in eukaryotic cells, and the relationships between cells and their environments. Prerequisite: BIOL 1441. CHEM 2181 and CHEM 2321 are recommended.

**BIOL 3302. UNDERGRADUATE RESEARCH EXPERIENCE. 3 Hours.**

In this laboratory course, students will learn core concepts in Biology through an intense research experience. Students will master skills including quantitative data analysis, oral and written communication, and critical thinking. Permission is required to enroll in this course.

**BIOL 3303. DRUGS AND BEHAVIOR. 3 Hours.**

A survey of the psychoactive agents, their therapeutic uses, and social abuses. Alcohol, nicotine, caffeine, narcotics, hallucinogens, stimulants, and tranquilizers. Offered as BIOL 3303, HEED 3303, and PSYC 3303; credit will be granted only once. May not be used for biology grade point calculation or biology credit toward a B.S. degree in biology, microbiology, or medical technology. Students seeking certification in health education must enroll in HEED 3303.

**BIOL 3304. MICROBIAL GENETICS. 3 Hours.**

Consideration of the physical, chemical, and functional nature of genetic processes in micro-organisms. Prerequisite: BIOL 2444, or permission of instructor.

**BIOL 3306. BACTERIAL PHYSIOLOGY AND ANTIBIOTICS. 3 Hours.**

This course will cover the fundamentals of how bacterial cells work, and how antibiotics interfere with essential functions to stop bacterial cells from working. This class is taught largely through reading and discussion of the primary literature, and with active learning and writing assignments. Prerequisite: BIOL 2444.

**BIOL 3307. EVOLUTIONARY MEDICINE. 3 Hours.**

The application of evolutionary theory to the practice of medicine from an anthropological perspective. Topics include diet/paleodiets, sleep habits, infectious diseases, the developmental origins of health and disease, mental health, women's health and reproduction, and aging/senescence, among others. Offered as BIOL 3307 and ANTH 3307; credit will only be granted in one department.

**BIOL 3308. MICROBIAL ECOLOGY AND EVOLUTION. 3 Hours.**

The diversity, ecology and evolution of microorganisms in natural systems. Topics will include the role of bacteria and fungi in the functioning of terrestrial ecosystems; microbial biogeography; taxonomic and metabolic diversity; evolutionary diversification; and interactions among microbes and with plant and animal hosts. Prerequisite: BIOL 2444.

**BIOL 3310. SELECTED TOPICS IN BIOLOGY. 3 Hours.**

Topics in biology not treated in the regular curriculum. Topic, format, and prerequisites to be determined by the instructor. May be repeated for biology elective credit as different topics are offered. Prerequisite: BIOL 1441, BIOL 1442.

**BIOL 3311. SELECTED TOPICS IN MICROBIOLOGY. 3 Hours.**

Topics in microbiology not treated in the regular curriculum. Topic, format, and prerequisites to be determined by the instructor. May be repeated for microbiology elective credit as different topics are offered. Prerequisite: BIOL 1441, BIOL 2444.

**BIOL 3312. IMMUNOLOGY. 3 Hours.**

An introduction to the components, properties, and manifestations of the adaptive immune response that occurs in vertebrates. Prerequisite: BIOL 1441, BIOL 2444. CHEM 2181, CHEM 2321 are recommended.

**BIOL 3313. HUMAN ADAPTATION AND THE CONCEPT OF RACE. 3 Hours.**

The study of modern human biological variation in the context of the history of the concept of race. Detailed historical review explores changing perspectives on variation within our species. Course examines physiological adaptations to environmental stress among a variety of human populations and implications of recent genetic research. Offered as BIOL 3313 and ANTH 3311; credit will only be granted in one department.

**BIOL 3314. PRIMATE EVOLUTION AND BEHAVIOR. 3 Hours.**

An overview of the Primate Order covering primate origins, evolution, ecology, adaptation, and behavior. Examination of the environmental context within which primates live, how the form of their bodies reflects their activities, and how they relate behaviorally to their environments and to one another. Offered as BIOL 3314 and ANTH 3313; credit will only be granted in one department.

**BIOL 3315. GENETICS. 3 Hours.**

Principles of molecular and classical genetics. The function and transmission of hereditary material in microorganisms, plants, and animals, including humans. Prerequisite: BIOL 1441.

**BIOL 3316. ASTROBIOLOGY I. 3 Hours.**

This is an interdisciplinary course between astrophysics, biology and geology. Topics include properties of life, origin and evolution of life on Earth, terrestrial geology and habitability, environmental forcings, extremophiles, mass extinctions, meteorites, searches for life in the solar system. Offered as BIOL 3316, GEOL 3316 and PHYS 3316; credit will be granted only once. Prerequisite: PHYS 1441 & PHYS 1442 or equivalent and PHYS 2315 or PHYS 3315, or permission from instructor. Prerequisites for Biology majors: PHYS 1441 & PHYS 1442 or equivalent.

**BIOL 3317. GENOMICS. 3 Hours.**

This course presents an integrative approach to genome science, combining elements of genetics, state of the art technologies in genomic analysis. A basic knowledge of genetics and probability concepts is required. Use of the World Wide Web will be an essential part of the course. Prerequisite: BIOL 3315 or permission of instructor.

**BIOL 3318. LIMNOLOGY. 3 Hours.**

The living and nonliving components of inland waters. An introduction to the geological, physical, and chemical background, and to the major organisms and ecological processes. Prerequisite: BIOL 1441.

**BIOL 3319. HUMAN GENETICS. 3 Hours.**

This course will enable students to comprehend the basic principles of genetics applied to human inheritance and disease, to interpret the research strategies aimed to identify and study the genes responsible for diverse functions and traits, as well as to assess the consequences of the genetic technologies in our society. Prerequisites: BIOL 1441 and BIOL 3315.

**BIOL 3320. BIOLOGY OF TEXAS. 3 Hours.**

This course is an introduction to habitat diversity and the number of species found in the state of Texas. Students will learn about the physical, climatological, and human geography of Texas and how that affects animal and plant life within the state. Descriptions of state and federal endangered species listing processes will also be covered. Prerequisite: BIOL 1441 and BIOL 1442.

**BIOL 3321. INFECTIOUS DISEASE. 3 Hours.**

This course will cover key concepts that relate to the history and background of infectious diseases, as well as the emergence, spread, and control of infectious disease epidemics. Vaccination, antibiotic resistance, and eradication of diseases will also be discussed. Prerequisite: BIOL 3444.

**BIOL 3322. BRAIN AND BEHAVIOR. 3 Hours.**

An introduction to the anatomical structures and physiological processes that determine behavior. Topics include the acquisition and processing of sensory information, the neural control of movement, and the biological bases of complex behaviors (such as learning, memory, sex, language, and addiction), as well as the basic functioning of the nervous system. Offered as BIOL 3322 and PSYC 3322. Credit will be granted only once. BIOL 3322 prerequisite: BIOL 1441, BIOL 1442. PSYC 3322 prerequisite: BIOL 1441 or PSYC 1315.

**BIOL 3323. NEUROBIOLOGY. 3 Hours.**

General principles of the function, structure, and organization of the nervous system. Topics include the gross and microscopic anatomy of nervous tissues; physical and chemical basis for action potentials and synaptic transmission; sensory and motor pathways of transduction; molecular, cellular, and systems study of learning and memory; development; and a study of neural diseases and disorders. Prerequisite: BIOL 1441, BIOL 1442.

**BIOL 3324. HUMAN ECOLOGY OF FOOD. 3 Hours.**

Modern food production and consumption is a complex, interdisciplinary topic directly relevant to global environmental and public health issues. This course will examine our place in the food web from ecological, biogeographical, historical, cultural, and sociopolitical perspectives. Course participants will examine the implications of our everyday decisions as consumers who play a key role in an intricate ecological system. Prerequisite: BIOL 1441 and BIOL 1442.

**BIOL 3326. ANIMAL BEHAVIOR. 3 Hours.**

A survey of research and theory comparing behavior at various phyletic levels. Offered as BIOL 3326 and PSYC 3326. Credit will be granted for only one of these courses. Prerequisite: BIOL 1441, BIOL 1442.

**BIOL 3327. MICROBIAL DIVERSITY. 3 Hours.**

This course is an introduction to the great diversity of microbial life. The topic material explores this diversity by considering the great age of bacteria, their evolution, biochemistry, habitat and form. The course of study focuses attention on organisms not commonly encountered in General Microbiology laboratories. Prerequisite: BIOL 3444 Microbiology.

**BIOL 3328. ENVIRONMENTAL MICROBIOLOGY. 3 Hours.**

An introduction to the principles, methodology, and practical applications and implications of environmental microbiology. Lecture topics include habitat and community approaches to environmental microbiology, measures of microbial populations and activities, interactions among microbial communities, the role of microorganisms in the origin of mineral resources, microorganisms and pollution, and current developments on energy flow through microbial communities. Prerequisite: BIOL 3444.

**BIOL 3331. SERVICE LEARNING. 3 Hours.**

Service learning is a credit-bearing learning experience; therefore, credit is awarded for academic learning and not for service hours. Students engage in classroom activities, assignments, and discussions and in addition, integrate course content and learning outcomes with genuine community needs or issues. Collaborations with the community result in relationship-building and partnerships through intentional, structured service experiences. Students are required to analyze and evaluate these experiences by engaging in reflective activities, such as discussion and journaling. This process of structured service and learning in the community promote a sense of civic responsibility and commitment to others. Students commit to serve weekly time resulting in at least fifteen hours during one semester. This time is agreed upon by student, faculty, and community agency. Prerequisite: Permission of the Instructor.

**BIOL 3333. GLOBAL CHANGE BIOLOGY. 3 Hours.**

This course covers global-scale environmental changes and their consequences for species and ecological communities. We will focus on climate change, habitat loss, and species invasion, with special emphasis on combining physiology, ecology, and evolution to understand past responses and predict future outcomes. Prerequisite: BIOL 1442.

**BIOL 3339. INTRODUCTION TO EVOLUTION. 3 Hours.**

The goals of this course are: to introduce students to the process of evolution, the patterns that result, and the way that evolutionary history has shaped the diversity of organisms on Earth; to explore how evolutionary biologists formulate and test hypotheses; to investigate applications of evolutionary biology to mainstream medical research; and to investigate current controversies in evolutionary biology. Prerequisites: BIOL 1441 and BIOL 3315 (or equivalent), or permission of instructor.

**BIOL 3340. BIOINFORMATICS. 3 Hours.**

This course is an applied introduction to bioinformatics and computational genomics. The course is geared toward the student with a biology background and limited programming experience. The course provides an entrance to commonly used programming/scripting languages and an introduction to numerous aspects of modern genomic data analyses (e.g. identification of coding and regulatory features in novel sequences, expression analysis, and comparative/phylogenetic analyses). Prerequisite: BIOL 1442 and BIOL 3315, or permission of instructor.

**BIOL 3342. DEVELOPMENTAL BIOLOGY IN HEALTH AND DISEASE. 3 Hours.**

An introduction to fundamental developmental events that form complex organisms with an emphasis on human health and disease. Prerequisites: BIOL 1441 and 1442. BIOL 3301 is recommended.

**BIOL 3349. COOPERATIVE PROGRAM IN BIOLOGY. 3 Hours.**

The purpose of this course is to allow students to earn college credit for relevant field work in the areas of biology and microbiology. Students must apply for the program and be cleared for registration during the semester prior to enrollment.

**BIOL 3352. INTRODUCTION TO FORENSIC LAB SCIENCE. 3 Hours.**

An introduction to the various disciplines of Forensic Science including DNA analysis, drug analysis, and firearms basics. Laboratory consists of hands-on investigation of mock crime scenes, fingerprint enhancement methods, and biological analysis of fluids. Prerequisite: BIOL 1441, BIOL 1442, CHEM 1441.

**BIOL 3353. FUNDAMENTAL MEDICAL MYCOLOGY. 3 Hours.**

Medical mycology deals with those infections in humans, and animals resulting from pathogenic fungi. As a separate discipline, the concepts, methods, diagnosis, and treatment of fungal diseases of humans are specific. Fundamental Medical Mycology balances clinical and laboratory knowledge to provide students with in-depth coverage of the most common fungal diseases and its etiologic agents from both the laboratory and clinical perspective. Prerequisite: BIOL 2444.

**BIOL 3355. TOXICOLOGY. 3 Hours.**

An introduction to the general principles of toxicology with an emphasis on certain classes of toxic agents, their sources and toxic effects, as well as their environmental fates. Pollution of various media (air, water and soil) and the differences between them will be discussed. Prerequisite: BIOL 1441, BIOL 1442, CHEM 1441 and CHEM 1442.

**BIOL 3356. ENVIRONMENTAL SYSTEMS, BIOLOGICAL ASPECTS. 3 Hours.**

Biological components of environmental systems. Population dynamics, species interactions, community structure, biodiversity, bioenergetics, nutrient cycling and human impacts are reviewed. Prerequisite: BIOL 1441, BIOL 1442.

**BIOL 3358. ASTROBIOLOGY II. 3 Hours.**

This is an interdisciplinary course between astrophysics, biology and geology. Topics include basic properties of life, habitability of Earth, studies of possible life regarding Mars, Europa & Titan, space missions, exoplanets and exomoons, stellar habitable zones, multistellar systems, exoEarths, biomarkers, SETI, Fermi paradox, Drake equation, cosmology. Offered as BIOL 3358, GEOL 3358, and PHYS 3358; credit will be granted only once. Prerequisite: PHYS 1441 & PHYS 1442 or equivalent and PHYS 2315 or PHYS 3315, or permission from instructor. Prerequisites for Biology majors: PHYS 1441 & PHYS 1442 or equivalent. Note that Astrobiology I is strongly recommended to students to be taken prior to Astrobiology II, but is not a prerequisite.

**BIOL 3359. MEDICAL MOLECULAR BIOLOGY. 3 Hours.**

This course is an introduction to modern molecular biology and human diseases. This course will use medical diseases, class projects, and problem sets to explore and learn modern molecular biology. The molecular mechanisms and underpinnings for several human diseases will be covered. Topics may include, gene regulation, the dynamic genome and how to rewrite it, modern cloning schemes, synthetic biology, and drug design. BIOL 3315 or BIOL 2444 are recommended, but not required. Prerequisite: BIOL 1441.

**BIOL 3409. PALEOANTHROPOLOGY. 4 Hours.**

Paleoanthropology: an exploration of fossil evidence for human origins and human evolution. Course focuses on the evolution of humans and our close relatives, from our origins as a distinct lineage to "anatomically modern" Homo sapiens, including the relationship between biological and cultural/behavioral evolution. Offered as BIOL 3409 and ANTH 3409; credit will be granted only once.

**BIOL 3410. SELECTED TOPICS IN BIOLOGY. 4 Hours.**

Topics in biology not treated in the regular curriculum. Topic, format, and prerequisites to be determined by the instructor. May include lab, service learning or any other experiential learning module. May be repeated for biology elective credit as different topics are offered. Prerequisite: BIOL 1441 or BIOL 1442.

**BIOL 3420. GENETICS METHODS LAB. 4 Hours.**

This course combines computational and experimental approaches to study genome composition, evolution, and disease. Students will learn contemporary laboratory techniques while exploring transposable elements as tools for genetic analysis. Topics include genetic variation, Mendelian genetics, gene regulation, and gene-directed therapy. Prerequisite: BIOL 3315.

**BIOL 3427. PLANT SCIENCE. 4 Hours.**

A survey of plant science including the importance of plants to people and the human side of botany: the structure, reproduction, physiology, and classification of plants. The laboratory includes the study of structure, function, reproduction, and classification of plants. Replaces BIOL 3327 and BIOL 3183. Credit cannot be given for BIOL 3427 and BIOL 3327 and 3183. Prerequisite: BIOL 1441, BIOL 1442 or equivalent.

**BIOL 3442. HUMAN PHYSIOLOGY. 4 Hours.**

A comparative study of vertebrate function. The general principles of physiological mechanisms on the cellular, tissue, organ, and organismal levels will be examined. Laboratory studies will complement lecture material and will stress experimental design, data analysis, and the understanding of critical research in physiology. Prerequisite: BIOL 1441, BIOL 1442.

**BIOL 3445. METHODS IN MOLECULAR MICROBIOLOGY. 4 Hours.**

An overview of different techniques used during manipulation of microorganisms. It will allow students to gain an historical perspective of techniques used in microbiology as well as learn state of the art molecular characterization of microorganisms and their genetic manipulation. Introduces biochemical, physiological, and molecular biology methods to assess community diversity and microbial activity in a variety of ecosystems. Bacterial growth and survival, population biology, and microbial interactions will also be discussed. Prerequisite: BIOL 1441 and BIOL 3444.

**BIOL 3446. HUMAN ANATOMY. 4 Hours.**

Study of the gross functional anatomy of the human body. Students will participate in laboratory exercises designed to familiarize them with human anatomical structures and their functions. Use of eponyms for anatomical terms will be minimized. Prerequisite: BIOL 1441, BIOL 1442 or 8 hours of Bioltran.

**BIOL 3454. GENERAL ZOOLOGY. 4 Hours.**

An overview of animal life including the diversity and evolution of major animal phyla, reproduction, development and aspects of physiological function. The laboratory examines form, function and phyletic relationships in a wide variety of animal types. Prerequisite: BIOL 1441, BIOL 1442, or equivalent, or permission of instructor.

**BIOL 3457. GENERAL ECOLOGY. 4 Hours.**

An examination of the theoretical and experimental aspects of the relationship between the biological and physical environments (organisms, food, space, and time) at the individual, population, community, and ecosystem levels. Prerequisite: BIOL 1441, BIOL 1442.

**BIOL 4089. RESEARCH IN BIOLOGY. 0 Hours.**

Research problems on an individual basis, conducted under the direction of a member of the biology faculty. Prerequisite: written permission of the supervising instructor prior to registration. This is a non-credit course. Prerequisite: Written permission of the supervising instructor prior to registration.

**BIOL 4101. CAREER READINESS CAPSTONE. 1 Hour.**

This is a career-readiness capstone course for students approaching graduation. Students will build a professional portfolio to be used towards post graduate prospects such as a scientific industry jobs or application to a graduate program.

**BIOL 4179. RESEARCH AND DIRECTED STUDY. 1 Hour.**

Research or independent study by individual students in biology under the supervision of a biology faculty member. Topics must be approved by the supervising faculty member. Prerequisite: BIOL 1441, BIOL 1442, and permission of instructor.

**BIOL 4189. RESEARCH IN BIOLOGY. 1 Hour.**

Research problems on an individual basis, conducted under the direction of a member of the biology faculty. A limit of two hours per semester is imposed and only a total of three hours may be counted toward degree requirements. These courses are offered only on a pass/fail basis. Prerequisite: written permission of the supervising instructor prior to registration.

**BIOL 4279. RESEARCH AND DIRECTED STUDY. 2 Hours.**

Research or independent study by individual students in biology under the supervision of a biology faculty member. Topics must be approved by the supervising faculty member. Prerequisite: BIOL 1441, BIOL 1442, and permission of instructor.

**BIOL 4289. RESEARCH IN BIOLOGY. 2 Hours.**

Research problems on an individual basis, conducted under the direction of a member of the biology faculty. A limit of two hours per semester is imposed and only a total of three hours may be counted toward degree requirements. These courses are offered only on a pass/fail basis. Prerequisite: written permission of the supervising instructor prior to registration.

**BIOL 4303. MICROBIOMES: HEALTH AND THE ENVIRONMENT. 3 Hours.**

The development, interactions, and change of polymicrobial communities in both humans and the environment with implications in health, nutrition, disease, research, ecology and agriculture. Prerequisite: BIOL 2444.

**BIOL 4307. MOLECULAR EVOLUTION. 3 Hours.**

This course focuses on understanding how genes and genomes evolve at the molecular level. Molecular biology provides the data while population genetics provides the theoretical framework. Prerequisite: BIOL 3315, BIOL 3339.

**BIOL 4309. NEUROPHARMACOLOGY. 3 Hours.**

A survey of how drugs affect the nervous system. General topics will include cellular and molecular foundations of neuropharmacology, receptors and modulation of neural signaling. The specific role of neurotransmitter systems (i.e. acetylcholine, dopamine, norepinephrine, serotonin, and opiate) will be explored. Offered as BIOL 4309 and PSYC 4309; credit will be granted only once. Prerequisite: one or more of the following courses or permission of instructor: BIOL 1441 or PSYC 3322/BIOL 3322 or BIOL 3301.

**BIOL 4311. HISTOLOGY. 3 Hours.**

Histology is a branch of biological science concerned with structure and function of the organism on a cellular level. The objective in this class is to provide students with the skills and knowledge needed to identify and describe tissues and organs in the microscopic images based on the characteristic morphologies of cells and arrangement of tissues. Students will learn about basic histological techniques used in slide preparation, four basic tissue types and types of tissue, followed by the survey of microscopic images of all organ systems. This course bridges the "whole body" disciplines of anatomy and physiology and cell-level sciences such as cell physiology and genomics. It will help students understand how the differential expression of the genome leads to different cell morphology that in turn leads to different functions. Prerequisite: BIOL 1441, BIOL 1442.

**BIOL 4312. INTRODUCTION TO VIROLOGY. 3 Hours.**

The nature, reproduction, and host cell interactions of viruses and virus-like agents of bacteria, animals, and plants. Prerequisite: BIOL 2444.



**BIOL 4315. HORMONES AND BEHAVIOR. 3 Hours.**

A study of the interaction between hormones and behavior. Specific topics covered include; examination of the hormonal influences on sex determination, reproductive behaviors, parental behavior, dominance and aggression, responses to stressful stimuli, homeostasis, and learning and memory. This course uses a comparative approach and draws examples of neuroendocrine function from throughout the animal kingdom including fish, birds, reptiles, and mammals (including humans). Offered as PSYC 4315 and BIOL 4315. Credit will be granted only once. Prerequisite: PSYC 3322/BIOL 3322 or BIOL 1441 or BIOL 3301.

**BIOL 4316. GROWTH, DEVELOPMENT, AND EVOLUTION. 3 Hours.**

A survey of topics at the nexus of modern human biological research in growth and development and the evolutionary record of hominid subadults. Offered as BIOL 4316 and ANTH 4315; credit will be granted only in one department. Prerequisite is only required for students registering for ANTH 4315. Prerequisite: ANTH 2307 or permission of the instructor.

**BIOL 4317. BACTERIAL PATHOGENESIS. 3 Hours.**

Host-pathogen relationships in microbial diseases. Topics include bacterium-host interactions; pathogens and pathogenic factors; techniques in pathogenesis research; molecular mechanisms of pathogenesis by major bacterial pathogens; antimicrobial compounds and resistance to antibiotics; and discussion of human genomics and susceptibility to infections. Prerequisites: BIOL 3312, BIOL 2444.

**BIOL 4321. ADVANCED PROBLEM SOLVING IN BIOLOGY. 3 Hours.**

This course will focus on crucial techniques needed to solve application-based questions in biology. Students will develop and practice reading comprehension, problem solving, critical thinking, and reasoning skills while deepening their understanding of core biological concepts, including cell and molecular biology; biochemistry; anatomy and physiology; and behavior. The goal of this course is to improve students' critical reasoning skills to prepare them for problem-based exams. BIOL 3442 is recommended. Prerequisite: BIOL 1442, BIOL 3301, BIOL 3315.

**BIOL 4327. BEHAVIORAL GENETICS. 3 Hours.**

Genetic influences on behavioral phenotypes. Research strategies, quantitative methods, and pharmacogenetic approaches to the brain; sociality and altruism; the personality, emotionality and intelligence; psychopathology; chromosomal abnormalities; forensic implications of genetic counseling. Offered as BIOL 4327 and PSYC 4327; credit will be granted only once. Students seeking credit toward the science requirement must enroll in BIOL 4327. Prerequisite: PSYC 1315 or BIOL 1441.

**BIOL 4329. NEURAL ENGINEERING. 3 Hours.**

This course consists of both lecture/discussion and laboratory. Lecture topics include central and peripheral nervous system injury and regeneration, brain/machine interfacing, primary culture of neural cells, neuroinflammatory and neurodegenerative disease. Laboratories include embryonic and neonatal rat derived neuronal culturing, immunostaining and quantitative analysis. Prerequisites: BIOL 3301, CSE 1310, CHEM 2322, and MATH 3319.

**BIOL 4332. POLYMERS IN BIOMEDICAL ENGINEERING. 3 Hours.**

This is a foundation course in polymeric biomaterial design, synthesis, characterization, and processing. The topics include design, surface-engineering, functionalization, characterization, as well as micro- and nano-fabrication of polymeric biomaterials. The biomedical applications of the polymeric biomaterials and their interaction with cell/tissue is discussed. Prerequisite: BIOL 3301, CSE 1310, CHEM 2322 and MATH 3319.

**BIOL 4333. NANOBOMATERIALS. 3 Hours.**

Synthesis, fabrication, characterization, and biomedical applications of nanobiomaterials. Topics include synthetic nanobiomaterials, biological nanobiomaterials (DNA nanomaterials, protein and peptide nanomaterials, etc.), biofunctionalization of nanobiomaterials, use of nanobiomaterials in tissue engineering, drug delivery, gene delivery. Prerequisites: BIOL 3301, CSE 1310, CHEM 2322, and MATH 3319.

**BIOL 4343. RESEARCH METHODS - UTEACH. 3 Hours.**

The purpose of this course is to present UTeach students with the tools scientists use to solve scientific problems. These tools enable scientists to develop new knowledge and insights, the most important of which are eventually presented in textbooks and taught in more conventional science classes. These tools include: design of experiments to answer scientific questions; use of statistics to interpret experimental results and deal with sampling errors; mathematical modeling of scientific phenomena; finding and reading articles in the current scientific literature; applying scientific arguments in matters of social importance; writing scientific papers; reviewing scientific papers; oral presentation of scientific work; use of probes and computers to gather and analyze data; ethical treatment of human subjects; laboratory safety. Research Methods is primarily a laboratory course, and most of these topics are developed in connection with 4 independent inquiries UTeach students design and carry out. Written inquiries will be evaluated as examples of scientific writing. Prerequisite: SCIE 1201 or SCIE 1334 or concurrent enrollment; junior or senior standing.

**BIOL 4345. MICROBIAL PHYSIOLOGY. 3 Hours.**

This course considers the anatomy and physiology of the bacterial cell in detail. Lecture topics consider the molecular architecture of cell walls, membranes and organelles, synthesis of wall material and membranes, insertion of proteins into membranes and regulation of biosynthetic systems at the whole cell level. Prerequisite: BIOL 1441 and BIOL 3444. CHEM 4311 recommended.

**BIOL 4350. CONSERVATION BIOLOGY. 3 Hours.**

Introduction to theory and practice of conservation biology, with emphasis on applications of modern quantitative and genetic techniques to preservation of organisms and habitats. Topics include identification and prioritization of units for protection; conservation genetics; preserve design; public policy issues; and case studies. Prerequisite: BIOL 3315 or equivalent (Genetics), or permission of the instructor.

**BIOL 4352. FORENSIC BIOLOGY. 3 Hours.**

A comprehensive review of biological principles, applied to forensic science, including sample recovery and handling, analytical techniques, profile matching/exclusion, reporting, and testimony. Prerequisite: BIOL 3315; statistics course recommended; or permission of instructor.

**BIOL 4355. METHODS IN FORENSIC BIOLOGY. 3 Hours.**

Analysis of typical biological evidentiary samples including extraction of DNA, quantitation, amplification and electrophoresis of examples. Instrumentation utilized includes thermal cyclers and ABI 377 genetic analyzer. Prerequisite: BIOL 4352 or concurrent enrollment.

**BIOL 4357. HEALTH PSYCHOLOGY. 3 Hours.**

This course provides a broad introduction to health psychology and its interface with the medical world. The course provides a balanced presentation of the important issues in the field, as well as specific content topics that are especially relevant today to better understand health and illness. Offered as BIOL 4357, HEED 4357, and PSYC 4357. Students seeking science requirement credit must enroll in BIOL 4357; students seeking Certification in Health must enroll in HEED 4357. Prerequisite: PSYC 1315 or BIOL 1333 or BIOL 1441 or BIOL 2457; junior standing recommended.

**BIOL 4365. TISSUE ENGINEERING LAB. 3 Hours.**

Each student will be given the opportunity to perform the techniques commonly used in tissue engineering and biomaterial research. These techniques are culture media preparation, cell culture/subculture, degradable scaffold preparation, scaffold modification, histological sections and staining, and cell imaging analyses. Prerequisites: BIOL 3301, CSE 1310, CHEM 2322, and MATH 3319.

**BIOL 4379. RESEARCH AND DIRECTED STUDY. 3 Hours.**

Research or independent study by individual students in biology under the supervision of a biology faculty member. Topics must be approved by the supervising faculty member. Prerequisite: BIOL 1441, BIOL 1442, and permission of instructor.

**BIOL 4388. INSTRUCTIONAL TECHNIQUES IN BIOLOGY. 3 Hours.**

Students will participate in laboratory instruction and student recitation sessions under the supervision of a faculty member. A maximum of 3 hours can be applied to the major for biology or microbiology credit. Enrollment by departmental permission only. A maximum of 6 hours credit from this class will be used to calculate a student's grade point average. Students on probation or who have not qualified for major status may not enroll in this course.

**BIOL 4389. RESEARCH IN BIOLOGY. 3 Hours.**

Research problems on an individual basis, conducted under the direction of a member of the biology faculty. A limit of two hours per semester is imposed and only a total of three hours may be counted toward degree requirements. These courses are offered only on a pass/fail basis. Prerequisite: written permission of the supervising instructor prior to registration.

**BIOL 4390. INSTRUCTIONAL TECHNIQUES IN MICROBIOLOGY. 3 Hours.**

Students will participate in laboratory instruction and laboratory preparation under the supervision of the lab coordinator. A maximum of 3 hours can be applied to the major for biology or microbiology credit. Enrollment by departmental permission only. A maximum of 6 hours credit from this class will be used to calculate a student's grade point average. Students on probation or who have not qualified for major status may not enroll in this course.

**BIOL 4392. INSTRUCTIONAL TECHNIQUES IN MICROBIOLOGY LEADER. 3 Hours.**

Students will take on a leadership role in laboratory instruction and preparation under the supervision of the lab coordinator. Students will strengthen their skill set and gain experience in a supervisory role. A maximum of 3 hours can be applied to the major for biology or microbiology credit. Enrollment by departmental permission only. A maximum of 6 hours credit from this class will be used to calculate a student's grade point average. Students on probation or who have not qualified for major status may not enroll in this course.

**BIOL 4393. HONORS SENIOR PROJECT IN BIOLOGY. 3 Hours.**

A topic will be selected after consultation with a supervising professor and will involve both original research and writing a formal report. The work will be evaluated by a faculty honors committee. Completion of this course will satisfy the thesis requirement for the Honors College described elsewhere in this catalog.

**BIOL 4395. FORENSICS-EL PA. 3 Hours.****BIOL 4406. HUMAN OSTEOLOGY. 4 Hours.**

Detailed examination of human skeletal morphology. Topics include form and function of all skeletal elements in the human body, differentiation of each bone, left and right side identification, identification of fragmented remains, and muscle attachments and articulations. Content useful in forensic anthropology, archaeology, and hominid paleontology. Offered as BIOL 4406 and ANTH 4406; credit will be granted only in one department.

**BIOL 4421. ADVANCED TOPICS IN NEUROSCIENCE. 4 Hours.**

This course will cover current topics in Neuroscience using an interactive, participatory format that includes a lecture portion and a laboratory section. The course will focus on specific content topics that are especially relevant today to better understand and use advanced concepts in Neuroscience research. Completion of this course is essential for students who are interested in pursuing a career in Neuroscience research. Offered as BIOL 4421 or PSYC 4421. Credit will be granted only once. Junior standing recommended. Prerequisite: C or better in BIOL 3322 or PSYC 3322.

**BIOL 4440. LABORATORY METHODS IN BACTERIAL PATHOGENESIS. 4 Hours.**

This course is intended to expose students to research techniques for studying bacterial pathogens. Students will use molecular and classical techniques to isolate, identify, and characterize bacteria and their response to stimuli. Techniques will range from polymerase chain reaction (PCR), gene sequencing, sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE) and Immunofluorescence Microscopy. Prerequisites: BIOL 3312, BIOL 3444, BIOL 4317, or permission of instructor.

**BIOL 4441. ADVANCED MICROBIOLOGY LAB. 4 Hours.**

An overview of advanced microbiology techniques used in microbial genetics and physiology. It will allow students not only to gain an advanced and applicable perspective of techniques used in microbiology, but also to learn current state-of-the-art molecular techniques for genetic manipulation and physiological characterization of microorganisms. Included are molecular, physiological, and biochemical methods as well as metagenomics approaches and basic analysis of sequencing data for studying microbiomes. Enrollment requirements: BIOL 1441, General Microbiology (BIOL 2444), and Microbial Genetics (BIOL 3304). Prerequisite: BIOL 1441, BIOL 2444, BIOL 3304.

**BIOL 4459. BIOARCHAEOLOGY. 4 Hours.**

The study of human remains in archaeological contexts in order to reconstruct individual identity, life history, and past population characteristics. No formal prerequisites, but familiarity with the human skeleton is helpful. Lab component is required. Offered as BIOL 4459 and ANTH 4459; credit will be granted only in one department.

**BIOL 4460. ZOOARCHAEOLOGY. 4 Hours.**

The study of faunal remains from archaeological contexts to understand past human economic strategies and ecological circumstances. Topics include skeletal and taxonomic identification, taphonomic processes, mortality profiles, biometric analyses, and human behavioral ecology. Lab component is required. Offered as BIOL 4460 and ANTH 4460; credit will be granted only once.

**BIOL 5101. SPECIAL TOPICS IN BIOLOGY. 1 Hour.**

Seminar on significant biological research. May be repeated for credit. Prerequisite: consent of the instructor.

**BIOL 5102. PROFESSIONAL DEVELOPMENT. 1 Hour.**

This course will provide senior graduate students with important information regarding various aspects of their professional development including job searching, interviewing, stress and time management, and professional ethics.

**BIOL 5193. RESEARCH IN BIOLOGY. 1 Hour.**

Conference course in which the student undertakes intensive investigation of topics under the supervision of a staff member. Prerequisite: consent of the instructor. Graded P/F/R.

**BIOL 5291. INDIVIDUAL PROBLEMS IN BIOLOGY. 2 Hours.**

Individual research projects supervised by a faculty member. Prerequisite: consent of the instructor.

**BIOL 5293. RESEARCH. 2 Hours.****BIOL 5301. LABORATORY ROTATION. 3 Hours.**

This course is an elective designed to enable students to choose a major advisor and laboratory. Rotations among two or three faculty laboratories will familiarize students with faculty research interests, sharpen individual research skills, and expose students to different study systems, instruments, and research methods. May only be taken once for credit by MS students; may be repeated for credit once by Ph.D. students.

**BIOL 5302. MICROBIAL GENETICS. 3 Hours.**

Consideration of the nature, expression and regulation of the genetic processes in micro-organisms.

**BIOL 5303. MICROBIOMES: HEALTH AND THE ENVIRONMENT. 3 Hours.**

The development, interactions, and change of polymicrobial communities in both humans and the environment with implications in health, nutrition, disease, research, ecology and agriculture.

**BIOL 5304. VIROLOGY. 3 Hours.**

The nature, reproduction and host-cell interactions of viruses and animals. Emphasizes molecular aspects of viral replication and the molecular basis of pathogenesis. Prerequisite: consent of the instructor.

**BIOL 5307. NEUROBIOLOGY. 3 Hours.**

General principles of the function, structure, and organization of the nervous system. Topics include the gross and microscopic anatomy of nervous tissues; physical and chemical basis for action potentials and synaptic transmission; sensory and motor pathways of transduction; molecular, cellular, and systems study of learning and memory; development; and a study of neural diseases and disorders.

**BIOL 5309. IMMUNOLOGY. 3 Hours.**

This course is designed to acquaint students with the cellular processes involved in the generation of an immune response. It will provide students with detailed knowledge of the cells and organs of the immune system, their organization and diversity and their specialized functions at different anatomical locations. The importance of immune cell receptors and cytokines in cellular interactions and co-ordination of immunological mechanisms is also emphasized.

**BIOL 5310. SELECTED TOPICS IN BIOLOGY. 3 Hours.**

Topics may vary depending on the needs and interests of the students. May be repeated for credit. Prerequisite: consent of the student's thesis committee and the current course instructor.

**BIOL 5311. EVOLUTION. 3 Hours.**

Study of the origin of living systems and the mechanism of their evolution.

**BIOL 5312. ADVANCED GENETICS. 3 Hours.**

Mechanisms of transmission and function of genetic material. Covers fundamental concepts in transmission genetics including: genotype/phenotype relationships; inheritance; linkage; genome organization; and gene expression. Experimental and quantitative approaches to genetic analyses are emphasized. Prerequisite: consent of the instructor.

**BIOL 5314. BIOMETRY. 3 Hours.**

An examination of statistical methods and procedures in relation to the design of biological experiments and the analysis of their results. Prerequisite: consent of the instructor.

**BIOL 5315. COMMUNITY ECOLOGY. 3 Hours.**

An investigation of the effects of interspecific interactions on the distribution and abundance of organisms. Prerequisite: consent of the instructor.

**BIOL 5317. BACTERIAL PATHOGENESIS. 3 Hours.**

Host-pathogen relationships in microbial diseases. Topics include bacterium-host interactions, pathogens and pathogenic factors; techniques in pathogenesis research: molecular mechanisms of pathogenesis by major bacterial pathogens; antimicrobial compounds and resistance to antibiotics; and discussion of human genomics and susceptibility to infections.

**BIOL 5319. HUMAN GENETICS. 3 Hours.**

This course will enable students to comprehend the basic principles of genetics applied to human inheritance and disease, to interpret the research strategies aimed to identify and study the genes responsible for diverse functions and traits, as well as to assess the consequences of the genetic technologies in our society.

**BIOL 5321. ADVANCED PROBLEM SOLVING IN BIOLOGY. 3 Hours.**

This course will focus on crucial techniques needed to solve application-based questions in biology. Students will develop and practice reading comprehension, problem solving, critical thinking, and reasoning skills while deepening their understanding of core biological concepts, including cell and molecular biology; biochemistry; anatomy and physiology; and behavior. The goal of this course is to improve students' critical reasoning skills to prepare them for problem-based exams. BIOL 3442 is recommended. Prerequisite: BIOL 1442, BIOL 3301, BIOL 3315.

**BIOL 5325. PLANT ECOLOGY. 3 Hours.**

An introduction to plant ecology including physiological, population, community and ecosystem ecology.

**BIOL 5335. ESSENTIALS OF GENOMICS. 3 Hours.**

An integrative approach to genome science, combining elements of genetics, statistics and bioinformatics. Current technologies used in genomics analysis will be presented.

**BIOL 5336. MOLECULAR EVOLUTION. 3 Hours.**

An exploration of how genes and genomes evolve at the molecular level. The presentation uses the theoretical framework provided by population genetics to analyze molecular biology data.

**BIOL 5340. BIOINFORMATICS. 3 Hours.**

This course is an applied introduction to bioinformatics and computational genomics. The course is geared toward the student with a biology background and limited programming experience. The course provides an entrance to commonly used programming/scripting languages and an introduction to numerous aspects of modern genomic data analyses (e.g. identification of coding and regulatory features in novel sequences, expression analysis, and comparative/phylogenetic analyses).

**BIOL 5341. HISTOLOGY. 3 Hours.**

Histology is a branch of biological science concerned with structure and function of the organism on a cellular level. The objective in this class is to provide students with the skills and knowledge needed to identify and describe tissues and organs in the microscopic images based on the characteristic morphologies of cells and arrangement of tissues. Students will learn about basic histological techniques used in slide preparation, four basic tissue types and types of tissue, followed by the survey of microscopic images of all organ systems.

**BIOL 5342. DEVELOPMENTAL BIOLOGY IN HEALTH AND DISEASE. 3 Hours.**

An introduction to fundamental developmental events that form complex organisms with an emphasis on human health and disease.

**BIOL 5349. COOPERATIVE PROGRAM IN BIOLOGY. 3 Hours.**

The purpose of this course is to allow students to earn credit for relevant field work in the areas of biology and microbiology. Students must apply for the program and be cleared for registration during the semester prior to enrollment.

**BIOL 5350. CONSERVATION BIOLOGY. 3 Hours.**

Theory and practice of conservation biology, with emphasis on applications of modern quantitative and molecular genetic techniques to preservation of organisms and habitats. Includes: identification and prioritization of units for protection; conservation genetics; preserve design; public policy; and current case studies. Prerequisites: BIOL 3315 or equivalent or consent of the instructor.

**BIOL 5351. ENVIRONMENTAL MICROBIOLOGY. 3 Hours.**

Principles, methodology, and practical applications of environmental microbiology. Topics include: habitat and community approaches to environmental microbiology; measures of microbial populations and activities; interactions among microbial communities; role of microorganisms in the origin of mineral resources and pollution and energy flow through microbial communities. Prerequisite: BIOL 3444 or equivalent or consent of the instructor.

**BIOL 5353. FUNDAMENTAL MEDICAL MYCOLOGY. 3 Hours.**

Medical mycology deals with those infections in humans, and animals resulting from pathogenic fungi. As a separate discipline, the concepts, methods, diagnosis, and treatment of fungal diseases of humans are specific. Fundamental Medical Mycology balances clinical and laboratory knowledge to provide students with in-depth coverage of the most common fungal diseases and its etiologic agents from both the laboratory and clinical perspective.

**BIOL 5354. LIMNOLOGY. 3 Hours.**

The study of biotic and abiotic components of inland waters. Prerequisite: consent of the instructor.

**BIOL 5355. TOXICOLOGY. 3 Hours.**

An introduction to the general principles of toxicology with an emphasis on certain classes of toxic agents, their sources and toxic effects, as well as their environmental fates. Pollution of various media (air, water and soil) and the differences between them will be discussed.

**BIOL 5359. MEDICAL MOLECULAR BIOLOGY. 3 Hours.**

This course is an introduction to modern molecular biology and human diseases. This course will use medical diseases, class projects, and problem sets to explore and learn modern molecular biology. The molecular mechanisms and underpinnings for several human diseases will be covered. Topics may include, gene regulation, the dynamic genome and how to rewrite it, modern cloning schemes, synthetic biology, and drug design.

**BIOL 5366. ADVANCED ORGANISMAL PHYSIOLOGY. 3 Hours.**

In this course, the fundamentals of the structure (anatomy) and function (physiology) of "higher" plants and animals are discussed. Cellular, tissue, organ, and organismal levels will be the focus. General topics will include energy acquisition, distribution of nutrients, fluid transport, gas exchange, defense, sensing and responding to the environment, and reproduction. An understanding of basic biological concepts is expected.

**BIOL 5370. THESIS RESEARCH IN CELL BIOLOGY. 3 Hours.**

Faculty supervised thesis research.

**BIOL 5371. THESIS RESEARCH IN ECOLOGY AND EVOLUTION. 3 Hours.**

Faculty supervised thesis research.

**BIOL 5372. THESIS RESEARCH IN BIOINFORMATICS. 3 Hours.**

Faculty supervised thesis research.

**BIOL 5373. THESIS RESEARCH IN MICROBIOLOGY. 3 Hours.**

Faculty supervised thesis research.

**BIOL 5374. THESIS RESEARCH IN GENETICS AND GENOMICS. 3 Hours.**

Faculty supervised thesis research.

**BIOL 5391. INDIVIDUAL PROBLEMS IN BIOLOGY. 3 Hours.**

Individual research projects supervised by a faculty member. Prerequisite: consent of the instructor.

**BIOL 5392. MASTER'S NON-THESIS CAPSTONE. 3 Hours.**

The Master of Science in Biology Non-Thesis (MSNT) capstone course creates opportunities for students to integrate, reflect on, and apply what they have learned in their coursework. Students also practice professional competencies including communication, teamwork, critical thinking, research, problem-solving, and analytical thinking. This course satisfies the capstone requirement for the MS in Biology (non-thesis) degree.

**BIOL 5393. RESEARCH IN BIOLOGY. 3 Hours.**

Conference course in which the student undertakes intensive investigation of topics under the supervision of a staff member. Prerequisite: consent of the instructor. Graded P/F/R.

**BIOL 5398. THESIS. 3 Hours.**

Graded R/F only. Prerequisite: consent of faculty.

**BIOL 5420. GENETICS METHODS LAB. 4 Hours.**

This course combines computational and experimental approaches to study genome composition, evolution, and disease. Students will learn contemporary laboratory techniques while exploring transposable elements as tools for genetic analysis. Topics include genetic variation, Mendelian genetics, gene regulation, and gene-directed therapy.

**BIOL 5421. METHODS IN MOLECULAR MICROBIOLOGY. 4 Hours.**

This course will provide an overview of different techniques used during manipulation of microorganisms. It will allow students to gain a historical perspective of techniques used in microbiology (Winogradsky column, Koch solid agar plating) as well as learn state of the art molecular characterization of microorganisms and their genetic manipulation. This course introduces current biochemical, physiological and molecular biology methods to assess community diversity and microbial activity in a variety of ecosystems. Other topics discussed include bacterial growth and survival, population biology, and microbial interactions.

**BIOL 5440. LABORATORY METHODS IN BACTERIAL PATHOGENESIS. 4 Hours.**

This course is intended to expose students to research techniques for studying bacterial pathogens. Students will use molecular and classical techniques to isolate, identify and characterize bacteria and their response to stimuli. Techniques will range from PCR, Gene Sequencing, SDS\_PAGE and Immunofluorescence Microscopy. Prerequisite: BIOL 3312, BIOL 3444, BIOL 4317.

**BIOL 5493. RESEARCH. 4 Hours.****BIOL 5593. RESEARCH. 5 Hours.****BIOL 5693. RESEARCH IN BIOLOGY. 6 Hours.**

Conference course in which the student undertakes intensive investigation of topics under the supervision of a staff member. Prerequisite: consent of the instructor. Graded P/F/R.

**BIOL 5698. THESIS. 6 Hours.**

Graded P/F/R. Prerequisite: consent of faculty.

**BIOL 5998. THESIS. 9 Hours.**

Graded P/F/R. Prerequisite: consent of faculty.



**BIOL 6101. GRADUATE DEVELOPMENT. 1 Hour.**

An introduction to graduate school for incoming students. Students will learn basic science communication skills (oral presentation, abstract writing etc.), an overview of university infrastructure, and an introduction to grant management.

**BIOL 6102. RESPONSIBLE CONDUCT IN RESEARCH. 1 Hour.**

An overview of bioethics and responsible conduct in research according to standards set by the National Institutes of Health and the National Science Foundation. This includes establishing conflicts of interest, mentor and trainee proper practices, data acquisition and management, and proper practices as an author when publishing.

**BIOL 6103. CAREER DEVELOPMENT. 1 Hour.**

Students will learn valuable skills when applying for academic and non-academic jobs. This includes CV preparation, interview skills, presenting a job seminar, and resources for searching jobs.

**BIOL 6191. ADVANCED RESEARCH. 1 Hour.**

Faculty supervised individual research. May be repeated for credit. Graded P/F/R.

**BIOL 6291. ADVANCED RESEARCH. 2 Hours.**

Faculty supervised individual research. May be repeated for credit. Graded P/F/R.

**BIOL 6301. ESSENTIAL TOPICS IN GENOMICS. 3 Hours.**

This course will explore diverse aspects of genome biology, including the evolutionary principles that influence how genomes change through time, genome structure, and genome function. Emphasis will be given on how genome technology influences the way we do modern biology and how genomics influences the world around us.

**BIOL 6302. MICROBIOLOGY, MOLECULAR AND CELLULAR BIOLOGY. 3 Hours.**

Using model microorganisms, this course will investigate their (1)Physiology, biochemistry, and genetics, (2)The hosts innate and adaptive immune responses, (3)The molecular basis for virulence and pathogenesis and (4)The ecological and economic impact of microbial pathogens including epidemics and pandemics.

**BIOL 6303. ECOLOGICAL AND EVOLUTIONARY ANALYSIS. 3 Hours.**

Analysis-based/applied course with instruction on advanced statistical approaches. Topics to be covered include Poisson and Binomial Error Distribution, mixed effect models, phylogenetic comparative methods, structural equation modeling, power analysis, Bayesian analysis, study/sampling design, and generating publication-ready figures.

**BIOL 6310. SELECTED TOPICS IN BIOLOGY FOR PhD STUDENTS. 3 Hours.**

Topics may vary depending on the needs and interests of the students. May be repeated for credit. This course is specific to students in the PhD program.

**BIOL 6391. ADVANCED RESEARCH. 3 Hours.**

Faculty supervised individual research. May be repeated for credit. Graded P/F/R.

**BIOL 6399. DISSERTATION. 3 Hours.**

BIOL 6399 and BIOL 6699 graded R/F only; BIOL 6999 graded P/F/R. Prerequisite: admission to candidacy for the degree Doctor of Philosophy in Quantitative Biology.

**BIOL 6491. ADVANCED RESEARCH. 4 Hours.**

Faculty supervised individual research. May be repeated for credit. Graded P/F/R.

**BIOL 6591. ADVANCED RESEARCH. 5 Hours.**

Faculty supervised individual research. May be repeated for credit. Graded P/F/R.

**BIOL 6691. ADVANCED RESEARCH. 6 Hours.**

Faculty supervised individual research. May be repeated for credit. Graded P/F/R.

**BIOL 6699. DISSERTATION. 6 Hours.**

BIOL 6399 and BIOL 6699 graded R/F only; BIOL 6999 graded P/F/R. Prerequisite: admission to candidacy for the degree Doctor of Philosophy in Quantitative Biology.

**BIOL 6999. DISSERTATION. 9 Hours.**

BIOL 6399 and BIOL 6699 graded R/F only; BIOL 6999 graded P/F/R. Prerequisite: admission to candidacy for the degree Doctor of Philosophy in Quantitative Biology.

**BIOL 7399. DOCTORAL DEGREE COMPLETION. 3 Hours.**

This course may be taken during the semester in which a student expects to complete all requirements for the doctoral degree and graduate. Enrolling in this course meets minimum enrollment requirements for graduation, for holding fellowships awarded by The Office of Graduate Studies and for full-time GTA or GRA positions. Students should verify that enrollment in this course meets other applicable enrollment requirements. To remain eligible in their final semester of study for grants, loans or other forms of financial aid administered by the Financial Aid Office must enroll in a minimum of 5 hours as required by the Office of Financial Aid. Other funding sources may also require more than 3-hours of enrollment. Additional hours may also be required to meet requirements set by immigration law or by the policies of the student's degree program. Students should contact the Financial Aid Office, other sources of funding, Office of International Education and/or their graduate advisor to verify enrollment requirements before registering for this course. This course may only be taken twice. Students who do not complete all graduation requirements while enrolled in this course must enroll in a minimum of 6 dissertation hours (6699 or 6999) in their graduation term. Graded P/F/R.

**COURSES****BLAW 3310. LEGAL AND ETHICAL ENVIRONMENT OF BUSINESS. 3 Hours.**

The basic structure and processes of the legal system are reviewed followed by coverage of key common law areas and major regulatory rules that impact business. The focus is on a working knowledge of the law that has the greatest impact on business today and the social and ethical issues that may be related to legal issues. Prerequisite: 30 credit hours.

**BLAW 3311. LAW I. 3 Hours.**

The law relevant to business transactions of large and small business firms and individuals. The history and development of our legal system, (e.g. increased government regulation of business) reviewed to help the student understand political and social influences on law. Topics covered include common law and Uniform Commercial Code, and contractual relationships (contracts, assignments, commercial papers, sales, and bailments). Prerequisite: 30 credit hours.

**BLAW 3312. LAW II. 3 Hours.**

The law of property (real and personal), business associations (agency, partnership, corporation, bankruptcy), wills and trusts. Prerequisite: 30 credit hours.

**BLAW 3314. REAL ESTATE LAW. 3 Hours.**

Development of real estate law and the legal constraints within which real estate decisions are made. Prerequisite: 60 credit hours.

**BLAW 4310. BASIC INTERNATIONAL LAW FOR BUSINESS. 3 Hours.**

The basic principles of law related to international transactions and relations as may be applicable to business dealings. Laws related to persons and property in the foreign environment. Prerequisite: 60 credit hours.

**BLAW 4332. BUSINESS LAW FOR ACCOUNTANTS. 3 Hours.**

This course provides the basic legal principles of business organizations and operations, with coverage including the law of contracts (both common law and the law of sales of goods), commercial paper, property (including bailments, documents of title, patents and copyrights), employment law, agency, business organizations, selected topics of government regulation of business (securities regulation, antitrust, and bankruptcy), money laundering, suretyship and creditors' rights, the Dodd-Frank Act of 2010, the Sarbanes-Oxley Act of 2002, and CPA professional responsibility and liability. Prerequisite: 60 Credit hours completed.

**BLAW 5330. LEGAL ENVIRONMENT OF BUSINESS. 3 Hours.**

The basic structure and processes of the legal system are reviewed followed by coverage of key common law areas and major regulatory rules that impact business. The focus is on a working knowledge of the law that has the greatest impact on business today and the social and ethical issues that may be related to legal issues.

**BLAW 5331. LAW OF INTERNATIONAL BUSINESS. 3 Hours.**

General principles of law applicable to international business including case law, statutory law, treaties, administrative law, and international agreements.

**BLAW 5332. BUSINESS LAW FOR ACCOUNTANTS. 3 Hours.**

This course provides the basic legal principles of business organizations and operations, with coverage including the law of contracts (both common law and the law of sales of goods), commercial paper, property (including bailments, documents of title, patents and copyrights), employment law, agency, business organizations, selected topics of government regulation of business (securities regulation, antitrust, and bankruptcy), money laundering, suretyship and creditors' rights, the Dodd-Frank Act of 2010, the Sarbanes-Oxley Act of 2002, and CPA professional responsibility and liability.

**BLAW 5392. SELECTED TOPICS IN BUSINESS LAW. 3 Hours.**

In-depth study of selected topics in business law. May be repeated when topics vary. Prerequisite: consent of instructor.

**COURSES****BSAD 6182. INDEPENDENT STUDIES IN BUSINESS ADMINISTRATION. 1 Hour.**

This independent study course is centered on the application of content related to teaching in higher education settings. Students will be expected to design a lesson, present a lecture, and arrange for a final feedback report following an observed teaching demonstration. The focus will be on reflective teaching, sound lesson design, and receiving feedback towards improved teaching practice in higher education.

**BSAD 6310. FOUNDATIONS OF SCIENTIFIC INQUIRY. 3 Hours.**

The evolution of the modern corporation is briefly addressed. The core topics include the structure of explanation, the structure of scientific laws, theory building, philosophy of science and relativistic/post-relativistic philosophies of science.

**BSAD 6311. EXPERIMENTAL DESIGN AND RESEARCH METHODS. 3 Hours.**

In-depth coverage of selected topics in the design of research; topics include philosophy of science, theory of measurement, complex experimental and quasi-experimental designs.

**BSAD 6312. REGRESSION. 3 Hours.**

The theoretical and practical aspects of regression analysis. Topics include simple and multiple linear regression, the matrix formulation of regression models, regression diagnostics and remedial measures, collinearity and ridge regression, normal correlation models, and non-linear least squares, time series including ARIMA models are covered. Practical applications of statistical software packages are emphasized.

**BSAD 6313. ANOVA. 3 Hours.**

Experimental design and data analysis, especially as related to business and economic research. Topics include completely randomized designs, complete and incomplete blocks, nested designs, estimation and testing of fixed, random and mixed effects, sampling, nonparametric statistics and analysis of variance.

**BSAD 6314. MULTIVARIATE STATISTICS. 3 Hours.**

Topics include commonly applied multivariate methods such as multiple analysis of variance, factor analytic methods, discriminant analysis, logistic regression, canonical correlations, profile analysis, cluster analysis, and repeated measures. The use available computer packages to conduct data analysis will be stressed.

**BSAD 6315. TIME SERIES. 3 Hours.**

Univariate and multivariate time series; analysis of economic and financial data; out-of-sample forecasting using computer software. Autoregressive-moving average models, vector autoregression, unit roots, co-integration, ARCH and GARCH.

**BSAD 6316. FINANCIAL ECONOMETRICS. 3 Hours.**

In-depth study of the econometric tools and techniques used in empirical finance research. Course emphasizes data extraction and analysis of common finance databases, as well as the theoretical basis for current empirical finance techniques and methods.

**BSAD 6317. APPLIED BUSINESS & ECONOMICS DATA ANALYSIS I. 3 Hours.**

The course develops an understanding of basic statistical and econometric techniques. Participants exploit real data and computational power to uncover patterns/trends and examine relationships. There is a focus on conceptual frameworks and the application of techniques to data sets in various fields. Participants learn how to use statistical packages such as R, SAS, and STATA to apply the tools to real data. Participants will complete an empirical analysis paper. Prerequisite: BSTAT 5325 or consent of instructor.

**BSAD 6318. APPLIED BUSINESS AND ECONOMICS DATA ANALYSIS II. 3 Hours.**

The course covers cross-section, panel data, and limited dependent variables methods. Topics may include analysis of natural experiments/differences-in-differences, panel data methods, instrumental variable estimation, simultaneous equation models, sample selection corrections, and limited dependent variable and hierarchical models. Participants learn how to use statistical packages such as R and SAS, to apply these methods to data to examine causal relationships. They build an understanding of appropriate methods for different research design. Participants will complete an empirical research paper. Prerequisite: ECON 5336 or BSAD 6317 or consent of the instructor; cross referenced with ECON 5339.

**BSAD 6319. BUSINESS & ECONOMIC FORECASTING. 3 Hours.**

This applied course provides students the foundation to analyze business, economic, and financial data to develop forecasts using current statistical and computing tools. Emphasis is on methods that allow students to capture trending and seasonal patterns present in the data and other predictable variations hiding in plain sight, including temporal correlation. Once equipped with appropriate models, including ARIMA methods, students learn how to use the extracted information to project into the future. Critical thinking will be strengthened, as students will select an appropriate forecasting model and demonstrate its efficacy against reasonable alternatives. Prerequisite: ECON 5336 or BSAD 6317 or consent of the instructor.

**BSAD 6320. CAUSAL INFERENCE FOR BUSINESS DECISIONS. 3 Hours.**

Students learn methods to identify and measure the outcomes of business decisions. In particular, students will learn various issues pertaining to the misattribution of causal effects. The course surveys multiple methods to overcome the misidentification problem. Students will engage in empirical analysis. Prerequisite: ECON 5336 or BSAD 6317 and ECON 5339 or BSAD 6318.

**BSAD 6321. FOUNDATIONS OF STRUCTURAL EQUATION MODELING. 3 Hours.**

The purpose of this course is to provide a foundation into structural equation modeling (SEM) techniques and issues as well as hands-on training with SEM software. Application of basic techniques such as confirmatory factor analysis (CFA), mediation and moderation in SEM, and multi-group analyses will be covered. Students must have taken a graduate course on regression. Prerequisite: Multivariate.

**BSAD 6322. MODELING IN BUSINESS RESEARCH. 3 Hours.**

A wide range of modeling techniques such as game theory in economics, discrete choice models in marketing and dynamical stochastic models will be discussed. The course focuses on model development to match mathematical framework and features to the underlying research setting and estimation/model selection techniques. Examples drawing from multiple research disciplines will be used to demonstrate relevant techniques and design principles step by step.

**BSAD 6323. DATA ANALYTICS SEMINAR. 3 Hours.**

The imperative to harness vast amounts of data has spawned a number of tools and techniques that complement traditional statistical approaches. From a research perspective, these tools and techniques afford new ways of collecting and analyzing data. This seminar will introduce students to contemporary data analytic techniques, including social network analysis, text analysis, machine learning and AI, and their applications in research.

**BSAD 6330. NONPARAMETRIC STATISTICS. 3 Hours.**

A survey of statistical tools which may be used when the normal assumptions of parametric statistics cannot be made; including procedures for categorical data, methods involving ranks, bootstrapping, and Kolmogorov-Smirnov type techniques. Cross listed with BSTAT 5330. Prerequisite: BSTAT 5325 or equivalent.

**BSAD 6392. DOCTORAL RESEARCH AND TEACHING COLLOQUIUM. 3 Hours.**

Review of the research process and contemporary developments in the methodology and design of empirical research in the major fields of study represented in the doctoral program. Review of teaching methods for effective classroom instruction. May be repeated for credit.

**BSAD 6399. DISSERTATION. 3 Hours.****BSAD 6699. DISSERTATION. 6 Hours.****BSAD 6999. DISSERTATION. 9 Hours.****BSAD 7399. DOCTORAL DEGREE COMPLETION. 3 Hours.**

This course may be taken during the semester in which a student expects to complete all requirements for the doctoral degree and graduate. Enrolling in this course meets minimum enrollment requirements for graduation, for holding fellowships awarded by The Office of Graduate Studies and for full-time GTA or GRA positions. Students should verify that enrollment in this course meets other applicable enrollment requirements. To remain eligible in their final semester of study for grants, loans or other forms of financial aid administered by the Financial Aid Office must enroll in a minimum of 5 hours as required by the Office of Financial Aid. Other funding sources may also require more than 3-hours of enrollment. Additional hours may also be required to meet to requirements set by immigration law or by the policies of the student's degree program. Students should contact the Financial Aid Office, other sources of funding, Office of International Education and/or their graduate advisor to verify enrollment requirements before registering for this course. This course may only be taken twice. Students who do not complete all graduation requirements while enrolled in this course must enroll in a minimum of 6 dissertation hours (6699 or 6999) in their graduation term. Graded P/F/R.

## COURSES

**BSTAT 2305. INTRODUCTORY STATISTICS FOR BUSINESS ANALYTICS. 3 Hours. (TCCN = BUSI 2305)**

Guiding business and economic decision-making with the use of descriptive and inferential statistical techniques. Topics include the collection, description and summarization of business and economic data; probability as a foundation of business intelligence; discrete and continuous random variables, their probability and sampling distributions, and their application in business analytics; estimation and confidence intervals for (and tests of hypotheses regarding) the population mean in business settings; and correlation and linear regression analysis as business decision-making tools. Software is used to conduct analyses throughout the course.

**BSTAT 3321. INTERMEDIATE STATISTICS FOR BUSINESS ANALYTICS. 3 Hours.**

Informing business and economic decision-making with intermediate-level tools of business analytics. Topics can include the quality and representativeness of data; conditional probability; statistical independence; business applications of discrete and continuous probability distributions at the intermediate level; multiple-population inference; non-parametric methods; and intermediate regression analysis. Both spreadsheet and statistical software are used to conduct analyses throughout the course. Prerequisite: MATH 1308 or BSTAT 2305.

**BSTAT 3322. ADVANCED STATISTICS FOR BUSINESS ANALYTICS. 3 Hours.**

Advanced statistical methods oriented toward predictive analytics and multivariate methods in business settings. Topics can include experimental design; regression cross-validation; logistic regression; classification and regression trees; cluster analysis; factor analysis and multi-dimensional scaling; and time series analysis and forecasting. Prerequisite: BSTAT 3321.

**BSTAT 5301. FOUNDATIONS OF ANALYTICS. 3 Hours.**

Introduction to statistical learning for business analytics, designed to prepare graduate students to become competent consumers of data analytics and statistical information that they will encounter in their professional and personal lives. Students should be able to perform basic statistical analyses and to think critically when interpreting statistical results. Topics include data visualization, spreadsheet analytics, descriptive statistics, probability, estimations, hypothesis testing, and simple regression.

**BSTAT 5303. QUANTITATIVE ANALYSIS. 3 Hours.**

Study of the methods of quantitative analysis used in business administration. Topics include matrix algebra, systems of linear equations, differential and integral calculus, linear programming, classical optimization, and a survey of management science models. Prerequisite: MATH 1315.

**BSTAT 5325. ADVANCED METHODS FOR ANALYTICS. 3 Hours.**

Advanced statistical learning for business analytics designed to prepare graduate students to become competent producers and consumers of predictive analytics and statistical information and to use evidenced based managerial decision making in their careers. They should be able to recognize the strengths and weaknesses of applicable techniques and when additional expertise is required. Topics include multiple regression, correlation, logistic regression, discriminant analysis, clustering, and classification and regression trees. It is strongly recommended that students who have no recent courses in statistics take BSTAT 5301 prior to BSTAT 5325.

**BSTAT 5330. Nonparametric Statistics. 3 Hours.**

A survey of statistical tools which may be used when the normal assumptions of parametric statistics cannot be made; including procedures for categorical data, methods involving ranks, bootstrapping, and Kolmogorov-Smirnov type techniques. Cross-listed with BSAD 6330. Prerequisite: BSTAT 5325 or equivalent.

**BSTAT 5360. COMPUTATIONAL TECHNIQUES FOR BUSINESS ANALYTICS. 3 Hours.**

Computer software is the primary analytical tool for business analytics and modern research methods. Data analysts, statisticians, and researchers need technologies and skills using the computer as a tool for structuring and cleaning data sets, creating validation samples, conducting analyses, fitting models, simulating stochastic systems, model validation, and model presentation. Emphasis is placed on the use of data analytic software. Cross-listed with INSY 5360. Prerequisite: BSTAT 5325 or equivalent.

**BSTAT 5392. SELECTED TOPICS IN BUSINESS STATISTICS. 3 Hours.**

In-depth study of selected topics in business statistics. May be repeated when topics vary.

**BSTAT 5399. GRADUATE BUSINESS ANALYTICS INTERNSHIP. 3 Hours.**

Practical training in business statistics. Analysis of theory applied to real life situations. Course counts as an elective and has a pass/fail grade. No credit will be given for previous experience or activities.

**BSTAT 6382. INDEPENDENT STUDIES IN BUSINESS STATISTICS. 3 Hours.**

Extensive analysis of a business statistics topic.

## COURSES

**BUSA 2211. BUSINESS DATA LITERACY AND VISUALIZATION. 2 Hours.**

This course is designed to introduce business data literacy and business data visualization. The course will cover data fundamentals including both the principles and techniques needed to effectively validate business data, draw insights from business data, and communicate the results. Students will learn the value of visualizations, specific techniques in visualization, and how to best leverage visualization methods to tell engaging business data stories.

**BUSA 4344. SAS TOOLS FOR BUSINESS AND ECONOMICS. 3 Hours.**

SAS is used by many businesses to generate analysis and reports they rely on to make good decisions. This course teaches students the skills needed to use SAS to clean data, visualize data, conduct basic business and economic analysis, and present that information in business-friendly reports using the tools in SAS for effective communication. Prerequisite: BSTAT 3321.

**BUSA 4345. R FOR BUSINESS AND ECONOMIC ANALYSIS. 3 Hours.**

This course teaches students how to analyze, visualize, and summarize data analysis using R. It covers the preliminaries of coding, data cleaning and visualization, and report writing using RStudio's markdown package. Students will then use the techniques learned in the course to write a modern, data analysis report using contemporary business or economic data. Prerequisite: BSTAT 3321.

**BUSA 5322. DATA ANALYTICS WITH PYTHON AND MACHINE LEARNING. 3 Hours.**

This course uses Python to give students hands-on experience with web scraping and machine learning. Web scraping gives students the ability to collect data from webpages that would be difficult to acquire otherwise. Machine learning techniques covered in this class include linear regression and classification, trees and tree-based methods such as random forests, neural networks, support vector machines, clustering, and dimension reduction methods. This class will help students learn to use Python in a professional context, and students will add supervised and unsupervised machine learning techniques to their economic analysis toolkit. Prerequisite: ECON 5336 or BSTAT 5325 or consent of instructor.

**BUSA 5344. SAS TOOLS FOR BUSINESS AND ECONOMICS. 3 Hours.**

SAS is used by many businesses to generate analysis and reports they rely on to make good decisions. This course teaches students the skills needed to use SAS to clean data, visualize data, conduct basic business and economic analysis, and present that information in business-friendly reports using the tools in SAS for effective communication. Prerequisite: BSTAT 3321.

**BUSA 5345. R FOR BUSINESS AND ECONOMIC ANALYSIS. 3 Hours.**

This course teaches students how to analyze, visualize, and summarize data analysis using R. It covers the preliminaries of coding, data cleaning and visualization, and report writing using RStudio's markdown package. Students will use the techniques learned in the course to write a modern, data analysis report using contemporary business or economic data. Prerequisite: BSTAT 3321.

## COURSES

**CE 1000. FRESHMAN UNDERGRADUATE RESEARCH. 0 Hours.**

Freshman level undergraduate research. Prerequisite: Departmental good standing and permission of instructor. May be taken a maximum of 3 times.

**CE 1105. INTRODUCTION TO CIVIL ENGINEERING. 1 Hour.**

Introduction to basic civil engineering practice. There are several writing assignments and an oral presentation. Use of spreadsheet and word processor software in solving civil engineering problems and presenting solutions. Professional engineering licensure and the various specializations within civil engineering are covered.

**CE 1252. COMPUTER TOOLS - AUTOCAD. 2 Hours.**

Introduction to computer aided design, using AutoCAD. Creation of precise two-and/or three- dimensional engineering drawings and solid models. Prerequisite: Grade of C or better in MATH 1302.

**CE 1353. INTRODUCTION TO COMPUTER AIDED DESIGN TOOLS IN CIVIL ENGINEERING. 3 Hours.**

An introduction to computer aided design using AutoCAD interface built in Civil 3D. Students will be taught CAD commands, tools, 2D drawing objects, multi-view drawing, layer management, linetypes, object snap, polar tracking, and annotation. Civil 3D concepts and essential functions for creating, designing, and analyzing civil engineering drawings will be covered. Prerequisite: Grade of C or better in MATH 1421 (or concurrent enrollment) or MATH 1426 (or concurrent enrollment).



**CE 2000. SOPHOMORE UNDERGRADUATE RESEARCH. 0 Hours.**

Sophomore level undergraduate research. Prerequisite: Departmental good standing and permission of instructor. May be taken a maximum of 3 times.

**CE 2152. COMPUTER TOOLS - MATHCAD. 1 Hour.**

Introduction to computer aided mathematics, using Mathcad. Solution of engineering problems involving systems of simultaneous linear and nonlinear equations and elementary calculus, use of the tools for visualization. Prerequisite: Grade of C or better in PHYS 1443.

**CE 2153. COMPUTER TOOLS - CIVIL 3D. 1 Hour.**

Introduction to civil engineering construction documentation and building information modeling (BIM) using AutoCAD Civil 3D. Prerequisite: Grade of C or better in CE 1252.

**CE 2191. PROBLEMS IN CIVIL ENGINEERING. 1 Hour.**

Selected problems in civil engineering on an individual or group basis. Reference material is assigned and progress conferences are held frequently, by arrangement, with a faculty supervisor. Prerequisite: permission of the chair of the department and sophomore classification in civil engineering.

**CE 2221. DYNAMICS. 2 Hours.**

Planar and spatial kinematics and kinetics of particles and rigid bodies utilizing Newton's Laws of Motion, the principle of work and energy, and the principle of impulse and momentum; introduction to single degree of freedom vibration. Prerequisite: Grade of C or better in CE 2311; grade of C or better in MATH 2425.

**CE 2291. PROBLEMS IN CIVIL ENGINEERING. 2 Hours.**

Selected problems in civil engineering on an individual or group basis. Reference material is assigned and progress conferences are held frequently, by arrangement, with a faculty supervisor. Prerequisite: permission of the chair of the department and sophomore classification in civil engineering.

**CE 2311. STATICS. 3 Hours.**

Vector algebra; composition and resolution of forces; equivalence of force couple systems; equilibrium of force systems acting on particles, and force - couple systems acting on rigid bodies, and systems of rigid bodies; internal forces in rigid bodies; shear and moment diagrams; centroids and moments of inertia; frictional forces. Prerequisite: Grade of C or better in PHYS 1443.

**CE 2312. STATICS AND DYNAMICS FOR NON-CE MAJORS. 3 Hours.**

Principles of forces and force systems, resultants and components of force systems, forces due to friction, condition of equilibrium, forces acting on members of trusses and frame structures, centroids and moments of inertia, review of kinematics and kinetics of particle motion, and two-dimensional motion of rigid bodies. CE 2312 cannot be substituted for CE 2221 and CE 2311. Prerequisite: PHYS 1443 and MATH 2425 or concurrent enrollment.

**CE 2313. MECHANICS OF MATERIALS I. 3 Hours.**

Concepts of stress and strain; stress-strain relationships. Behavior of members subjected to tension, compression, shear, bending, torsion, and combined loading. Deflections and elastic curves, shear and bending moment diagrams for beams, and column theory. Prerequisite: Grade of C or better in CE 2311; Grade of C or better in MATH 2425.

**CE 2331. ENGINEERING MEASUREMENT AND COMPUTER MODELING. 3 Hours.**

Principles and theories of physical measurements of spatial quantities; the use of surveying instruments; introduction to engineering using computer modeling programs; and organization and programming for computer solutions. Prerequisite: Grade of C or better in CE 2153.

**CE 2391. PROBLEMS IN CIVIL ENGINEERING. 3 Hours.**

Selected problems in civil engineering on an individual or group basis. Reference material is assigned and progress conferences are held frequently, by arrangement, with a faculty supervisor. Prerequisite: Permission of the chair of the department.

**CE 3000. JUNIOR UNDERGRADUATE RESEARCH. 0 Hours.**

Junior level undergraduate research. Prerequisite: Departmental good standing and permission of instructor. May be taken a maximum of 3 times.

**CE 3131. ENVIRONMENTAL ANALYSIS. 1 Hour.**

Laboratory examinations of water, wastewater, and air. Water and air quality parameters and their significance. Sources and types of pollutants and their effects. Prerequisite: Concurrent enrollment in CE 3334 and Permission of the CE Chair or Admission to the CE Professional Program.

**CE 3142. APPLIED FLUID MECHANICS LAB. 1 Hour.**

Fluid flow measurements studied by means of performed laboratory experiments and/or digital computer programming of relevant equations. Prerequisite: Concurrent enrollment in CE 3305 and Permission of the CE Chair or Admission to the CE Professional Program.

**CE 3143. PROPERTIES AND BEHAVIOR OF SOILS. 1 Hour.**

An introduction to determination of civil engineering properties of soil and their behavior, identification, grain size analysis, Atterberg limits, compaction, permeability, consolidation, and shear strength. Also an introduction to sampling of soil materials. Prerequisite: Concurrent enrollment in CE 3343 and Permission of the CE Chair or Admission to the CE Professional Program.

**CE 3210. CIVIL ENGINEERING COMMUNICATIONS. 2 Hours.**

Technical writing, oral communication, professional presentations, and other related topics. Prerequisite: Grade of C or better in COMS 2302 and Permission of the CE Chair or Admission to the CE Professional Program.

**CE 3253. APPLICATIONS OF COMPUTER-BASED DESIGN PROGRAMS IN CIVIL ENGINEERING. 2 Hours.**

Applications of computer-based design programs including AutoCAD Civil 3D in civil engineering projects. Prerequisite: Grade of C or better in CE 2153 and CE 2331, and Permission of the CE Chair or Admission to the CE Professional Program.

**CE 3300. INTRODUCTION TO SUSTAINABLE ENGINEERING. 3 Hours.**

Introduction to key sustainability concepts and challenges. The engineering design process and consideration of sustainability. Techniques for generating creative and innovative alternative solutions to sustainability problems. Use of life cycle assessment to quantify environmental, economic, and social impacts of various alternatives. Methods to incorporate life cycle assessment into alternatives evaluation. Case study project. Prerequisite: Admission to an Engineering Professional Program or Junior Level Standing.

**CE 3301. STOCHASTIC MODELS FOR CIVIL ENGINEERING. 3 Hours.**

Basic theory of probability and statistics with practical applications to civil and environmental engineering problems. Emphasis on sampling, distribution functions, tests of significance, and regression modeling. Prerequisite: Grade of C or better in MATH 2425; Permission of the CE Chair or Admission to the CE Professional Program.

**CE 3302. TRANSPORTATION ENGINEERING. 3 Hours.**

Planning, design, and operation of transportation facilities. Characteristics of vehicle movement; basic geometric design of highways; traffic flow relations in traffic streams; highway capacity; traffic engineering; and procedures for transportation planning. Prerequisite: Grade of C or better in CE 2331; and Grade of C or better in either CE 3301 or IE 3301 and Permission of the CE Chair or Admission to the CE Professional Program.

**CE 3305. BASIC FLUID MECHANICS. 3 Hours.**

Fundamentals of fluid statics, kinematics of fluid flow, fluid energy, fluid forces, similitude, and dimensional analysis. Related to steady flow of incompressible fluids in confined and free surface systems. Prerequisite: Grade of C or better in CE 2311; Grade of C or better in MATH 3319 or concurrent enrollment; Permission of the CE Chair or Admission to the CE Professional Program.

**CE 3311. CONSTRUCTION ENGINEERING. 3 Hours.**

Principles of construction engineering and the project management process, value engineering, specifications, different construction contracts and delivery methods, estimating and scheduling fundamentals and project control, and management of construction process. Prerequisite: Grade of C or better in IE 2308 and Permission of the CE Chair or Admission to the CE Professional Program.

**CE 3334. PRINCIPLES OF ENVIRONMENTAL ENGINEERING. 3 Hours.**

Physical, chemical, and biological unit operations and processes in an air, water, and land environment. Prerequisites: Grade of C or better in CHEM 1465 or CHEM 1442; Grade of C or better in CE 3305; concurrent enrollment in CE 3131 and Permission of the CE Chair or Admission to the CE Professional Program.

**CE 3341. STRUCTURAL ANALYSIS. 3 Hours.**

Structural analysis/design process, structural forms, and basic structural elements. Analysis of statically determinate structures including beams, trusses, frames, and composite structures, shear and moment diagrams, influence lines, and moving loads. Methods to compute deflections including double integration, moment area, and virtual work. Methods of analysis for statically indeterminate structures including consistent deformation, slope deflection and moment distribution. Use of structural analysis programs. Prerequisite: Grade of C or better in CE 2313 and Permission of the CE Chair or Admission to the CE Professional Program.

**CE 3342. WATER RESOURCES ENGINEERING. 3 Hours.**

Hydrologic cycle, precipitation, evapotranspiration, water budget, rainfall-runoff, hydrograph, reservoir and streamflow routing, groundwater flow, catchment hydrology, probability concepts in design, hydrologic modeling, open channel and pipe network hydraulics, pumps, urban stormwater drainage. Prerequisite: Grade of C or better in CE 3301; grade of C or better in CE 3305; concurrent enrollment in CE 3142 and Permission of the CE Chair or Admission to the CE Professional Program.

**CE 3343. SOIL MECHANICS. 3 Hours.**

An introduction to the significant geophysical and soil science properties and behavior of materials making up the earth's crust as they apply to civil engineering, sources of materials, classification, plasticity, permeability, stress distribution, consolidation, shear strength, and settlement. Also an introduction to basic foundation engineering concepts. Prerequisite: Grade of C or better in CE 2313; concurrent enrollment in CE 3143 and Permission of the CE Chair or Admission to the CE Professional Program.

**CE 3361. PROPERTIES & BEHAVIOR OF CIVIL ENGINEERING MATERIALS. 3 Hours.**

The nature and properties of materials used in civil engineering such as structural metals, concrete, timber, and bituminous materials. The engineering application and performance of materials are emphasized. Laboratory experimentation is also used to investigate properties and behavior of civil engineering materials. Prerequisite: Grade of C or better in CE 2313; Grade of C or better in CE 3143; Permission of the CE Chair or Admission to the CE Professional Program.

**CE 4000. SENIOR UNDERGRADUATE RESEARCH. 0 Hours.**

Senior level undergraduate research. Prerequisite: Departmental good standing and permission of instructor. May be taken a maximum of 3 times.

**CE 4191. PROBLEMS IN CIVIL ENGINEERING. 1 Hour.**

Selected problems in civil engineering on an individual or group basis. Reference material is assigned and progress conferences are held frequently, by arrangement, with a faculty supervisor. Prerequisite: permission of the chair of the department and sophomore standing in civil engineering.

**CE 4291. PROBLEMS IN CIVIL ENGINEERING. 2 Hours.**

Selected problems in civil engineering on an individual or group basis. Reference material is assigned and progress conferences are held frequently, by arrangement, with a faculty supervisor. Prerequisite: permission of the department chairperson and sophomore standing in civil engineering.

**CE 4300. ADVANCED TOPICS IN CIVIL ENGINEERING. 3 Hours.**

Advanced topics of current interest in any one of the various fields of civil engineering. The subject title to be listed in the class schedule. May be repeated for credit when topic changes. Prerequisite: changes with topic; consent of instructor required and Admission to the CE Professional Program.

**CE 4301. ADVANCED TOPICS IN CIVIL ENGINEERING WITH LAB. 3 Hours.**

Advanced topics of current interest in any one of the various fields of civil engineering. The subject title to be listed in the class schedule. May be repeated for credit when topic changes. Prerequisite: Changes with topic; Consent of instructor required and Admission to the CE Professional Program.

**CE 4302. ADVANCED CONCRETE MATERIALS. 3 Hours.**

Providing a practical understanding of design and characterization of advanced concrete materials, this course is intended for graduate and senior undergraduate students who want to advance their knowledge in new concepts of materials in construction. Topics include the study of properties at the nanoscale and how they affect the material's properties at the macro level. Lectures will focus on the advances in the design and technology of cement based materials, with particular emphasis on the evolution of nanotechnology in construction. Prerequisite: Grade of C or better in CE 3361 and admission to the CE Professional Program.

**CE 4303. CONSTRUCTION PROJECT ADMINISTRATION. 3 Hours.**

Topics in construction management and project administration, such as project delivery system, documentation and specification, electronic project administration, construction safety, risk allocation and liability sharing, changes and extra work, claims and disputes, and project closeout. Credit not granted for CE 4303 and CE 5342. Prerequisite: Grade of C or better in CE 3311 and admission to the CE Professional Program.

**CE 4304. CONSTRUCTION CONTRACTS, SPECIFICATIONS, & ADMINISTRATION. 3 Hours.**

Types of construction contracts, contractual relationship between general contractor and owner, contractual relationship between general contractor and subcontractors, legal issues in construction administration, insurance, and concepts in value engineering. Reading and evaluating specifications, CSI Master Format. Credit not granted for both CE 4304 and CE 5378. Prerequisite: Grade of C or better in CE 3311 and admission to the CE Professional Program.

**CE 4305. TRENCHLESS TECHNOLOGY METHODS. 3 Hours.**

Pipeline and utility design, construction and renewal. Topics include pipeline infrastructure structural considerations, planning and construction considerations, pipe materials, and trenchless technologies. Prerequisite: Grade of C or better in CE 3311 and admission to the CE Professional Program.

**CE 4306. INFRASTRUCTURE ASSET MANAGEMENT. 3 Hours.**

Infrastructure inventory, inspection, and life cycle costs. Topics include pipeline deterioration parameters, asset management technologies, risk assessment, government regulations and case studies. Prerequisite: Grade of C or better in CE 3311 and admission to the CE Professional Program.

**CE 4307. CONSTRUCTION SUSTAINABILITY. 3 Hours.**

Types of construction contracts, contractual relationship between general contractor and owner, contractual relationship between general contractor and subcontractors, legal issues in construction administration, insurance, and concepts in value engineering. Reading and evaluating specifications, CSI Master Format. Credit not granted for both CE 4307 and CE 5382. Prerequisite: Grade of C or better in CE 3311 and admission to the CE Professional Program.

**CE 4308. TEMPORARY STRUCTURES. 3 Hours.**

Analysis and design of temporary structures. Topics include loads on temporary structures, shoring, formwork, falsework, scaffolding, bracing, soldier beam and lagging, sheet piling, equipment bridges, and support of existing structures. Prerequisite: Grade of C or better in CE 3341 and CE 3343; Admission to the CE Professional Program.

**CE 4309. ADVANCED MATERIALS MECHANICAL TESTING AND CHARACTERIZATION. 3 Hours.**

Providing comprehensive understanding of the mechanical property characterization of advanced materials and composites, this course is intended for senior undergraduate and graduate students who want to improve their knowledge in new applications of materials in engineering concepts. Topics include the study and examination of the principles, procedures, and applications of experimental methods for characterizing the deformation and failure behavior of materials at the nano-, micro- and macro- scale. The course consists of lectures and lab sessions. Lectures will focus on an in-depth analysis of the failure of advanced materials with linear/elastic and non-linear behavior, e.g., concrete, engineering metals and alloys, polymers, and advanced ceramics. Laboratory sessions provide hands-on experience on advanced methods for tensile, compression, bending, torsion, multiaxial, indentation, fracture, fatigue, creep, high strain rate and nondestructive testing and evaluation using standards/codes. The course features special sessions focusing on the unique aspects associated with the mechanical property characterization and simulation of advanced composite and nanocomposite materials. Prerequisite: Grade of C or better in CE 3361 and admission to the CE Professional Program.

**CE 4310. SYSTEM EVALUATION IN CIVIL ENGINEERING. 3 Hours.**

Techniques necessary to perform economic and multi-criteria evaluations of civil engineering projects. These will be used to assess the strengths and weaknesses of different decision-making strategies and analyze contemporary topics and case studies in making civil engineering decisions. Prerequisite: Grade of C or better in IE 2308; Grade of C or better in CE 3301.

**CE 4311. URBAN TRANSPORTATION INFRASTRUCTURE PLANNING. 3 Hours.**

Urban transportation system design, planning, transportation modeling, economic theory, travel demand and travel estimation techniques. Prerequisite: Grade of C or better in CE 3302 and Admission to the CE Professional Program.

**CE 4312. STREET AND HIGHWAY DESIGN. 3 Hours.**

The geometric design concepts for urban and rural roadways. Consideration of vehicle and road user characteristics in roadway design, including horizontal and vertical alignments, intersections, interchanges, and roadway cross-section and right-of-way considerations. Prerequisite: Grade of C or better in CE 3302 and Admission to the CE Professional Program.

**CE 4313. TRAFFIC ENGINEERING. 3 Hours.**

Design and control of fixed-time, actuated, and computer-controlled traffic signals; optimization of traffic flow at intersections; capacity analysis of intersections, legal requirements and traffic studies for installation of traffic control devices; characteristics of signs, signals, and markings; traffic laws. Prerequisite: Grade of C or better in CE 3302 and Admission to the CE Professional Program.

**CE 4314. INTRODUCTION TO RAILROAD ENGINEERING. 3 Hours.**

Overview of the railroad industry in the United States; structure of track, base, and foundation; drainage, railroad structures (bridges and retaining walls); geometric design; communications and signaling; maintenance. Credit not granted for both CE 4314 and CE 5334. Prerequisite: Grade of C or better in CE 3302 and Admission to the CE Professional Program.

**CE 4318. MACHINE LEARNING IN CIVIL ENGINEERING. 3 Hours.**

Machine learning is transforming the way we approach problems across all fields of civil and environmental engineering. This course is designed for students across various concentrations to offer a broad perspective on how data science and machine learning can reshape the future of Civil and Environmental engineering. You will learn how machine learning techniques can be applied to analyze and improve a wide range of engineering systems—from smart buildings and geotechnical infrastructure to water resources and transportation networks. Whether working with big data, such as GPS tracking data for traffic flow, satellite images for environmental monitoring, and IoT sensor data in buildings, or small data, such as soil properties for construction site assessment and water distribution system restoration after disasters, machine learning can uncover patterns and insights to improve efficiency, reliability, and resilience of the components or systems. Students will learn how to select and build models for regression, classification, and clustering, and apply them to tackle real-world challenges across various engineering disciplines. Through case studies and practical exercises in Python and Jupyter Notebooks, you will also gain valuable skills in exploratory data analysis, machine learning model construction and validation, and result visualization. Credit not granted for both AREN 4318 and CE 4318. Prerequisite: Grade of A or better in CE 3301 or consent of instructor and admission to the CE Professional Program.

**CE 4319. CIVIL ENGINEERING INFORMATICS. 3 Hours.**

The course introduces students to computer tools, software systems, and AI/machine learning models for collection, analysis, visualization, and interpretation of civil engineering (CE) data. Students will learn Python programming, and importantly their use in cloud computing systems using state of the science, industry-standard platforms from Microsoft and Google. Students will explore wide-ranging data from all CE disciplines. Topics will generally include: (i) creating automated workflows for collecting data from public sources, (ii) working with databases, (iii) understanding data and metadata file formats and standards, (iv) statistical analysis, (v) time-series and spatial analysis, (vi) integration of various data, (vii) basic machine learning models, (viii) interactive data visualizations, and (ix) running programs and tools in cloud computing systems. Prerequisite: Grade of B or better in CE 3301 and admission to the CE Professional Program.

**CE 4320. EARTH STRUCTURES DESIGN. 3 Hours.**

Study of the states of stress and analysis/design techniques associated with cuts, fills, and retaining structures. Includes slope stability, conventional and reinforced earth retaining walls, excavation bracing, and sheet pile wharf structures. Prerequisite: Grade of C or better in CE 3343 and Admission to the CE Professional Program.

**CE 4321. FOUNDATION ENGINEERING. 3 Hours.**

Aspects of design and construction considerations for all types of foundation systems in most soil/rock support conditions, interactions between soils and structures, bearing capacity theories, consolidation, shrink-swell, and settlement. Numerical analyses of design are applied to most of the situations. Prerequisite: Grade of C or better in both CE 3341 and CE 3343 and Admission to the CE Professional Program.

**CE 4322. APPLICATIONS WITH GEOSYNTHETICS. 3 Hours.**

Definitions and properties of geotextiles, geogrids, geonets, geocomposites and geomembranes; reinforcement design applications in rigid and flexible pavements, foundations, embankments, slopes and retaining walls; drainage and filtration application designs, AASHTO design criteria; construction methods. Prerequisite: Grade of C or better in CE 3343 and Admission to the CE Professional Program.

**CE 4323. LANDFILL DESIGN. 3 Hours.**

Introduction and types of landfills, landfill site selection, siting and configuration, compacted and geosynthetic clay liners, final cover design, landfill settlement and slope stability, post closure uses of landfills, leachate and gas generation, collection and removal system, bioreactor landfills and future trends. Prerequisite: Grade of C or better in CE 3343 and Admission to the CE Professional Program.

**CE 4324. MECHANICS OF MATERIALS II. 3 Hours.**

Theories of stress and deformation, stress-strain tensors, stress and strain relationships, stresses due to various loading conditions, theories of failure, energy methods, shear-center, unsymmetrical bending, curved beams, torsion in closed and open cell cross-sections and buckling analysis. Prerequisite: Grade of C or better in CE 2313 and Admission to the CE Professional Program.

**CE 4325. FUNDAMENTALS OF FINITE ELEMENT METHOD. 3 Hours.**

Stiffness method using basic equations and virtual work; element equations using shape functions for axial, beam, frame, two dimensional elements; stiffness methods for three dimensional structures. Flexibility method; finite elements modeling and optimization of idealized structures. Prerequisite: Grade of C or better in CE 3341 and Admission to the CE Professional Program.

**CE 4326. GIS/HYDROLOGIC AND HYDRAULIC MODELING. 3 Hours.**

Use of Geographic Information Systems (GIS) and design of GIS-developed hydrologic/hydraulic models commonly applied in the water resources field. The course will have three main areas of emphasis including: principles and operations of ArcGIS, design and implementation of standard hydrologic and hydraulic models, and the linkage of these models to engineering analysis of current water resources problems including flooding, water quality and water supply. Prerequisite: Grade of C or better in CE 3342 and Admission to the CE Professional Program.

**CE 4327. SITE REMEDIATION ENGINEERING. 3 Hours.**

This course provides practical understanding of the engineering principles and practices associated with the characterization and remediation of contaminated sites. Methods for site characterization and risk assessment will be highlighted while the emphasis will be on remedial action screening processes and technology principles and conceptual design. In-situ and ex-situ treatment processes will be covered, including unit operations, coupled processes, and complete systems within the context of community implementation. Case studies with focus on developing communities will be used and computerized tools for process selection and design will be presented. Prerequisite: Grade of C or better in CE 3334 and Admission to the CE Professional Program.

**CE 4328. WATER SYSTEM DESIGN. 3 Hours.**

Hydraulic/hydrologic analysis and design of municipal water distribution, stormwater collection, and wastewater collection systems. Prerequisite: Grade of C or better in CE 3342 and Admission to the CE Professional Program.

**CE 4330. HYDRAULIC DESIGN. 3 Hours.**

Design methods for appurtenances of water conveyance systems under open channel and pressure flow conditions. Prerequisite: Grade of C or better in CE 3342 and Admission to the CE Professional Program.

**CE 4332. CONSTRUCTION EQUIPMENT, METHODS, & MANAGEMENT. 3 Hours.**

Introduction to the construction industry and the methods, equipment, and management techniques used. Topics include equipment operating characteristics, underground construction, job site safety, and field management. Credit not granted for both CE 4332 and CE 5344. Prerequisite: Grade of C or better in CE 3311 and Admission to the CE Professional Program.

**CE 4334. DRONES & ADVANCED CONSTRUCTION TECHNOLOGY. 3 Hours.**

A practical course for technologies and their applications used on construction job sites. Topics include drones (also known as sUAS, or small unmanned aircraft systems), robotics, extended reality, artificial intelligence, blockchain, wearables, etc. Practical sessions are included to train students to operate drones for various construction applications. Credit not granted for both CE 4334 and AREN 4334. Prerequisite: Grade of C or better in CE 2331; Grade of C or better in CE 3311; Admission to the CE Professional Program.

**CE 4335. GEOTECHNICAL ASPECTS OF CONSTRUCTION. 3 Hours.**

Review of engineering geology and soil mechanics; interpretation of geotechnical reports; site preparation; ground improvement; excavation including supports and dewatering; foundations including consideration of deep foundations and expansive soils; tunneling in soils and rock. Prerequisite: Grade of C or better in CE 3343 and admission to the CE Professional Program.

**CE 4336. HOT MIX ASPHALT DESIGN & CONSTRUCTION. 3 Hours.**

An in-depth study of the properties of constituent materials for asphalt concrete mixtures. Design methods for Hot-Mixes Asphalt (HMA) and Stone Matrix Asphalt (SMA). Theory and practice of asphalt concrete mix for pavements, including specifications and construction methods for hot-mix asphalt and surface treatments. Maintenance and rehabilitation of flexible pavements. Relationships of material engineering properties to pavement design and performance. Prerequisites: Grade of C or better in CE 3361 and Admission to the CE Professional Program.

**CE 4337. PORTLAND CEMENT CONCRETE PAVEMENTS. 3 Hours.**

Portland cement concrete mix design and production. Paving operations. Saw and seal operations. Subgrade preparation. Base selection. Drainage selection, design and construction. Bonded and unbonded concrete overlays. Whitetopping and Ultra-Thin Whitetopping. Concrete pavement restoration; Quality Assurance and Quality Control in Concrete Pavement Construction. Prerequisite: Grade of C or better in CE 3361 and Admission to the CE Professional Program.

**CE 4347. REINFORCED CONCRETE DESIGN. 3 Hours.**

An analysis, design and synthesis course for concrete structures, emphasizing strength design method. Topics include strength and serviceability requirements, design of one way slabs, rectangular beams, flanged sections and columns, for strength, shear, bond, bearing, and serviceability. Building codes, American Concrete Institute (ACI) specifications, material specifications, test methods, and recommended practice documents are involved. Prerequisite: Grade of C or better in CE 3341 and admission to the CE Professional Program.

**CE 4348. STRUCTURAL DESIGN IN STEEL. 3 Hours.**

A design synthesis course for structural steel structures using Allowable Strength Design and Load Resistance Factor Design. Topics include tension members, compression members, flexural members and simple connections. Building codes, American Institute of Steel Construction (AISC) specs, material specs, test methods, and recommended practice documents. Prerequisite: Grade of C or better in CE 3341 and Admission to the CE Professional Program.

**CE 4350. INTRODUCTION TO AIR POLLUTION. 3 Hours.**

An introduction to the air pollution field, including: pollutant types, sources, effects; atmosphere and basic calculations; emission estimates; Clean Air Act; dispersion modeling; air pollution reduction strategies. Prerequisite: Grade of C or better in CE 3334 and Admission to the CE Professional Program.

**CE 4351. PHYSICAL UNIT PROCESSES. 3 Hours.**

Principles of unit process modeling using reactor and kinetic theory, and theory and design of mixing, mass transfer, flocculation, sedimentation, filtration, and gas transfer. Prerequisite: Grade of C or better in both CE 3131 and CE 3334 and Admission to the CE Professional Program.



**CE 4352. PROFESSIONAL PRACTICE. 3 Hours.**

Professional practice issues in the private and public sector are addressed by visiting practitioners. Topics include project management, teamwork, obtaining work, regulatory requirements, specifications, issues in design/build, design alternatives, cost estimation, design and construction drawings, contract and construction law, legal issues, ethics and professionalism, design reports, licensure, lifelong learning, ethical and engineering practice organizations. Learning principles of engineering practice by working as a team is emphasized. Oral and written presentations are required. Prerequisites: Grade of C or better in CE 3210 and CE 3311 and Admission to the CE Professional Program.

**CE 4353. WATER CHEMISTRY. 3 Hours.**

Principles of water chemistry applied to the theory and design of unit processes including coagulation, precipitation, corrosion, oxidation-reduction, and membrane processes. Prerequisites: Grade of C or better in both CE 3334 and CE 3131 and Admission to the CE Professional Program.

**CE 4354. INTRODUCTION TO SOLID WASTE ENGINEERING. 3 Hours.**

This course provides an overview of the various aspects of integrated municipal solid waste management (with the exception of landfilling, covered in CE 4323). Topics covered include waste generation, characterization, and collection; source reduction; waste processing; design of facilities for materials recovery (recycling centers) and energy recovery (combustors and anaerobic digesters); life cycle analysis of solid waste management facilities; case study project. Prerequisite: Grade of C or better in CE 3334 and Admission to the CE Professional Program.

**CE 4355. DESIGN OF WATER AND WASTEWATER TREATMENT FACILITIES. 3 Hours.**

Design of facilities commonly used in water and wastewater treatment plants including pumps, pipelines, channels, flow measurement and control devices, screens, grit removal, mixing, sludge removal, aeration equipment, and chemical feed and storage. Materials of construction, process control interface, and operation and maintenance factors are also discussed. Prerequisite: Grade of C or better in both CE 3334 and CE 3142 and Admission to the CE Professional Program.

**CE 4356. ADVANCED STEEL DESIGN. 3 Hours.**

Covers torsional design of beams, beams with web holes, composite design of beams, lateral-torsional buckling of beams, plate buckling, column design and behavior, frame stability, bracing requirements for compression members. Prerequisite: CE 4348 and Admission to the CE Professional Program.

**CE 4357. INTRODUCTION TO BIOLOGICAL WASTEWATER TREATMENT SYSTEMS. 3 Hours.**

Basic understanding of biological processes used in water quality control and to show how theoretical concepts can be applied in a practical design. The course will include a discussion of the theory, design, and operation of biological systems used for water and wastewater treatment. Credit is not granted for both CE 4357 and CE 5325. Prerequisite: Grade of C or better in CE 3334 and CE 3131; Admission to the CE Professional Program.

**CE 4358. OPEN CONDUIT SYSTEM. 3 Hours.**

Non-pressure conduit and channel flow, surface profiles, steady and gradually varied flow, hydraulic jumps, and specific energy. Prerequisite: Grade of C or better in CE 3342 and Admission to the CE Professional Program.

**CE 4360. DESIGN OF STRUCTURAL MASONRY. 3 Hours.**

Covers masonry unit types and mortar types, reinforcing and connections. Design of beams, columns, pilasters, and walls. Structural behavior and construction practices. Includes plain and reinforced masonry. Building Codes, Masonry Standards Joint Committee (MSJC) specifications, material specifications, test methods, and recommended practice documents. Prerequisite: Grade of C or better in CE 3341 and Admission to the CE Professional Program.

**CE 4361. ADVANCED REINFORCED CONCRETE DESIGN. 3 Hours.**

Advanced topics on structural design of concrete structures. Topics include slender columns, shear walls, torsion, deep beams, brackets, retaining walls, strut and tie model for shear torsion, two-way slabs, and shear friction. Building codes, American Concrete Institute (ACI) specifications, material specifications, test methods, and recommended practice documents are involved. Prerequisite: Grade of C or better in CE 4347 and Admission to the CE Professional Program.

**CE 4363. FUNDAMENTALS OF PRESTRESSED CONCRETE. 3 Hours.**

Introduction to pre-tensioned concrete structures, bonded and unbonded constructions, hardware, stress calculations, section proportioning, flexural design, shear design, prestress losses, deflections, allowable stress, ultimate strength, analysis and design of composite beams, design of prestressed concrete bridges. Both American Concrete Institute (ACI 318 and ACI 319) and American Association of State Highway and Transportation Officials Load and Resistance Factor Design (AASHTO LRFD) provisions will be discussed. Prerequisite: Grade of C or better in CE 4347 and Admission to the CE Professional Program.

**CE 4365. STRUCTURAL WOOD DESIGN. 3 Hours.**

Covers material grade and properties of wood, design criteria using structural lumber, glue laminated lumber and structural panels. Design of bending and compression members, trusses and diaphragms. Building codes, National Design Specification for Wood Construction (NDS) specifications, material specifications, test methods, and recommended practice documents. Prerequisite: Grade of C or better in CE 3341 and Admission to the CE Professional Program.

**CE 4366. FUNDAMENTALS OF FIBER REINFORCED COMPOSITES. 3 Hours.**

Introduction to basic analysis, design and manufacture of composite materials for engineered structures. Fiber materials, tapes, cloths, resin system, elastic constants, matrix formulation, theory of failure. The course will also cover an introduction to design with composites, preliminary design, optimization, processing variables, product design. Prerequisite: Grade of C or better in CE 3341 and Admission to the CE Professional Program.

**CE 4368. ADVANCED STRUCTURAL ANALYSIS. 3 Hours.**

Advanced analysis of indeterminate beams, frames, trusses, arches, and cables. Credit will not be granted for both CE 5351 and CE 4368. Prerequisite: Grade of C or better in CE 3341 and Admission to the CE Professional Program.

**CE 4369. LOADS ON STRUCTURES. 3 Hours.**

Structural analysis of structures under gravity and lateral loads, emphasizing the logical reasoning process of analysis, synthesis and design. Use of recommended practice documents and commercial structural and mathematical software will assist in providing insight and understanding of load requirements, structural behavior and analysis tools. Prerequisite: Grade of C or better in CE 3341 and Admission to the CE Professional Program.

**CE 4383. SENIOR PROJECT. 3 Hours.**

Planning, analysis of alternatives, and designs of selected projects that cross various civil engineering disciplines, and include engineering standards and multiple realistic constraints. Application of computer-aided engineering in analysis and design. A final oral presentation and written report that presents pros and cons of alternative solutions, application of engineering standards and multiple realistic constraints are required. A team approach is emphasized. Prerequisite: Grade of C or better in CE 4352; Grade of C or better in CE 4328 or CE 4347; Completion of all required 3000 level courses and Admission to the CE Professional Program.

**CE 4391. PROBLEMS IN CIVIL ENGINEERING. 3 Hours.**

Selected problems in civil engineering on an individual or group basis. Reference material is assigned and progress conferences are held frequently, by arrangement, with a faculty supervisor. Prerequisite: Permission of the chair of the department.

**CE 4393. INDUSTRIAL INTERNSHIP. 3 Hours.**

Student to experience industrial internship under supervision of an industrial mentor and internship committee. May not be repeated for credit. Credit not granted for both CE 4393 and CE 4394. Prerequisite: Grade of C or better in CE 3341; Grade of C or better in CE 3342; Admission to the CE Professional Program.

**CE 4394. RESEARCH INTERNSHIP. 3 Hours.**

Student to experience research internship under supervision of a CE faculty. May not be repeated for credit. Credit not granted for both CE 4393 and CE 4394. Prerequisite: Grade of C or better in CE 3341; Grade of C or better in CE 3342; Admission to the CE Professional Program.

**CE 4395. SUSTAINABLE ENGINEERING DESIGN PROJECT. 3 Hours.**

Following the engineering design process, students will brainstorm, evaluate, and select among engineering alternatives. Students will evaluate the alternatives based on sustainability criteria, including environmental, economic, and social impacts. Life cycle assessment will be used to quantify environmental and economic impacts of the design alternatives. Students will use a decision-making matrix in selecting among alternatives. Prerequisite: Grade of C or better in CE 3300, Grade of C or better in Societal Context Elective, ECON 2305 or IE 2308 (or concurrent enrollment), Grade of C or better in 6 credit hours of Sustainable Engineering Electives (or concurrent enrollment).

**CE 5191. ADVANCED STUDIES IN CIVIL ENGINEERING. 1 Hour.**

Individual studies of advanced topics under the supervision of a professor or professors. Prerequisite: consent of instructor.

**CE 5300. TOPICS IN CIVIL ENGINEERING. 3 Hours.**

Topics of current interest in the field of civil engineering. The subject title is listed in the class schedule and in the student's record. Topics vary. May be repeated for credit when topic changes. Prerequisite: consent of instructor.

**CE 5301. TOPICS IN CIVIL ENGINEERING WITH LAB. 3 Hours.**

Topics of current interest in the field of civil engineering. The subject title is listed in the class schedule and in the student's record. Topics vary. May be repeated for credit when topic changes. Prerequisite: Consent of instructor.

**CE 5302. ADVANCED CONCRETE MATERIALS. 3 Hours.**

Providing a practical understanding of design and characterization of advanced concrete materials, this course is intended for graduate and senior undergraduate students who want to advance their knowledge in new concepts of materials in construction. Topics include the study of properties at the nanoscale and how they affect the material's properties at the macro level. Lectures will focus on the advances in the design and technology of cement based materials, with particular emphasis on the evolution of nanotechnology in construction. Prerequisite: CE 3361.

**CE 5303. INTRODUCTION TO FINITE ELEMENT. 3 Hours.**

Stiffness method using basic equations and virtual work; element equations using shape functions for axial, beam, frame, two dimensional elements; stiffness method for three dimensional structures. Flexibility method; finite element modeling and optimization of idealized structures. Credit not granted for both CE 4325 and CE 5303. Prerequisite: CE 3341.

**CE 5304. POST-TENSIONED CONCRETE DESIGN. 3 Hours.**

Overview of Post-tensioned Concrete Structures; Allowable Stresses, Ultimate Flexural Strength, and One-Way Shear Design according to ACI 318 and ACI 320; Equivalent Load and Load Balancing Method in Determinate Systems; Equivalent Load, Load Balancing Method, and Secondary Effects in Indeterminate Systems; Idealized and Actual Tendon Layouts in Indeterminate Systems; Post-tensioned Continuous Beams and Intermediate Structures; Post-tensioned One-Way Slabs; Equivalent Frame Method and Computer-Aided Analysis of Equivalent Frames; Post-tensioned Two-Way Slabs; Punching Shear and Design of Headed Shear Stud Reinforcement; Anchorage Zone; Post-tensioned Slabs-on-Ground. Prerequisite: CE 4347.

**CE 5305. FIBER REINFORCED COMPOSITE DESIGN. 3 Hours.**

Introduction to basic analysis, design and manufacture of composite materials for engineered structures. Fiber materials, tapes, cloths, resin systems, elastic constants, matrix formulation, theory of failure. The course will also cover an introduction to design with composites, preliminary design, optimization, processing variables, product design. Credit not granted for both CE 4366 and CE 5305. Prerequisite: CE 3341.

**CE 5306. STRUCTURAL STEEL DESIGN. 3 Hours.**

The basic design course for steel structures emphasizing Load Resistant Factor Design Method. Topics include tension members, compression members, flexural members, and simple connections. Building codes, American Institute of Steel Construction (AISC) specifications, material specifications, test methods, and recommended practice documents. Credit not granted for both CE 4348 and CE 5306. Prerequisite: CE 3341.

**CE 5307. STRUCTURAL TIMBER DESIGN. 3 Hours.**

Covers material grade, properties of wood, design criteria using structural lumber, glue laminated lumber and structural panels. Design of bending and compression members, trusses and shear diaphragms. Building codes, National Design Specifications (NDS), material specifications, test methods, and recommended practice documents. Credit not granted for both CE 4365 and CE 5307. Prerequisite: CE 3341.

**CE 5308. STRUCTURAL MASONRY DESIGN. 3 Hours.**

Covers masonry unit type and grades of mortar types, reinforcing and connectors. Design of beams, columns, pilasters, and walls. Structural behavior and construction practices. Includes plain and reinforced masonry. Building codes, Masonry Standard Joint Committee (MSJC) specifications, material specifications, test methods, and recommended practice documents. Credit not granted for both CE 4360 and CE 5308. Prerequisite: CE 3341.

**CE 5309. PRESTRESSED CONCRETE. 3 Hours.**

Introduction to pre-tensioned concrete structures for bridge and building applications, bonded and unbonded construction, hardware, stress calculations, section proportioning, flexural design, shear design, prestress losses, deflections, allowable stress, ultimate flexural strength design/analysis methods, shear design, analysis and design of composite beams, live load distribution factors for prestressed beams and girders in concrete bridges, compression and tension members. Both American Concrete Institute (ACI 318 and ACI 319) and American Association of State Highway and Transportation Officials Load and Resistance Factor Design (AASHTO LRFD) provisions will be discussed. Credit not granted for both CE 4363 and CE 5309. Prerequisite: CE 4347.

**CE 5310. PLASTIC ANALYSIS AND DESIGN OF STRUCTURES. 3 Hours.**

Behavior of structural members beyond elastic range; plastic analysis of steel and concrete members and framed structures; stepwise incremental load and mechanism methods; yield/failure mechanisms for various types of frames. Use of nonlinear structural analysis programs and design code provisions. Application to earthquake resistant design. Prerequisite: CE 4347 and CE 4348; or equivalent.

**CE 5311. ADVANCED STEEL DESIGN I. 3 Hours.**

Covers torsional design of beams, beams with web holes, composite design of beams, lateral-torsional buckling of beams, plate buckling, column design and behavior, frame stability, bracing requirements for compression members. Prerequisite: CE 4348 or CE 5306.

**CE 5312. ADVANCED CONCRETE DESIGN I. 3 Hours.**

Advanced topics on structural design of concrete structures. Topics include slender columns, shear walls, torsion, deep beams, brackets, retaining walls, strut and tie model for shear torsion, two-way slabs, and shear friction. Building codes, American Concrete Institute (ACI) specifications, material specifications, test methods, and recommended practice documents are involved. Credit not granted for both CE 4361 and CE 5312. Prerequisite: CE 4347.

**CE 5313. GEOTECHNICAL ASPECTS OF CONSTRUCTION. 3 Hours.**

Review of engineering geology and soil mechanics and teaching of the foundation and underground excavation construction solely to graduate students specializing in construction engineering & management. Topics include interpretation of geotechnical reports, embankment construction, foundations on expansive soils, excavation supports, excavation dewatering, deep foundation construction, tunneling in soft ground as well as in soft/hard rock, and trenchless technology piping. Credit not granted for both CE 4335 and CE 5313. Prerequisite: CE 5378.

**CE 5314. ADVANCED STEEL DESIGN II. 3 Hours.**

Covers structural design of beam columns and building connections. Rigid frame and multi-story building design issues. Building codes, American Institute of Steel Construction (AISC) specifications, and recommended practice documents. Prerequisite: CE 4348 or CE 5306.

**CE 5315. ADVANCED MECHANICS OF MATERIALS. 3 Hours.**

Analysis of stresses and strains at a point, stress-strain relationships, stresses due to various loading conditions, theories of failure, energy methods, shear center, unsymmetrical bending, curved beams, torsion in closed and open cell cross-sections, principles of plastic analysis, and buckling analysis. Credit not granted for both CE 4324 and CE 5315. Prerequisite: CE 2313.

**CE 5316. MACHINE LEARNING FOR CIVIL ENGINEERING. 3 Hours.**

Machine learning is transforming the way we approach problems across all fields of civil and environmental engineering. This course is designed for students across various concentrations to offer a broad perspective on how data science and machine learning can reshape the future of Civil and Environmental engineering. You will learn how machine learning techniques can be applied to analyze and improve a wide range of engineering systems—from smart buildings and geotechnical infrastructure to water resources and transportation networks. Whether working with big data, such as GPS tracking data for traffic flow, satellite images for environmental monitoring, and IoT sensor data in buildings, or small data, such as soil properties for construction site assessment and water distribution system restoration after disasters, machine learning can uncover patterns and insights to improve efficiency, reliability, and resilience of the components or systems. Credit not granted for AREN 4318, CE 4318, and CE 5316. Prerequisite: AREN 3301 or CE 3301.

**CE 5317. ENVIRONMENTAL ENGINEERING PROCESS AND ANALYSIS LAB. 3 Hours.**

The course meets for 2 hours of lecture and 3 hours of lab each week. Lectures will cover advanced analytical procedures for the analyses of air, liquid, and other wastes, including optical, Chromatographic, electrical, and other instrumental methods of analysis. Lectures will also review the basics of physical/chemical processes. In the laboratory, students will demonstrate and analyze basic reactor types (CSTR, plug flow, and reactors in series) and treatment of contaminants, including gas transfer, adsorption, advanced oxidation processes, and membrane separation.

**CE 5318. PHYSICAL-CHEMICAL PROCESSES I. 3 Hours.**

Principles of unit process modeling using reactor and kinetic theory, theory and design of mixing, mass transfer, flocculation, sedimentation, filtration and gas transfer. Credit not granted for both CE 4351 and CE 5318. Prerequisite: CE 3131 and CE 3334; or consent of instructor.

**CE 5319. PHYSICAL-CHEMICAL PROCESSES II. 3 Hours.**

Principles of water chemistry applied to the theory and design of unit processes including coagulation, precipitation, corrosion, oxidation-reduction, and membrane processes. Credit not granted for both CE 4353 and CE 5319 Prerequisite: CE 3131 and CE 3334; or consent of instructor.

**CE 5320. TEMPORARY STRUCTURES. 3 Hours.**

Analysis and design of temporary structures. Topics include loads on temporary structures, shoring, formwork, falsework, scaffolding, bracing, soldier beam and lagging, sheet piling, equipment bridges, and support of existing structures. Prerequisite: CE 3341 and CE 3343.

**CE 5321. ENGINEERING FOR ENVIRONMENTAL SCIENTISTS. 3 Hours.**

Fundamental principles of engineering science applicable to the comprehension and design of engineered environmental systems. Includes water and air quality indices; kinetic and reactor theory; mass and energy balances; fluid system theory; and applications of physical, chemical and biological processes in the design of engineered environmental systems. May not be used to satisfy any of the requirements for a graduate degree in Civil Engineering. Prerequisite: PHYS 1441, CHEM 1442, and MATH 2425.

**CE 5322. ADVANCED PHYSICAL-CHEMICAL PROCESSES. 3 Hours.**

The course represents the fundamentals and applications of various advanced physical and chemical unit operations and processes for controlling drinking water quality. The course will cover 1) general overview on the standard, regulations, and goals of drinking water quality, 2) detailed discussion of the theory, design, and operation of advanced physical and chemical unit processes, including but not limited to, sorption, centrifugation, osmotic pressure, membrane separation, chemical oxidation and advanced oxidation, UV technology, and disinfection, and 3) post treatment issues. Prerequisites: CE 5318.

**CE 5323. SUSTAINABLE ENGINEERING. 3 Hours.**

Introduction to sustainability concepts and challenges through evaluation of case studies. The engineering design process and consideration of sustainability. Techniques for generating creative and innovative alternative solutions to sustainability problems. Training on Simapro software for life cycle assessment of environmental impacts. Evaluation of economic and social impacts of alternatives and decision-making.

**CE 5324. INFRASTRUCTURE DURABILITY & MONITORING. 3 Hours.**

Durability and total cost of ownership for infrastructure; the physical, mechanical and chemical characteristics of deterioration and degradation for steel and other metals, Portland cement concrete, and organic materials; practical aspects of identification and remediation; a research literature review related to material durability.

**CE 5325. BIOLOGICAL PROCESSES FOR WASTEWATER TREATMENT. 3 Hours.**

Biological processes used in water quality control. Includes principles from microbiology and biochemistry applied to suspended and attached growth systems. Prerequisite: CE 5318.

**CE 5326. WATER AND WASTEWATER TREATMENT FACILITIES DESIGN. 3 Hours.**

Design of facilities commonly used in water and wastewater treatment plants including pumps, pipelines, channels, flow measurement and control devices, screens, grit removal, mixing, sludge removal, aeration equipment, and chemical feed and storage. Materials of construction, process control interface, and operation and maintenance factors are also discussed. Credit not granted for both CE 4355 and CE 5326. Prerequisite: CE 3131, CE 3142, and CE 3334.

**CE 5327. ADVANCED PROJECT CONTROL. 3 Hours.**

Fundamentals of construction estimating and scheduling, earned value, value engineering, risk allocations, jobsite management, safety and closeout.

**CE 5328. FUNDAMENTALS OF AIR POLLUTION. 3 Hours.**

An introduction to the air pollution field including: pollutant types, sources, effects; atmosphere and basic calculations; emission estimates; Clean Air Act; dispersion modeling; air pollution reduction strategies. Credit not granted for both CE 4350 and CE 5328. Prerequisite: concurrent enrollment in CE 3334 or CE 5321 or consent of instructor.

**CE 5329. CIVIL ENGINEERING INFORMATICS. 3 Hours.**

The course introduces students to computer tools, software systems, and AI/machine learning models for collection, analysis, visualization, and interpretation of civil engineering (CE) data. Students will learn Python programming, and importantly their use in cloud computing systems using state of the science, industry-standard platforms from Microsoft and Google. Students will explore wide-ranging data from all CE disciplines. Topics will generally include: (i) creating automated workflows for collecting data from public sources, (ii) working with databases, (iii) understanding data and metadata file formats and standards, (iv) statistical analysis, (v) time-series and spatial analysis, (vi) integration of various data, (vii) basic machine learning models, (viii) interactive data visualizations, and (ix) running programs and tools in cloud computing systems. Credit not granted for both CE 4319 and CE 5329. Prerequisite: CE 2153 & CE 3301.

**CE 5330. CHARACTERISTICS OF TRAFFIC. 3 Hours.**

The fundamental elements of traffic - the driver, the vehicle, and the roadway - are considered and then extended into studies of streams of traffic flow. Techniques of conducting traffic engineering studies, including methods of measuring speed, volume, and density, are covered along with methods for the determination of capacity on freeways and rural highways (uninterrupted flow facilities). Parking and accident studies are also included. Prerequisite: CE 3302; and CE 3301 or concurrent registration therein.

**CE 5331. TRAFFIC ENGINEERING OPERATIONS. 3 Hours.**

Methods of traffic regulation and control optimization. Traffic laws, motorist communication by means of traffic control devices, and the design and operation of both fixed time and actuated traffic signals at intersections. Analysis and design techniques for intersections using capacity and level of service concepts. Credit will not be granted for both CE 4313 and CE 5331. Prerequisite: CE 3302; and CE 3301 or concurrent registration therein.

**CE 5332. HIGHWAY DESIGN. 3 Hours.**

Geometric considerations necessary for the design of city streets, highways, and freeways such as the cross sections, vertical and horizontal alignment, sight distances and stopping distances. Includes the design of maneuver areas, channelization, ramps, intersections, and interchanges. Credit will not be granted for both CE 4312 and CE 5332. Prerequisite: CE 3302.

**CE 5333. TRAFFIC CONTROL SYSTEMS. 3 Hours.**

Control algorithms and optimization of splits, offsets, and cycle lengths for arterial progression and traffic signals in networks; computer simulation techniques; problem solving with computer simulation and optimization packages; freeway control using ramp meters and dynamic motorist communications. Prerequisite: CE 4313 or CE 5331 or Equivalent or Consent of Instructor.

**CE 5334. INTRODUCTION TO RAILROAD ENGINEERING. 3 Hours.**

Overview of railroad industry in the United States; structure of track, base, and foundation; drainage; railroad structures (bridges and retaining walls); geometric design; communications and signaling; maintenance. Credit not granted for CE 4314 and CE 5334. Prerequisite: CE 3302.

**CE 5335. AIRPORT ENGINEERING. 3 Hours.**

Airport master planning, for forecasting air travel demand, airside capacity, passenger terminal design, air traffic control, land access planning and design, landside operations, air cargo facility design. Prerequisite: CE 3302.

**CE 5336. PAVEMENT DESIGN. 3 Hours.**

Principles and theoretical concepts of rigid and flexible pavements for highways and airfields; effects of traffic loads, natural forces, and material quality; current design practices; and life cycle cost analysis. Prerequisite: CE 3302, CE 3343, and CE 3361.

**CE 5337. URBAN TRANSPORTATION PLANNING. 3 Hours.**

Theory and application of a comprehensive urban transportation planning methodology. Basic studies of population dynamics, urban growth, land use, forecasting trip generation and distribution, traffic assignment, mode split, evaluation, simulation models, characteristics of mass transit and other non-auto modes, and system design and evaluation. Credit will not be granted for both CE 4311 and CE 5337. Prerequisite: CE 3301 and CE 3302; or consent of instructor.

**CE 5338. SYSTEM EVALUATION. 3 Hours.**

Techniques necessary to perform economic and multi-criteria evaluations of civil engineering projects. These will be used to assess the strengths and weaknesses of different decision-making strategies and analyze contemporary topics and case studies in making civil engineering decisions. Prerequisite: IE 2308 and CE 3301 or IE 3301 or equivalents, or consent of instructor.

**CE 5339. STATISTICS FOR CONSTRUCTION. 3 Hours.**

Point estimation, interval estimation, sample size determination, tests of hypothesis, analysis of variance, linear regression, matrix methods for multiple linear regression, polynomial regression, transformations, non-linear regression. Prerequisite: CE 3301.

**CE 5340. CONSTRUCTION PROJECT ACQUISITION. 3 Hours.**

Fundamentals of acquiring the required goods and services necessary to fulfill the obligations of the construction contract. Service and subcontractor contracts, negotiating tactics and strategies, material pricing; and dispute resolution. The course includes negotiation practice based on typical construction acquisition situations to help prepare the student with experience of negotiating in the real world of construction and business. Prerequisite: consent of instructor.

**CE 5341. PAVEMENT EVALUATION, REHABILITATION AND MANAGEMENT SYSTEMS. 3 Hours.**

Pavement inventory; condition and structural evaluation techniques; serviceability concepts; deterioration modeling; maintenance vs. rehabilitation vs. reconstruction; economic considerations, selection of project alternatives and life cycle cost analysis. Prerequisite: CE 5336 or equivalent.

**CE 5342. CONSTRUCTION PROJECT ADMINISTRATION. 3 Hours.**

Topics in construction management and project administration, such as project delivery system, documentation and specification, electronic project administration, construction safety, risk allocation and liability sharing, changes and extra work, claims and disputes, and project closeout. Credit not granted for CE 4303 and CE 5342.

**CE 5343. ADVANCED BUILDING INFORMATION MODELING. 3 Hours.**

Introduction to current Building Information Modeling (BIM); Discussion of the role of BIM in the Construction Engineering and Management; Revit Architecture, Structure, and MEP; Creating sets, building elements, structural systems, and MEP systems; BIM and clash detection; BIM and Construction Cost Estimating and Scheduling.

**CE 5344. CONSTRUCTION METHODS: FIELD OPERATIONS. 3 Hours.**

Introduction to the methods, equipment, and management techniques used in the construction industry. Topics include equipment operating characteristics, job site safety, and field management. Credit not granted for CE 4332 and CE 5344.

**CE 5345. INFRASTRUCTURE EVALUATION, MAINTENANCE, AND RENEWAL. 3 Hours.**

This course is designed for engineers and managers involved in infrastructure development, sustainability, and replacement. Topics include asset management, inspection, evaluation, maintenance, and renewal alternatives for waste collection and water distribution systems, surface and subsurface drainage, pavements, bridges, culverts, buildings, and other structures. Prerequisite: Consent of instructor.

**CE 5346. OPEN CHANNEL FLOW. 3 Hours.**

Open channel hydraulic principles, flow classification, backwater curves, transitions, obstructions, bends, flood flow computations, and urban watershed applications. Credit not granted for both CE 4358 and CE 5346. Prerequisite: CE 3305 and CE 4328; or consent of instructor.



**CE 5347. ADVANCED HYDROLOGY. 3 Hours.**

Elements of hydrometeorology, infiltration, soil moisture, hydrographs, rainfall runoff relationships, and effects of these factors with regard to water resources, urban watersheds, flood control, and environmental issues. Prerequisite: CE 3342 and CE 4328 or equivalent.

**CE 5348. GROUNDWATER HYDROLOGY. 3 Hours.**

Hydrology and hydrogeology of groundwater to include aquifer and vadose properties and measurements, basic flow systems and solutions, well systems, elementary contaminate transport, water quality, recharge, subsidence, flow system analysis, flow nets, and leaky aquifers. Prerequisite: CE 3342 or consent of instructor.

**CE 5349. ADVANCED GIS AND HYDROLOGIC AND HYDRAULIC MODELING. 3 Hours.**

Use of Geographic Information Systems (GIS) and design of GIS developed hydrologic/hydraulic models commonly applied in the water resources field. The course will have three main areas of emphasis including: principles and operations of ArcGIS, design and implementation of standard hydrologic and hydraulic models, the linkage of these models to engineering analysis of current water resources problems including flooding, water quality and water supply.

**CE 5350. RISK MANAGEMENT. 3 Hours.**

The risk management process including risk identification, monitoring, and control; integrated quantitative cost and schedule risk analysis.

**CE 5351. ADVANCED STRUCTURAL ANALYSIS I. 3 Hours.**

Advanced analysis of indeterminate beams, frames, trusses, arches, and cables. Credit will not be given for both CE 5351 and CE 4368. Prerequisite: CE 3341.

**CE 5352. REMOTE SENSING-HYDROMETEOROLOGY. 3 Hours.**

Atmospheric composition, radiative fluxes, thermodynamics, water vapor, stability, circulation, precipitation processes, fronts, thunderstorms and tropical storms; basics of remote sensing; observing precipitation using weather radar and satellite-borne sensors; prediction of precipitation by numerical weather models. The class will be a combination of lectures and in-class computer-based laboratory exercises. Prerequisite: CE 3342 and CE 4328.

**CE 5353. ADVANCED HYDRAULICS. 3 Hours.**

Flow resistance, St. Venant equations, solution of St. Venant by finite difference methods, dam break problem, water hammer intro to finite elements to open channel flow. Credit will not be granted for both CE 4330 and CE 5353. Prerequisite: CE 5346 and CE 5347; or consent of instructor.

**CE 5354. WATER RESOURCES PLANNING. 3 Hours.**

Historical and current water development concepts. Administrative and allocation concerns. General principles and procedures of water resource planning includes regional, multipurpose, economic and systems considerations. Prerequisites: CE 3301, CE 3342, and IE 2308; or consent of instructor.

**CE 5355. CONSTRUCTION MATERIALS. 3 Hours.**

Principles of construction related to construction regulations and standards, loads, fire safety, acoustics, joints and sealants. Systems of construction involving concrete, steel, wood, masonry, sealants, and soil, and including excavations, below grade construction, formwork, cladding, joints, windows, doors, roofing, and ceilings.

**CE 5356. SURFACE WATER QUALITY MODELING. 3 Hours.**

Contaminant transport and fate in surface water. Engineering methods assessing surface water and transport for water and sediment quality. Modeling dissolved oxygen, chemicals and waterborne substances. Prerequisite: CE 5346.

**CE 5357. HYDROLOGIC TECHNIQUES. 3 Hours.**

A study of current hydrologic techniques and methods for the analysis of hydrologic variables necessary in the design of projects such as bridges, culverts, reservoirs. Techniques involve extreme value statistics, model hydrographs, deterministic and stochastic methods for data analysis. Prerequisite: CE 5347 or consent of instructor.

**CE 5358. SOLID WASTE ENGINEERING. 3 Hours.**

This course provides an overview of the various aspects of integrated municipal solid waste management (with the exception of landfilling, covered in CE 5375). Topics covered include waste generation, characterization, and collection; source reduction; waste processing; design of facilities for materials recovery (recycling centers) and energy recovery (combustors and anaerobic digesters); life cycle analysis of solid waste management facilities; case study project. Credit not granted for both CE 4354 and CE 5358. Prerequisite: CE 3334 or CE 5321 or consent of instructor.

**CE 5359. HUMAN INTERACTION IN THE BUILT ENVIRONMENT. 3 Hours.**

Understanding human interaction in the built environment is critical for assessing comfort levels and system performance. This course would cover theories of human computer interaction, environmental monitoring, and advanced data analytics. Students would be given a hands-on opportunity to build their own data acquisition system to collect and model human behavior. This course meets the emerging trend in a nexus of computer science and facility management. Credit not granted for both AREN 4343 and CE 5359.

**CE 5360. BUILDING SCIENCE II. 3 Hours.**

Building science is critical for accessing human comfort and energy efficiency. In this course, students will be able to understand the basic concepts of thermodynamics (heat transfer, energy balance, psychrometric chart) and apply to building engineering (human comfort, building enclosures, HVAC systems). As a term project, students will learn energy simulation tools. There will be additional tasks to learn EnergyPlus for graduate students. Credit not granted for both AREN 4314 and CE 5360. Prerequisite: AREN 3213.

**CE 5361. DESIGN AND CONSTRUCTION OF ASPHALT CONCRETE. 3 Hours.**

An in-depth study of the properties of constituent materials for asphalt concrete mixtures. Design methods for Hot-Mixes Asphalt (HMA) and Stone Matrix Asphalt (SMA). Theory and practice of asphalt concrete mix for pavements, including specifications and construction methods for hot-mix asphalt and surface treatments. Maintenance and rehabilitation of flexible pavements. Relationships of material engineering properties to pavement design and performance. Credit not granted for both CE 4336 and CE 5361. Prerequisite: CE 3361 or equivalent.

**CE 5362. RIGID PAVEMENTS. 3 Hours.**

Portland cement concrete mix design and production. Paving operations. Saw and seal operations. Subgrade preparation. Base selection. Drainage selection, design and construction. Bonded and unbonded concrete overlays. Whitetopping and ultra-thin whitetopping. Concrete pavement restoration; quality assurance and quality control in concrete pavement construction. Credit not granted for both CE 4337 and CE 5362. Prerequisite: CE 3361 or equivalent.

**CE 5363. CONSTITUTIVE MODELING OF SOILS. 3 Hours.**

Fundamental aspects of elasto-plastic behavior of soils along axisymmetric stress paths, shear strength of soils in light of critical state soil mechanics, and constitutive models to predict soil response under saturated conditions, including Cam Clay and modified Cam Clay models. Prerequisite: CE 3343 or consent of instructor.

**CE 5364. FOUNDATION ANALYSIS AND DESIGN. 3 Hours.**

The design, construction, and performance of footings, rafts, and piles founded on or in sands, clays, silts, stratified soils, and weak rock. Includes the influence of various geologic terrain on selecting foundation type and constructability, in-situ investigations to determine material design parameters, bearing capacity, and settlement of foundations. Credit not granted for both CE 4321 and CE 5364. Prerequisite: CE 3343.

**CE 5365. THEORETICAL SOIL MECHANICS. 3 Hours.**

Theory of consolidation, magnitude, time rate, pore pressure dissipation with variable construction rate and layered soils. Secondary compression, preconsolidation, and preloading. Shear strength of soil. Critical state soil mechanics, dilation and strain-softening in drained shear, pore pressure response in undrained shear, including static liquefaction. Prerequisite: CE 3343 or consent of instructor.

**CE 5366. SOIL DYNAMICS. 3 Hours.**

Fundamental aspects of mechanical behavior and characterization of soils and earth structures subjected to dynamic loads, including wave propagation in soils, dynamic soil properties, liquefaction of soils, dynamic bearing capacity of shallow foundations, seismic design of retaining walls, and seismic slope stability. Prerequisites: CE 2221 and CE 3343; or consent of instructor.

**CE 5367. DESIGN OF EARTH STRUCTURES. 3 Hours.**

Study of the states of stress and analysis techniques associated with cuts, fills, and retaining structures. Includes slope stability, embankment reinforcement, conventional and reinforced earth retaining walls, excavation bracing, and sheet pile wharf structures. Credit not granted for both CE 4320 and CE 5367. Prerequisite: CE 3343 or consent of instructor.

**CE 5368. UNSATURATED SOIL MECHANICS. 3 Hours.**

Fundamental aspects of the mechanical behavior of unsaturated soils, including stress and volumetric state variables, matrix suction measurements and soil-water characteristic curves, shear-strain-strength and volume change responses, suction-controlled laboratory testing techniques and constitutive modeling. Prerequisite: CE 3343; or consent of instructor.

**CE 5369. COMPUTATIONAL GEOTECHNICS. 3 Hours.**

Introduction to analytical, finite differences, and finite element modeling, analyses of embankments, earth dams, slopes, excavation support systems including soldier pile and diaphragm walls, shallow and deep foundation systems, and other geostructures using different geotechnical software. Prerequisite: CE 3343 or consent of instructor.

**CE 5370. EXPERIMENTAL SOIL MECHANICS. 3 Hours.**

Fundamentals of experimental studies of soil behavior, soil properties and their laboratory test methods which include consolidation, direct shear, static triaxial, cyclic triaxial, resonant column, bender elements and other advanced geotechnical laboratory tests, instrumentation and measurement techniques. Prerequisite: CE 3343 or consent of instructor.

**CE 5371. SOIL BEHAVIOR. 3 Hours.**

Fundamental aspects of soil behavior, bonding, crystal structure, surface characteristics, clay mineralogy, soil-water movement, fabric, effective stress concepts, conduction phenomena, consolidation, and shear strength. Prerequisite: CE 3343 or consent of instructor.

**CE 5372. GEOSYNTHETICS. 3 Hours.**

Geosynthetics properties and testing, design of geotextiles, geogrids, geonets, and geomembranes for applications in separation, pavement, embankment and retaining wall reinforcement, soil stabilization, filtration, drainage and liquid barrier, construction guidelines and case histories. Credit not granted for both CE 4322 and CE 5372. Prerequisite: CE 3343 or consent of instructor.

**CE 5374. GROUND IMPROVEMENT. 3 Hours.**

Introduction and types of ground improvement for different problem soils including soft and expansive soils, shallow and deep soil densification, sand drains and wick drains, chemical modification, chemical binders and mechanisms of ground improvement, different types of grouting, deep mixing, stone columns, soil nailing, ground anchors, geosynthetics, MSE walls, reinforced slopes. Prerequisite: CE 3343 or consent of instructor.

**CE 5375. GEOTECHNICAL ASPECTS OF LANDFILLS. 3 Hours.**

Introduction and types of landfills, landfill site selection, siting and configuration, compacted and geosynthetic clay liners, final cover design, landfill settlement and slope stability, post closure uses of landfills, leachate and gas generation, collection and removal system, bioreactor landfills and future trends. Credit not granted for both CE 4323 and CE 5375. Prerequisite: CE 3343 or consent of instructor.

**CE 5377. CONSTRUCTION FINANCE. 3 Hours.**

Financial aspects and job costing of a construction project. Includes project management principles, budgets, cost codes, cost-to-complete, and financial reports specific to the management of a construction company and project control.

**CE 5378. CONSTRUCTION CONTRACTS, SPECIFICATIONS, & ADMINISTRATION. 3 Hours.**

Types of construction contracts, contractual relationship between general contractor and owner, contractual relationship between general contractor and subcontractors, legal issues in construction administration, insurance, and concepts in value engineering. Reading and evaluating specifications, CSI Master Format. Credit not granted for CE 4304 and CE 5378. Prerequisite: Consent of instructor.

**CE 5380. MANAGEMENT OF INFRASTRUCTURE ASSETS. 3 Hours.**

Overview of an infrastructure management system. Infrastructure asset development and management. Optimization of infrastructure asset procurement and preservation through good data input and the use of economic models, benefit cost studies, and good maintenance and rehabilitation practices to protect assets investments.

**CE 5381. ADVANCED MATERIALS MECHANICAL TESTING AND CHARACTERIZATION. 3 Hours.**

Providing comprehensive understanding of the mechanical property characterization of advanced engineering materials, this course is intended for graduate students who want to improve their knowledge in new applications of materials in engineering concepts. Topics include the study and examination of the principles, procedures, and applications of experimental methods for characterizing the deformation and failure behavior of advanced materials at the nano-, micro- and macro- scale. The course consists of lectures and lab sessions. Lectures will focus on an in-depth analysis of the failure criteria of advanced materials with linear/elastic and non-linear behavior, i.e., engineering metals and alloys, polymers, and advanced ceramics. Laboratory sessions provide hands-on experience on advanced test methods using standards/codes for tensile, compression, bending, torsion, multiaxial, indentation, fracture, fatigue, creep, high strain rates and nondestructive evaluation. The course features special sessions focusing on the unique aspects associated with mechanical property characterization and simulation of advanced composite and nanocomposite materials. Credit not granted for both CE 4309 and CE 5381. Prerequisite: CE 3361.

**CE 5382. CONSTRUCTION SUSTAINABILITY. 3 Hours.**

Introduction to International Code Council's 2012 International Building Code and USGBC's LEED® New Construction Guidelines v.3 for constructing sustainable/green buildings. Review of building occupancy categories, construction types, allowable height and area, life safety requirements, rated building assemblies, and egress. Site selection, energy and water efficiency, material reuse and indoor air quality. Credit not granted for CE 4307 and CE 5382.

**CE 5383. EXPERIMENTAL STRESS ANALYSIS. 3 Hours.**

Introduction to experimental stress-analysis techniques. Theory and application of mechanical strain gages, electrical strain gages, introduction to photoelastic and thermal techniques, and brittle coatings. Prerequisite: CE 2313.

**CE 5384. CONCRETE BRIDGE DESIGN AND EVALUATION. 3 Hours.**

Analysis, design and evaluation of concrete highway bridges using AASHTO specifications. Analysis and design topics include bridge type selection, preliminary design, AASHTO LRFD bridge design philosophy, design loads, deck design, shear design, barrier design and substructure design. Evaluation topics include bridge inspection, non-destructive evaluation (NDE), load testing and load rating, using the AASHTO procedures. Prerequisite: CE 4363 or CE 5309.

**CE 5385. STRUCTURAL DYNAMICS. 3 Hours.**

Equation of motion for single degree of freedom systems including: free vibration; harmonic and periodic excitations; arbitrary, step and pulse excitations. Dynamic response of multi degree of freedom systems including: free vibration; computation of vibration properties of structures; damping in structures; modal analysis; and response history analysis. Dynamic analysis of systems with distributed mass. Prerequisite: CE 5303 or concurrent registration.

**CE 5386. BUILDING HVAC SYSTEMS & ENERGY SIMULATION. 3 Hours.**

This course will introduce the fundamental principles and engineering procedures for basic building science; design of heating, ventilating, and air conditioning (HVAC) systems; system and equipment selection; and duct design and layout. This course will also include energy conservation techniques and computer applications, including building energy modeling.

**CE 5387. CONSTRUCTION PRODUCTIVITY. 3 Hours.**

Evaluation of construction project management's effectiveness. An investigation of the advanced techniques required for improvement of construction projects including time, cost, quality management, preplanning, field evaluation techniques, time-lapse photograph, safety, human factors, and communications. Prerequisite: CE 5327.

**CE 5388. PIPELINE CONSTRUCTION AND TRENCHLESS TECHNOLOGY. 3 Hours.**

Pipeline and utility design, construction and renewal. Topics include pipeline infrastructure structural considerations, planning and construction considerations, pipe materials, and trenchless technologies. Credit not granted for both CE 4305 and CE 5388. Prerequisite: graduate standing and consent of instructor.

**CE 5389. PIPELINE SYSTEMS ASSET MANAGEMENT. 3 Hours.**

Pipeline systems asset management, inventory, inspection, and life cycle costs. Topics include pipeline deterioration parameters, asset management technologies, risk assessment, government regulations, renewal technologies, and case studies. Credit not granted for both CE 4306 and CE 5389. Prerequisite: graduate standing and consent of instructor.

**CE 5390. UNSATURATED SOIL MECHANICS II. 3 Hours.**

Advanced principles of unsaturated soil behavior in light of critical state based soil mechanics. Topics: Cam-Clay model for saturated soils, Cam-Clay model for unsaturated soils, and calibration/programming of Barcelona Basic Model for unsaturated soils. Prerequisite: CE 5368 or consent of instructor.

**CE 5391. ADVANCED STUDIES IN CIVIL ENGINEERING. 3 Hours.**

Individual studies of advanced topics under the supervision of a professor or professors. Graded F, P, R. Prerequisite: consent of instructor.

**CE 5392. SPECIAL TOPICS IN AIR POLLUTION. 3 Hours.**

Sources, transport, fate, characteristics, and control of air contaminants. May be repeated for credit when topics vary. Topics include: Topic 1 - Air Quality Modeling. Mathematical models for predicting air pollutant transport and transformation in the atmosphere, to evaluate health impacts and potential control strategies. The course covers 4 types of air quality models: box models, photochemical grid models (for ozone and particulate matter), Gaussian dispersion models (major emphasis), and receptor models. Use of Gaussian dispersion modeling software. Topic 2 - Air Pollution Control System Design. Design of air pollution control systems for stationary sources, including particle control technologies (cyclones, electrostatic precipitators, fabric filters and wet scrubbers) and gaseous control technologies (incinerators, adsorption systems, absorption systems, biofilters, nitrogen oxide controls, mercury controls, and carbon dioxide controls). Topic 3 - Air Pollution Chemistry and Meteorology. Designed to give students an understanding of how pollutants react and travel in the atmosphere. Chemistry of ground-level ozone formation, ozone layer depletion, acid deposition, fine particle formation, and climate change; meteorological variables impacting pollutant transport in the atmosphere, such as atmospheric stability, turbulence and wind speed. Prerequisite: Graduate standing and consent of instructor.

**CE 5393. ENVIRONMENTAL ORGANIC CHEMISTRY. 3 Hours.**

Introduction to chemical structures, reactions, and transformations. Disposition of compounds of environmental significance utilizing sorption, bioaccumulation, acid-base reactions, hydrolysis reactions, biodegradation, and biotransformation. Prerequisite: CE 3334 or consent of instructor.

**CE 5394. EARTHQUAKE DESIGN OF REINFORCED CONCRETE BUILDINGS. 3 Hours.**

Design of earthquake resistant reinforced concrete (RC) building structures. ACI 318, ASCE 7, earthquake loads effects on buildings and related structural damage, properties of concrete and steel beyond the elastic range, development and anchorage, confined concrete, inelastic behavior of RC members under large load reversals, design of RC beams, columns, beam-column joints, special moment frames, coupling beams, special structural walls, and other structural systems. Prerequisite: CE 4347.

**CE 5395. MASTER'S PROJECT. 3 Hours.**

Non-thesis master's degree candidates with approval to include a project in their program. Graded F, P, R. Prerequisite: consent of instructor and approval of Civil Engineering Graduate Advisor.

**CE 5396. SITE REMEDIATION ENGINEERING. 3 Hours.**

This course provides practical understanding of the engineering principles and practices associated with the characterization and remediation of contaminated sites. Methods for site characterization and risk assessment will be highlighted while the emphasis will be on remedial action screening processes and technology principles and conceptual design. In-situ and ex-situ treatment processes will be covered, including unit operations, coupled processes, and complete systems within the context of community implementation. Case studies with focus on developing communities will be used and computerized tools for process selection and design will be presented. Prerequisite: CE 3334; or consent of instructor.

**CE 5398. THESIS. 3 Hours.**

Research and preparation pertaining to the master's thesis. Graded F, P, R.

**CE 5695. MASTER'S PROJECT. 6 Hours.**

Non-thesis master's degree candidates with approval to include a project in their program. Graded F, P, R. Prerequisite: consent of instructor and approval of Civil Engineering Graduate Advisor.

**CE 5698. THESIS. 6 Hours.**

Research and preparation pertaining to the master's thesis. Graded F, P, R.

**CE 6197. RESEARCH IN CIVIL ENGINEERING. 1 Hour.**

Individual supervised research projects. May be repeated for credit. Graded F, P, R. Prerequisite: consent of instructor and approval of Supervising Committee Chair.

**CE 6297. RESEARCH IN CIVIL ENGINEERING. 2 Hours.**

Individual supervised research projects. May be repeated for credit. Graded F, P, R. Prerequisite: consent of instructor and approval of Supervising Committee Chair.

**CE 6300. ADVANCED TOPICS IN CIVIL ENGINEERING. 3 Hours.**

Topics of current interest in the field of civil engineering. The subject title is listed in the class schedule and in the student's record. Topics vary. May be repeated for credit when topic changes. Prerequisite: consent of instructor.

**CE 6306. PUBLIC TRANSIT PLANNING & OPERATIONS. 3 Hours.**

Theory and application of technologies used for transit demand analysis, routing, scheduling, evaluation, crew assignment, maintenance strategies, and management. Land-use impact on public transit policy and operation is also introduced. Prerequisite: CE 4311 or CE 5337 or equivalent.

**CE 6308. ANALYTICAL MODELS IN TRANSPORTATION. 3 Hours.**

Development and analysis of mathematical models in transportation. Topics include travel demand, trip generation, distribution, mode choice, assignment, plan evaluation, spatial distribution, traffic control and flow models; principles of behavioral, econometric, deterministic, probabilistic, and chaotic simulation models, and their applications. Prerequisite: CE 4311 or CE 5337.

**CE 6309. TRAFFIC FLOW THEORY. 3 Hours.**

Speed, density relationships of vehicular traffic flow; statistical aspects of traffic events and queuing processes; deterministic models and simulation models of traffic flow behavior; applications of flow theory to traffic problem solutions. Prerequisite: CE 5330 or equivalent.

**CE 6311. ADVANCED FOUNDATION DESIGN. 3 Hours.**

Subsurface investigations; advanced design of mat foundations, retaining walls, reinforced retaining walls, anchor tiebacks, driven piles, and piers; destructive and nondestructive tests on deep foundations; group piles, laterally loaded piles, and design of foundations in expansive soils. Prerequisite: CE 4321 or CE 5364.

**CE 6312. IN-SITU TESTING. 3 Hours.**

Site characterization, in-situ testing procedures, and soil property interpretation methods for standard penetration tests, cone penetration tests utilizing friction cone, piezocone, and seismic cone, dilatometer, vane shear, pressure meter, and bore hole shear tests, non-destructive tests for pavement subgrade characterization. Prerequisite: CE 3143 or CE 5370 or consent of instructor.

**CE 6313. DESIGN OF EARTH DAMS. 3 Hours.**

Introduction to dams and levees, failure and damage analysis, erosion, seepage, filter, drainage design, foundation preparation for problematic subsoil conditions, seepage induced slope stability issues, desiccation crack and erosion control, numerical modeling and case studies, seismic issues. Prerequisite: CE 5367 or consent of instructor.

**CE 6314. STORMWATER MODELING. 3 Hours.**

Hydrologic modeling methods and issues, urban watershed modeling, methods of system analysis; analysis of hydrologic components as linear and nonlinear systems, watershed response, kinematic wave; and model parameters optimization. Prerequisite: CE 5346 and CE 5347; or consent of instructor.

**CE 6315. ADVANCED GEOTECHNICAL MODELING. 3 Hours.**

This course covers two numerical simulation methods: discrete element method (DEM) and finite element method (FEM). The four basic elements in DEM: initialization, search, contact models, velocity and displacement calculations will be introduced. This course will use FORTRAN as the coding language. A basic Fortran code will be provided. Students will learn how to make modifications to the basic code for their own applications. A term project will be required that consists of a numerical experiment. Fundamentals of FEM will be introduced including: basic elements, formulation methods, coordinate transformation, and boundary conditions. CAM clay model will be introduced and implemented in ABAQUS as a class exercise. Usage of ABAQUS will be introduced. Applications of FEM including pile soil interaction and simple beam simulation. Prerequisite: Grade of C or better in CE 5363; Grade of C or better in CE 5369; Programming language (FORTRAN, C, or MATLAB); and numerical analyses; or consent of instructor.

**CE 6316. SEDIMENT TRANSPORT. 3 Hours.**

Sourcing the sediment influx, the settling velocity, Shields critical shear stress, design with critical shear, bedload transport equations, suspended load transport, total transport equation, regime theory as index of stability. Prerequisite: CE 4358 or CE 5346; and CE 5347.

**CE 6350. ADVANCED CONCRETE DESIGN II. 3 Hours.**

Detailing of connections for ductility demands, modified compression field theory, strut and tie modeling of systems and areas, and design of shear walls and hybrid construction. Behavior of reinforced concrete structures, with emphasis on ductility and detailing. Prerequisite: CE 5312.

**CE 6354. REPAIR AND REHABILITATION OF STRUCTURES. 3 Hours.**

Causes of distress, evaluation methods for condition, strength, serviceability; repair materials, repair techniques, and quality control methods for repair of concrete. Criteria for rehabilitation; retrofit techniques for change in function, loading, and seismic forces. Prerequisite: CE 5311 and CE 5312.

**CE 6355. EARTHQUAKE ENGINEERING. 3 Hours.**

Earthquake characteristics; design of structures to resist earthquakes. Characterization of earthquakes for design. Development of design criteria for elastic and inelastic structural response. Seismic performance of various structural systems. Prediction of nonlinear seismic behavior. Basis for code design procedures. Preliminary design of steel and reinforced concrete structures. Evaluation of earthquake vulnerability of existing structures and rehabilitation of seismic deficiencies. Prerequisite: CE 5385.

**CE 6356. ENERGY METHODS. 3 Hours.**

Principles of mechanics; elastic beams and frames; variational method: curved cantilever beams; Rayleigh Ritz method; special form of Euler equation; differential equation for beam; variation of double integral; first variation of triple integral. Deformable bodies using indicial notation; buckling using energy method; Lagrange and Hamilton Principles; theory and analysis of plates; theory and buckling; and theory of vibration. Prerequisite: CE 5315.

**CE 6357. STRUCTURAL STABILITY. 3 Hours.**

Buckling of columns; approximate method of analysis for buckling problems; beam columns; structural system stability (buckling of frames); lateral torsional buckling; buckling of plates; and buckling of axially compressed cylindrical shells. Prerequisite: CE 5303 or concurrent registration therein.

**CE 6358. THEORY OF ELASTICITY & ADVANCED MECHANICS. 3 Hours.**

Introduction to matrices; vector spaces and calculus; tensor algebra, Eigenvalue problems. Solution to discrete systems: steady state problems and propagation problems. Solution of continuous systems: differential formulation; variational method; and weighted residual methods. Solution of linear and nonlinear static equilibrium equations. Theory of deformation; strain displacement relations in orthogonal curvilinear coordinate systems. Theory of stress; differential equation of equilibrium in curvilinear spatial coordinates; three dimensional equations of elasticity; nonlinear constitutive relationship; plane theory of elasticity; and plane elasticity in polar coordinates. Prerequisite: CE 5315 and MATH 3319.



**CE 6360. THEORY OF ELASTICITY. 3 Hours.**

Introductory mathematical concepts: vector calculus; tensor algebra. Theory of deformation; strain displacement relations in orthogonal curvilinear coordinate systems. Theory of stress; differential equation of equilibrium in curvilinear spatial coordinates; three dimensional equations of elasticity; nonlinear constitutive relationship; plane theory of elasticity; and plane elasticity in polar coordinates. Prerequisite: CE 5315.

**CE 6391. ADVANCED PROJECTS IN CIVIL ENGINEERING. 3 Hours.**

Projects related to advanced topics in graduate area. Graded F, P, R. Prerequisite: consent of instructor and approval of Civil Engineering Graduate Advisor.

**CE 6397. RESEARCH IN CIVIL ENGINEERING. 3 Hours.**

Individual supervised research projects. May be repeated for credit. Graded F, P, R. Prerequisite: consent of instructor and approval of Supervising Committee Chair.

**CE 6399. DISSERTATION. 3 Hours.**

Preparation of a doctoral dissertation in civil engineering. Graded F, R. Prerequisite: admission to candidacy for the Doctor of Philosophy degree.

**CE 6697. RESEARCH IN CIVIL ENGINEERING. 6 Hours.**

Individual supervised research projects. May be repeated for credit. Graded F, P, R. Prerequisite: consent of instructor and approval of Supervising Committee Chair.

**CE 6699. DISSERTATION. 6 Hours.**

Preparation of a doctoral dissertation in civil engineering. Graded F, R. Prerequisite: admission to candidacy for the Doctor of Philosophy degree.

**CE 6997. RESEARCH IN CIVIL ENGINEERING. 9 Hours.**

Individual supervised research projects. May be repeated for credit. Graded F, P, R. Prerequisite: consent of instructor and approval of Supervising Committee Chair.

**CE 6999. DISSERTATION. 9 Hours.**

Preparation of a doctoral dissertation in civil engineering. Graded F, P, R. Prerequisite: admission to candidacy for the Doctor of Philosophy degree.

**CE 7399. DOCTORAL DEGREE COMPLETION. 3 Hours.**

This course may be taken during the semester in which a student expects to complete all requirements for the doctoral degree and graduate. Enrolling in this course meets minimum enrollment requirements for graduation, for holding fellowships awarded by The Office of Graduate Studies and for full-time GTA or GRA positions. Students should verify that enrollment in this course meets other applicable enrollment requirements. To remain eligible in their final semester of study for grants, loans or other forms of financial aid administered by the Financial Aid Office must enroll in a minimum of 5 hours as required by the Office of Financial Aid. Other funding sources may also require more than 3-hours of enrollment. Additional hours may also be required to meet to requirements set by immigration law or by the policies of the student's degree program. Students should contact the Financial Aid Office, other sources of funding, Office of International Education and/or their graduate advisor to verify enrollment requirements before registering for this course. This course may only be taken twice. Students who do not complete all graduation requirements while enrolled in this course must enroll in a minimum of 6 dissertation hours (6699 or 6999) in their graduation term. Graded P/F/R.

## COURSES

**CHEM 1101. SUCCESS IN CHEMISTRY AND BIOCHEMISTRY. 1 Hour.**

A first-year experience course for new students and new transfer students interested in a career in chemistry. Provides the necessary foundation for success in a college environment while balancing personal and work obligations. Orients students to life on campus, demonstrates how to leverage campus resources to achieve career and academic goals, and emphasizes engagement outside the classroom through collaborative and co-curricular opportunities. This course is reserved exclusively for students planning to major in chemistry or biochemistry who are in their first semester at UTA. Fulfills the University requirement for either UNIV 1101 or UNIV 1131.

**CHEM 1181. GENERAL CHEMISTRY I LABORATORY FOR ADVANCED CHEMICAL TECHNOLOGIES. 1 Hour.**

General, analytical, and synthetic chemistry concepts will be reinforced through problem- and inquiry-based laboratory activities. The Advanced Chemical Technologies track for majors will introduce research and scientific methods in the context of instructor and student-selected research problems. Hand-on experience in the laboratory will be supplemented with mini-lectures, modules, and web resources to increase student readiness for scientific discovery. Students will also learn about contemporary challenges and advances in chemistry and biochemistry. If a student withdraws from CHEM 1181, the student must also withdraw from CHEM 1341. Prerequisite: Concurrent enrollment in CHEM 1341.

**CHEM 1182. GENERAL CHEMISTRY II LABORATORY FOR ADVANCED CHEMICAL TECHNOLOGIES. 1 Hour.**

General, analytical, and synthetic chemistry concepts will be reinforced through problem- and inquiry-based laboratory activities. Research and scientific methods will be reinforced through the investigation of student-selected research problems and modules on scientific communication. Increased exposure to state-of-the-art analytical techniques and instruments, as well as synthetic methods will culminate in the preparation of a proposal related to the synthesis of new materials and the analysis of their structure and function. If a student withdraws from CHEM 1182, the student must also withdraw from CHEM 1342. Prerequisite: (CHEM 1341 with a grade of C or better) and (CHEM 1181 with a grade of C or better) and (concurrent enrollment in CHEM 1342).

**CHEM 1185. CHEMISTRY FOR ENGINEERS LABORATORY. 1 Hour.**

This course is intended to provide laboratory credit in chemistry for engineering-majors who transfer into UT-Arlington with credit in Chemistry for Engineers lecture only. Students may register for this course only with specific approval of a Chemistry advisor. Prerequisite: 3 hours of Chemistry for Engineers lecture. Credit cannot be earned for both CHEM 1465 and CHEM 1185.

**CHEM 1188. GENERAL CHEMISTRY I LABORATORY. 1 Hour.**

This course is intended to provide laboratory credit in freshman chemistry for students who transfer into UT-Arlington with credit in General Chemistry I lecture only. Experiments include: measurement and scientific equipment use, physical properties, separations, synthesis, qualitative analysis, spectroscopy. Students may register for this course only with specific approval of a Chemistry advisor. Prerequisite: 3 hours of General Chemistry I lecture. Credit cannot be earned for both CHEM 1441 and CHEM 1188.

**CHEM 1189. GENERAL CHEMISTRY II LABORATORY. 1 Hour.**

This course is intended to provide laboratory credit in freshman chemistry for students who transfer into UT-Arlington with credit for General Chemistry lecture only. Experiments include: thermodynamics, electrochemistry, synthesis, quantitative analysis, spectroscopy, stoichiometry, and acid-base chemistry. Students may register for this course only with specific approval of a Chemistry advisor. Prerequisite: CHEM 1188 and 6 hours of General Chemistry II lecture. Credit cannot be earned for both CHEM 1442 and CHEM 1189.

**CHEM 1341. GENERAL CHEMISTRY I. 3 Hours.**

This course covers the fundamentals of atomic structure, chemical bonding, the periodic table, nomenclature, kinetic theory, gas laws, chemical equations, and solutions. Only chemistry majors in the Advanced Chemical Technologies program may take this course. When combined with CHEM 1181, this course will satisfy completion of CHEM 1441 for Chemistry, Biochemistry, and Biological Chemistry majors. Prerequisite: (MATH 1302 or MATH 1303 or MATH 1322 or MATH 1323 or MATH 1402 or MATH 1421 or MATH 1426 or ALEKS  $\geq$  61) and (concurrent enrollment in CHEM 1181). ACT program only.

**CHEM 1342. GENERAL CHEMISTRY II. 3 Hours.**

This course covers study of advanced atomic structure and bonding concepts, acid-base theory, kinetics and equilibria, thermodynamics, electrochemistry, and the chemistry of some elements. Only chemistry majors in the Advanced Chemical Technologies program may take this course. When combined with CHEM 1182, this course will satisfy completion of CHEM 1442 for Chemistry, Biochemistry, and Biological Chemistry majors. Prerequisite: (CHEM 1341 or CHEM 1441 with a grade of C or better) and (CHEM 1181 with a grade of C or better) and (concurrent enrollment in CHEM 1182). ACT program only.

**CHEM 1345. CHEMISTRY IN THE WORLD AROUND US. 3 Hours. (TCCN = CHEM 1305)**

This course looks at current issues in society and uses chemical principles to understand them. Topics include sustainability, air pollution, the ozone layer, global climate change, fuels, and water. CHEM 1345/1346 cannot be used to fulfill the CHEM 1441/1442/1451/1465 requirement in any degree program.

**CHEM 1346. SEX, DRUGS, AND ARTIFICIAL INTELLIGENCE. 3 Hours. (TCCN = CHEM 1307)**

The goal of this course is for students to appreciate chemistry in the world around us. This will be accomplished by teaching chemistry concepts in the context of current topics of general interest, including artificial intelligence, polymers/plastics, forensics, psychedelics, and pharmaceutical science. CHEM 1346 cannot be used to fulfill CHEM 1441/1442/1451/1465 requirements in any degree program.

**CHEM 1400. INTRODUCTORY CHEMICAL PRINCIPLES. 4 Hours.**

Provides a background in fundamental chemical mathematics, in writing and understanding chemical formulas and equations, and in the application of scientific laws to the behavior of matter. Students will learn problem solving skills necessary in general chemistry I by hands-on and interactive approach. This course is designed for the student with little or no previous chemical training who intends to take the CHEM 1441/CHEM 1442 sequence or CHEM 1465 at a later date. CHEM 1400 cannot replace CHEM 1441/CHEM 1442/CHEM 1451/CHEM 1465. Prerequisite: (MATH 1302, MATH 1402, or equivalent) or ALEKS score  $\geq$  61.

**CHEM 1441. GENERAL CHEMISTRY I. 4 Hours. (TCCN = CHEM 1411)**

The lecture covers the fundamentals of atomic structure, chemical bonding, the periodic table, nomenclature, kinetic theory, gas laws, chemical equations, and solutions. The laboratory introduces the scientific method, experiment design, data collection and analysis, as well as illustrates fundamental principles presented in the lecture. Students who have not had high school chemistry are advised to take an introductory chemistry course first. Prerequisite: MATH 1302 or MATH 1303 or MATH 1322 or MATH 1323 or MATH 1402 or MATH 1421 or MATH 1426 or ALEKS  $\geq$  61 or Student Group CHEM 1441.

**CHEM 1442. GENERAL CHEMISTRY II. 4 Hours. (TCCN = CHEM 1412)**

Study of advanced atomic structure and bonding concepts, acid-base theory, kinetics and equilibria, thermodynamics, electrochemistry, the chemistry of some elements. The laboratory focuses on experimental design, data collection and analyses as well as chemical syntheses to illustrate fundamental principles presented in the lecture. Prerequisite: CHEM 1441 or equivalent with a grade of C or better or (CHEM 1341 with a grade C or better) or Student Group CHEM 1442.

**CHEM 1451. CHEMISTRY FOR HEALTH SCIENCES. 4 Hours. (TCCN = CHEM 1406)**

Survey of general, organic, and biochemistry with emphasis on applications to the human body. Measurement, atomic theory and structure, bonding, quantitative relationships in chemical reactions, gases, solutions, electrolytes, organic functional groups and nomenclature, organic reactions, carbohydrates, lipids, proteins, enzymes, metabolism, and nucleic acids. CHEM 1451 cannot count for major credit toward a degree in chemistry. Prerequisite: MATH 1301 or MATH 1302 or MATH 1303 or MATH 1315 or MATH 1316 or MATH 1322 or MATH 1323 or MATH 1324 or MATH 1421 or MATH 1426 or equivalent.

**CHEM 1465. CHEMISTRY FOR ENGINEERS. 4 Hours. (TCCN = CHEM 1409)**

An introduction to important concepts and principles of chemistry with emphasis on areas considered most relevant in an engineering context. Topics include chemical stoichiometry, bonding, chemical thermodynamics, equilibria, electrochemistry, and kinetics. Engineering students may substitute the eight hour sequence CHEM 1441 and CHEM 1442 for this class, but not either CHEM 1441 or CHEM 1442 alone. Students who complete CHEM 1465 and subsequently change majors to curricula that require both CHEM 1441 and CHEM 1442 may substitute CHEM 1465 for CHEM 1441. Prerequisite: C or better in MATH 1322 or C or better in MATH 1323 or C or better in MATH 1324 or C or better in MATH 1421 (or concurrent enrollment) or MATH 1426 (or concurrent enrollment) or HONR-SC 1426 (or concurrent enrollment) or MATH 2425 (or concurrent enrollment) or HONR-SC 2425 (or concurrent enrollment) or Student Group CHEM 1465.

**CHEM 2101. CHEMICAL INFORMATICS I. 1 Hour.**

Developing quantitative understanding in chemistry relies heavily on models, from very crude and simple ideas to complex theoretical frameworks. This class aims to introduce students into models and modeling chemical phenomena that develop understanding of chemical processes. Working with observations and data, we develop the art of developing qualitative relations and explore their limitations. The class is delivered as a practical tour with hands-on practice. Good number skills, basic knowledge of coding and handling of computers is required. Prerequisite: (CHEM 1442 with a grade of C or better) and (MATH 1426 with a grade of C or better or Concurrent enrollment in MATH 1426 or Instructor's permission).

**CHEM 2180. RESEARCH IN CHEMISTRY. 1 Hour.**

Research for undergraduate students supervised by faculty of the department. May be repeated. Graded pass/fail only. Prerequisite: written permission of the instructor. Students may take a maximum of 12 hours credit on a pass/fail basis.

**CHEM 2181. ORGANIC CHEMISTRY I LABORATORY. 1 Hour. (TCCN = CHEM 2123)**

Experiments which illustrate laboratory techniques, theoretical concepts, and synthesis. Prerequisite: CHEM 1442 with a grade of C or better or ((CHEM 1342 with a grade C or better) and (CHEM 1343 with a grade C or better)) or Student Group CHEM 2181. Corequisite: CHEM 2321. If student withdraws from CHEM 2321 prior to midsemester date, student must also withdraw from CHEM 2181.

**CHEM 2182. ORGANIC CHEMISTRY II LABORATORY. 1 Hour. (TCCN = CHEM 2125)**

Experiments which will include syntheses, characterization of unknown substances, and use of the chemical literature. Prerequisite: (CHEM 2181 with a grade of C or better) and (CHEM 2321 with a grade of C or better). Corequisite: CHEM 2322. If student withdraws from CHEM 2322 prior to the midsemester date, student must also withdraw from CHEM 2182.

**CHEM 2283. SYNTHESIS AND ANALYSIS LABORATORY I. 2 Hours.**

Students will perform experiments that build mastery in standard laboratory techniques and illustrate theoretical concepts related to organic synthesis and quantitative analysis methods. Students will continue to develop their mastery of analysis through an introduction to the acquisition and statistical analysis of quantitative and qualitative data, acquired in the context of a series of guided inquiry design and synthesis projects. Syntheses may involve small molecules, polymers, and materials designed to perform specific functions. Students will continue to develop their communication and group work skills by sharing independent data and critical feedback with peers. Additionally, laboratory exercises will involve basic titrimetric, spectrophotometric, and chromatographic methods. Prerequisite: CHEM 1442/CHEM 1342 and CHEM 1182 or equivalent with a grade of C or better. Corequisite: Concurrent enrollment or previous credit in CHEM 2321 and CHEM 2335. Students must remain enrolled in at least one of CHEM 2321 and CHEM 2335 beyond the mid-semester date to remain enrolled in CHEM 2283.

**CHEM 2284. SYNTHESIS AND ANALYSIS LABORATORY II. 2 Hours.**

Experiments will include syntheses and analysis, characterization of unknown substances, and use of the chemical literature. A focus will be placed on advancing the use of modern chemical technologies for both synthetic and analytical work in a guided inquiry format. Prerequisite: CHEM 2283 and CHEM 2321 with a grade of C or better. Corequisite: CHEM 2322.

**CHEM 2285. QUANTITATIVE CHEMISTRY LABORATORY. 2 Hours.**

An introduction to computers for the acquisition and statistical analysis of data. Laboratory exercises involving basic titrimetric, spectrophotometric and chromatographic methods. Prerequisite: CHEM 1442 or equivalent with a grade of C or better, and concurrent enrollment/previous credit in CHEM 2335.

**CHEM 2321. ORGANIC CHEMISTRY I. 3 Hours. (TCCN = CHEM 2323)**

The fundamentals of molecular structure, stereochemistry, and the reactions of aliphatic hydrocarbons. Electronic theory, synthetic methods, and mechanisms. Prerequisite: CHEM 1442 with a grade of C or better or ((CHEM 1342 with a grade C or better) and (CHEM 1182 with a grade C or better)) or Student Group CHEM 2321.

**CHEM 2322. ORGANIC CHEMISTRY II. 3 Hours. (TCCN = CHEM 2325)**

Organic spectroscopic analysis. The chemistry of aromatic hydrocarbons, alcohols and ethers, aldehydes, ketones, carboxylic acids and derivatives, amines, amino acid, carbohydrates, and other functional groups. Mechanisms and synthesis. Prerequisite: CHEM 2321 with a grade of C or better.

**CHEM 2335. QUANTITATIVE CHEMISTRY. 3 Hours.**

Basic methods of error analysis, simple and advanced methods for the solution of complex equilibria, fundamentals of titrimetric, spectrophotometric and chromatographic instrumental analysis. Prerequisite: (CHEM 1442 or CHEM 1342 or equivalent) and (MATH 1324 or MATH 1325 or MATH 1421 or MATH 1426 or equivalent or higher) and (CHEM 2285 or CHEM 2283 concurrent enrollment or previous credit).

**CHEM 2380. UNDERGRADUATE RESEARCH. 3 Hours.**

Research in chemistry supervised by a faculty member of the department. May be repeated. Graded pass/fail only. Prerequisite: written permission of the instructor. Students may take a maximum of 12 hours credit on a pass/fail basis.

**CHEM 3101. CHEMICAL INFORMATICS II. 1 Hour.**

This course provides a succinct overview of the emerging discipline of Chemical Informatics at the intersection of chemistry, computational science, and information science. Efficient and reliable analysis of chemical analytical data is a great challenge due to the increase in data size, variety and velocity. Attention in this class is drawn to specific opportunities afforded by this new field in accelerating discovery and understanding of cause and effect. The class is delivered as a practical tour with hands-on practice. Good number skills, basic knowledge of coding and handling of computers is required. Prerequisite: (CHEM 2101 with a grade C or better) or (Instructor's permission).

**CHEM 3131. CHEMISTRY COMMUNITY SERVICE LEARNING. 1 Hour.**

Service learning is a credit-bearing learning experience; therefore, credit is awarded for academic learning and not for service hours. Students engage in classroom activities, assignments, and discussions and in addition, integrate course content and learning outcomes with genuine community needs or issues. Collaborations with the community result in relationship-building and partnerships through intentional, structured service experiences. Students are required to analyze and evaluate these experiences by engaging in reflective activities, such as discussion and journaling. This process of structured service and learning in the community promote a sense of civic responsibility and commitment to others. Students commit to serve weekly time resulting in at least fifteen hours during one semester. This time is agreed upon by student, faculty, and community agency. Prerequisites: Permission of the Instructor.

**CHEM 3175. BIOPHYSICAL CHEMISTRY LABORATORY. 1 Hour.**

Introduction to the physical experimental techniques used in quantitative biochemical practice. Prerequisite: CHEM 3315 or concurrent enrollment.

**CHEM 3181. PHYSICAL CHEMISTRY I LABORATORY. 1 Hour.**

The physical and thermodynamic properties of substances, experimentally determined. Prerequisite: (Grade of C or better in ((CHEM 2284 or CHEM 2285) and CHEM 2335)) and (Grade of C or better in CHEM 3321 or concurrent enrollment).

**CHEM 3182. PHYSICAL CHEMISTRY II LABORATORY. 1 Hour.**

Experiments in kinetics, equilibria, spectroscopy, and electrochemistry. Modern instrumental techniques. Prerequisite: (Grade C or better in ((CHEM 2284 or CHEM 2285) and CHEM 2335)) and (Grade C or better in CHEM 3322 or concurrent enrollment).

**CHEM 3231. CHEMISTRY/BIOCHEMISTRY COMMUNITY SERVICE LEARNING. 2 Hours.**

Service learning is a credit-bearing learning experience; therefore, credit is awarded for academic learning and not for service hours. Students engage in classroom activities, assignments, and discussions and in addition, integrate course content and learning outcomes with genuine community needs or issues. Collaborations with the community result in relationship-building and partnerships through intentional, structured service experiences. Students are required to analyze and evaluate these experiences by engaging in reflective activities, such as discussion and journaling. This process of structured service and learning in the community promote a sense of civic responsibility and commitment to others. Students commit to serve weekly time resulting in at least fifteen hours during one semester. This time is agreed upon by student, faculty, and community agency. Prerequisites: Permission of the Instructor.

**CHEM 3307. INTRODUCTION TO POLYMER CHEMISTRY. 3 Hours.**

The chemistry and technology of polymeric systems. The chemistry of natural systems such as proteins as well as the synthesis of fibers, films, plastics, and elastomers. Discussion of the characterization of polymers by modern techniques using instrumental analysis is followed by a summary of end-use and processing techniques. Prerequisite: CHEM 2322 with a grade of C or better or permission of instructor.

**CHEM 3315. INTRODUCTION TO BIOPHYSICAL CHEMISTRY. 3 Hours.**

A basic course introducing the physical principles that govern biological systems and processes, and the methods used for their investigation. Topics include solution thermodynamics, biomolecular interactions, enzyme kinetics, transport processes (diffusion, sedimentation, electrophoresis, viscous flow), and the applications of spectroscopic methods (absorption, emission and scattering of radiation, and the utilization of polarized light). Prerequisite: A grade of C or better in each of the following: CHEM 2335, MATH 2425, and 8 hours of college level physics.

**CHEM 3317. INORGANIC CHEMISTRY. 3 Hours.**

An overview of descriptive main group chemistry, solid state structures and the energetics of ionic, metallic, and covalent solids, acid-base chemistry and the coordination chemistry of the transition metals. The course is intended to explore and describe the role of inorganic chemistry in other natural sciences with an emphasis on the biological and geological sciences. Important compounds and reactions in industrial chemistry are also covered. Intended for both chemistry and non-chemistry majors. Prerequisite: Grade of C or better in CHEM 2322 or concurrent enrollment.

**CHEM 3321. PHYSICAL CHEMISTRY I. 3 Hours.**

Thermodynamics, gases, First and Second Law, pure substances, mixtures and solutions, equilibrium; Statistical Thermodynamics; Kinetics, rates, mechanisms, transition state theory. In this class you will learn to understand the basic principles of Chemistry as the Science of Transformation and Change. We emphasize conceptual understanding and will become skilled in a quantitative description of the phenomena we study. The goal is that at the end of the course every student can outline the basic principles of Thermodynamics, has a sound understanding of ideal and approximate systems, and can apply the tools to engage in self-driven investigations. Prerequisites: CHEM 2335, MATH 2326, both with a grade of C or better and PHYS 1443 and PHYS 1444. MATH 3318 concurrent enrollment recommended.

**CHEM 3322. PHYSICAL CHEMISTRY II. 3 Hours.**

Quantum theory, introduction, principles. Schrödinger Equation, wavefunction; particle in a box, uncertainty; postulates of quantum mechanics; hydrogen atom, orbitals, structure of multi-electron atoms, atomic spectra and selection rules; molecular structure of diatomic molecules; introduction to molecular spectroscopy; materials and structure: lattices, diffraction methods, properties of solids. In this class you will learn to understand the principles of Quantum Chemistry and how it applies to atoms, molecules, and solids. We emphasize conceptual understanding and will become skilled in quantitative descriptions. The goal is that at the end of the course every student can outline the basic principles of Quantum Chemistry, both qualitatively and quantitatively. Students will obtain a sound understanding of probability, wavefunctions, orbitals, and spectroscopy, and can apply the learned concepts and tools to engage in self-driven investigations. This course is designated as the capstone course. Prerequisite: CHEM 2335, MATH 2326, both with a grade of C or better and PHYS 1443 and PHYS 1444. MATH 3318 concurrent enrollment recommended.

**CHEM 3331. CHEMISTRY/BIOCHEMISTRY COMMUNITY SERVICE LEARNING. 3 Hours.**

Service learning is a credit-bearing learning experience; therefore, credit is awarded for academic learning and not for service hours. Students engage in classroom activities, assignments, and discussions and in addition, integrate course content and learning outcomes with genuine community needs or issues. Collaborations with the community result in relationship-building and partnerships through intentional, structured service experiences. Students are required to analyze and evaluate these experiences by engaging in reflective activities, such as discussion and journaling. This process of structured service and learning in the community promote a sense of civic responsibility and commitment to others. Students commit to serve weekly time resulting in at least fifteen hours during one semester. This time is agreed upon by student, faculty, and community agency. Prerequisites: Permission of the Instructor.

**CHEM 4080. UNDERGRADUATE RESEARCH. 0 Hours.**

Research problems on an individual basis, conducted on a selected topic under the direction of a member of the chemistry and biochemistry faculty. May be repeated. This is a non-credit course and cannot be used to meet degree requirements. Prerequisite: Permission of the instructor.

**CHEM 4101. SEMINAR IN CHEMISTRY. 1 Hour.**

Oral and written communication of chemical information. Seminars will be presented by students on topics from the current chemical literature. A term paper is required. The use of the library for researching the chemical literature will be emphasized. May be repeated for a total of two semester hours of credit. Students must be within 12 credits hours from the degree completion. Departmental permission required.

**CHEM 4180. UNDERGRADUATE RESEARCH. 1 Hour.**

Research under the direction of a member of the department. No more than six hours of CHEM 4180, CHEM 4280, CHEM 4380 and CHEM 4381 may be taken for a letter grade. Prerequisite: Written permission of the instructor and a minimum grade point average of 2.5.

**CHEM 4181. COMPUTATIONAL CHEMISTRY LABORATORY. 1 Hour.**

Molecular modeling. Application of various computational techniques to chemical problems, including determination of molecular geometry, conformational analysis, and molecular energetics. Prerequisite: CHEM 3321 or CHEM 3322 with a grade C or better.

**CHEM 4191. READINGS IN CHEMISTRY. 1 Hour.**

May be repeated for a maximum of six hours credit. Topics arranged on an individual basis. Performance may be assessed by oral exam, written test, or review paper. Prerequisite: permission of department chair. Graded pass/fail only.

**CHEM 4203. COMPUTATIONAL CHEMISTRY. 2 Hours.**

A course emphasizing molecular quantum mechanics. Topics include the basic postulates of quantum mechanics, many electron wave functions, the variation method, and molecular orbital theory at various levels of approximation (Hueckel, Extended Hueckel, semi-empirical, ab initio, etc.). Related methods, such as force-field approaches and molecular dynamics, will be discussed. Prerequisite: CHEM 3322, with a grade of "C" or better.

**CHEM 4242. LABORATORY TECHNIQUES IN BIOCHEMISTRY. 2 Hours.**

Designed to introduce the student to biochemical laboratory methods; a practical approach to the properties of carbohydrates, proteins, enzymes, and nucleotides. Prerequisite: CHEM 4311, with a grade of "C" or better.

**CHEM 4280. UNDERGRADUATE RESEARCH. 2 Hours.**

Research under the direction of a member of the department. No more than six hours of CHEM 4180, CHEM 4280, CHEM 4380 and CHEM 4381 may be taken for a letter grade. Prerequisite: Written permission of the instructor and a minimum grade point average of 2.5.

**CHEM 4291. READINGS IN CHEMISTRY. 2 Hours.**

May be repeated for a maximum of six hours credit. Topics arranged on an individual basis. Performance may be assessed by oral exam, written test, or review paper. Prerequisite: permission of department chair. Graded pass/fail only.

**CHEM 4311. BIOCHEMISTRY I. 3 Hours.**

The chemistry of the sugars, amino acids, proteins, and nucleic acids, followed by an introduction to enzyme chemistry. The major metabolic pathways of the cell, glycolysis, TCA cycle, and pentose phosphate pathway. Auditing of this class is NOT permitted. Prerequisite: CHEM 2322, with a grade of "C" or better.

**CHEM 4312. BIOCHEMISTRY II. 3 Hours.**

A continuation of CHEM 4311. The breakdown and biosynthesis of fats and the synthesis of carbohydrates, including photosynthesis. Metabolic utilization of proteins and amino acids together with an introduction to protein synthesis. Prerequisite: CHEM 4311, with a grade of "C" or better, or equivalent.



**CHEM 4313. METABOLISM AND REGULATION. 3 Hours.**

Selected topics in advanced metabolism including biosynthesis of phospholipids, steroids, porphyrins and related molecules, and prostaglandins. Membranes and transport phenomena, regulation of glycogen and glucose metabolism in muscle and lipid metabolism in adipose tissue. Prerequisite: (Concurrent Enrollment to CHEM 4312) or (CHEM 4312 with a grade of C or better).

**CHEM 4314. ENZYMOLOGY. 3 Hours.**

A comprehensive study of enzymes including structures, reaction mechanisms, regulation, and kinetics. Prerequisite: CHEM 4311 with a grade of C or better.

**CHEM 4316. BIOCHEMICAL GENETICS. 3 Hours.**

Aspects of the biochemistry of gene expression in prokaryotic and eukaryotic organisms and its regulation, together with genetic manipulations and the methodology of recombinant DNA technology. Prerequisite: (Concurrent enrollment in CHEM 4312) or (CHEM 4312 with a grade of C or better).

**CHEM 4318. INORGANIC CHEMISTRY. 3 Hours.**

An overview of the chemistry of the transition metals. Topics include symmetry and applications, bonding models, magnetism, synthesis of metal complexes, modern characterization techniques including IR, NMR, and electronic spectroscopy, organometallic compounds, reaction mechanisms, catalysis, and bioinorganic chemistry. Prerequisite: CHEM 2322 with a grade of C or better.

**CHEM 4342. SOLID STATE AND MATERIALS CHEMISTRY. 3 Hours.**

Chemical synthesis, structure characterization, and properties of solid-state materials. Principles of solid-state synthesis, classical equilibrium approaches, diffusion, and chemical transport, non-equilibrium, and deposition methods; high temperature and high-pressure synthesis; basic characterization techniques using X-rays, electrons, and neutrons; basic structure types and symmetry; optical, electrical, and magnetic properties; examples will relate to materials used for energy harvesting, sensors, catalysis, and other applications. Prerequisite: Grade of C or better in CHEM 3317.

**CHEM 4343. RESEARCH METHODS - UTEACH. 3 Hours.**

The purpose of this course is to present UTeach students with the tools scientists use to solve scientific problems. These tools enable scientists to develop new knowledge and insights, the most important of which are eventually presented in textbooks and taught in more conventional science classes. These tools include: design of experiments to answer scientific questions; use of statistics to interpret experimental results and deal with sampling errors; mathematical modeling of scientific phenomena; finding and reading articles in the current scientific literature; applying scientific arguments in matters of social importance; writing scientific papers; reviewing scientific papers; oral presentation of scientific work; use of probes and computers to gather and analyze data; ethical treatment of human subjects; laboratory safety. Research Methods is primarily a laboratory course, and most of these topics are developed in connection with four independent inquiries UTeach students design and carry out. Written inquiries will be evaluated as examples of scientific writing. Prerequisite: SCIE 1201 or SCIE 1334 or concurrent enrollment; junior or senior standing.

**CHEM 4346. ADVANCED SYNTHETIC METHODS. 3 Hours.**

Methods and techniques for the synthesis and characterization of organic, inorganic, and organometallic compounds. Prerequisite: Grade of C or better in CHEM 2182, CHEM 2322, and CHEM 3317 or CHEM 4318.

**CHEM 4380. UNDERGRADUATE RESEARCH. 3 Hours.**

Research under the direction of a member of the department. No more than six hours of CHEM 4180, CHEM 4280, CHEM 4380 and CHEM 4381 may be taken for a letter grade. Prerequisite: Written permission of the instructor and a minimum grade point average of 2.5.

**CHEM 4381. HONORS RESEARCH. 3 Hours.**

Research in chemistry under the direction of a member of the department, resulting in a written honors thesis. No more than 6 hours of CHEM 4180, CHEM 4280, CHEM 4380 and CHEM 4381 may be taken for a letter grade. Prerequisite: CHEM 2322, CHEM 2182, and admission to the University Honors College.

**CHEM 4385. INSTRUCTIONAL TECHNIQUES IN CHEMISTRY. 3 Hours.**

Students participate in undergraduate laboratory instruction or recitation sessions under the supervision of a faculty member. No more than 6 hours of CHEM 4385 may be taken for a letter grade. Enrollment by departmental permission only.

**CHEM 4387. UNIVERSITY-INDUSTRY CHEMISTRY COOPERATIVE. 3 Hours.**

By special arrangement only. Cooperative study assignment doing chemical research in a local industrial chemical laboratory. Enrollment by departmental permission only. Graded pass/fail only.

**CHEM 4391. READINGS IN CHEMISTRY. 3 Hours.**

May be repeated for a maximum of six hours credit. Topics arranged on an individual basis. Performance may be assessed by oral exam, written test, or review paper. Prerequisite: permission of department chair. Graded pass/fail only.

**CHEM 4392. ADVANCED TOPICS IN CHEMISTRY. 3 Hours.**

Topics arranged on an individual basis. May be repeated for credit as the topic varies. Prerequisite: permission of instructor.

**CHEM 4461. INSTRUMENTAL ANALYSIS. 4 Hours.**

The principles involved in the operation of modern analytical instruments and the laboratory use of such instruments. Students must be within 30 hours of completing their bachelor degrees. Prerequisite: Grades of C or better in (CHEM 2284 or CHEM 2285) and CHEM 2335.

**CHEM 5011. SEMINAR IN CHEMISTRY. 0 Hours.**

Students will present a talk, prepare a poster, and engage in scientific writing and communication. Includes learning how to prepare, present, and defend an oral presentation. May not be counted for credit toward the degree requirements.

**CHEM 5168. QUANTUM CHEMISTRY LABORATORY. 1 Hour.**

Molecular modeling. Application of various computational techniques to chemical problems, including determination of molecular geometry, conformational analysis, and molecular energetics. Prerequisite: concurrent enrollment in CHEM 5262.

**CHEM 5191. READINGS IN CHEMISTRY. 1 Hour.**

Conference course which may be repeated for credit, with credit granted according to work performed. Graded P/F/R only. Prerequisite: permission of instructor.

**CHEM 5192. RESEARCH IN CHEMISTRY. 1 Hour.**

Conference course with laboratory with credit granted according to work performed. May be repeated for credit. Graded P/F/R only. Prerequisite: permission of instructor.

**CHEM 5262. COMPUTATIONAL CHEMISTRY. 2 Hours.**

Molecular quantum mechanics. Fundamental principles of quantum mechanics, with a special emphasis on molecular electronic structure theory. Topics covered include molecular mechanics, semi-empirical and ab initio molecular orbital theory, density functional theory, calculation of thermodynamic properties and molecular dynamics. Prerequisite: CHEM 5301 or permission of instructor. concurrent enrollment in CHEM 5168 required.

**CHEM 5291. READINGS IN CHEMISTRY. 2 Hours.**

Conference course which may be repeated for credit, with credit granted according to work performed. Graded P/F/R only. Prerequisite: permission of instructor.

**CHEM 5292. RESEARCH IN CHEMISTRY. 2 Hours.**

Conference course with laboratory with credit granted according to work performed. May be repeated for credit. Graded P/F/R only. Prerequisite: permission of instructor.

**CHEM 5300. SELECTED TOPICS IN ADVANCED CHEMISTRY. 3 Hours.**

The area may vary (typically analytical, applied, biological, colloid, environmental, inorganic, organic, physical, polymer, materials, theoretical, etc.) and will be announced in advance. More than one area may be covered simultaneously, in parallel courses offered under different section numbers. May be repeated for credit when area or topics vary. Prerequisite: permission of instructor.

**CHEM 5321. INTRODUCTION TO ANALYTICAL CHEMISTRY. 3 Hours.**

This course provides a broad overview of instrumental techniques, quantitative analysis, and chemical equilibria. It is designed to give a conceptual understanding of the theory, design, use, as well as limits and advantages of modern analytical instrumentation such as spectroscopy, chromatography, and mass spectrometry. Additionally, students will learn the statistics necessary for characterization of instrumental methods and analysis of sample populations and how to perform these analyses using spreadsheet based calculators such as Microsoft Excel. Students will be required to demonstrate proficiency in analytical skills by completing homework assignments (approximately 1 every 2 weeks) and through an open computer portion of their exams. Exams also feature a closed computer, short answer section that tests their grasp of the analytical concepts. Students are also required to submit a term paper and deliver a power point presentation on an analytical topic of their choice outside those covered during the course.

**CHEM 5324. ANALYTICAL MASS SPECTROMETRY AND SPECTROSCOPY. 3 Hours.**

This course covers modern aspects of atomic and molecular mass spectrometry, as well as spectrochemical analysis. Upon completion of this course, the student will be able to: describe the basic setup and operation of mass spectrometric and spectroscopic instrumentation; interpret spectra from various instruments as a means for qualitative and quantitative analysis; apply basic knowledge of mass spectrometry and spectroscopy for practical problem solving; relate the use of mass spectrometry and spectroscopy to his or her own research interests; and compile, present, and explain modern techniques for analytical research. Written and oral presentations, as well as traditional classroom examinations, homework, and quizzes will be used to assess student performance. Prerequisite: CHEM 4461 or equivalent; or permission of instructor.

**CHEM 5325. SEPARATION SCIENCE. 3 Hours.**

A comprehensive examination of most areas involving the separation of molecules and ions. Theoretical, practical and historical aspects of: distillation, sublimation, liquid-liquid extraction, solid phase extraction, chromatography, electrophoresis, field flow fractionation, membrane/barrier processes, and crystallization will be considered. Students taking this course must have a good basic background in organic chemistry and physical chemistry.

**CHEM 5326. ANALYTICAL CHEMISTRY - CONCEPTS AND IMPLEMENTATION. 3 Hours.**

This course familiarizes students with basic electronic design in analytical instrumentation. Familiarization with active and passive components, operational amplifiers, timers, logic gates, and designing analytical instrumentation based on such components, especially in Wet Chemistry. The course covers ionic equilibria and acid-base equilibria and solving complex problems by iterative numerical methods and nonlinear curve fitting using programming in BASIC and MS Excel Solver™. The course covers present day applications of wet chemical analysis, specific methods and instrumentation, practical aspects of automated liquid phase analytical methods including component availability and cost. A design problem, chosen by lottery, will be given to each student early in the semester. The newly acquired knowledge of chemistry and electronics will be used to design a new instrument and present it. Prerequisite: CHEM 4461 or equivalent undergraduate instrumental analysis course.

**CHEM 5327. ANALYTICAL ELECTROCHEMISTRY. 3 Hours.**

This course covers modern aspects of electroanalytical chemistry. Upon completion of this course, the student will be able to: understand the concepts of redox potentials and their role in electron transfer, the thermodynamic aspects of electrochemical cells, mass transport in electrochemical systems, and the principles underlying various electroanalytical techniques such as potentiometry, amperometry, coulometry and voltammetry. The instrumental aspects of these techniques will also be addressed, including specialized approaches such as spectroelectrochemistry. The student will be able to relate the use of these analytical techniques to his or her own research needs and interests. Written and oral examinations, as well as traditional classroom examinations, will be used to assess student performance. Prerequisite: CHEM 4461 or equivalent; or permission of instructor.

**CHEM 5328. ANALYTICAL SPECTROSCOPY. 3 Hours.**

This course covers many of the methods of spectrochemical analysis used in the analytical laboratory. At the end of this course, students should be able to: explain the fundamental theory of many spectroscopy methods, including atomic spectroscopy, molecular spectroscopy, UV/Vis spectroscopy, molecular luminescence, and infrared spectrometry, among others; describe basic instrumental components; apply basic statistics (e.g., measurement errors, and calibration methods) for data analysis; and understand the fundamental use and applications of spectroscopy methods for basic research and laboratory measurements. Student performance will be evaluated based on homework assignments, exams, quizzes, and presentations.

Prerequisite: CHEM 4461 or equivalent, or permission of instructor.

**CHEM 5331. ADVANCED BIOCHEMISTRY I. 3 Hours.**

1) Learn the vocabulary and conceptually understand at an advanced level the biochemical processes by which cells break down organic molecules and trap some of the released energy in the form of reactive nucleotides; use these reactive nucleotides to drive the synthesis of organic building blocks such as sugars, lipids, amino acids and nucleic acids from simpler molecules that serve as precursors. 2) To learn to critically review primary research articles in biochemistry by reading the assigned material related to proteins, expression and purification, kinetics, and metabolism as they are presented in class. 3) Research Project: To learn to critically review primary research articles in biochemistry by preparing a presenting and NIH R15 proposal/paper on a topic relevant to the topics covered in class. This project will teach students how to design and interpret experiments, thereby contributing to the creation of new knowledge in the fields of biochemistry and biophysics. This project will allow students to become knowledgeable in a specific subfield of biochemistry. 4) Develop an awareness of ethical responsibilities when conducting and reporting research and reviewing the research of others. 5) Understanding of the structures and functions of biological molecules. 6) Understanding of intermediary metabolism and its control. 7) Understanding of molecular genetics. 8) Ability to present concepts in oral, written and visual forms.

**CHEM 5332. CELL SIGNALING & HUMAN BIOCHEMISTRY. 3 Hours.**

Explores different aspects of signal transduction and different types of signaling pathways including enzyme linked receptors, G-protein signaling, G-protein coupled receptors, cytokine signaling, cyclic AMP based signaling, Calcium signaling, lipid signaling, NO-signaling, hormone signaling, peptide hormones, amino acid based hormones, steroid hormones; immune response and inflammation; cancer cell signaling, hypoxia and angiogenesis, aging; metabolic interrelation, vitamins and mineral, dietary supplements; recent topics in signaling, clinical correlation and health impacts.

**CHEM 5333. BIOPHYSICAL METHODS AND SPECTROSCOPY IN BIOCHEMISTRY. 3 Hours.**

A) Examination of various biophysical methods that determine enzyme functions: the methods includes purification of enzymes, determination of various kinetic parameters, and choice of methodology. B) Discussion of various spectroscopic approaches that determine the enzyme structures and functions: the approaches includes the modern spectroscopic techniques including fluorescence fluctuation spectroscopy as well as UV spec, frangonomics, surface plasmon resonance, FTIR-spectroscopy, and advanced NMR techniques such as HSQC and NOE.

**CHEM 5334. MECHANISMS OF ENZYME ACTIONS. 3 Hours.**

A) Exploration of enzyme properties that include enzyme kinetics, allostery, structure and their functions. B) Evaluation of enzyme functions associated with cofactors and regulators and their significance with respect to human health and diseases; evaluation of emerging scientific advances and challenges associated with enzyme actions will also be discussed throughout lectures, student paper presentation and student written proposal.

Prerequisite: A passing grade in the ACS-test in Biochemistry.

**CHEM 5335. GENES, GENOMES, AND NUCLEIC ACIDS. 3 Hours.**

Concepts of genes and genomes in prokaryotes and eukaryotes. Nucleic acids structures and functions. Detailed mechanisms of prokaryotic and eukaryotic DNA replication and transcription; mRNA processing; Gene regulation, epigenetics and non-coding RNA. Fundamental theory of each topic will be covered with emphasis on current research literature and clinical correlations. Prerequisite: Passing grade in ACS-test in Biochemistry.

**CHEM 5336. STRUCTURE & FUNCTION OF PROTEINS, MEMBRANES & CARBOHYDRATES AND FAST KINETICS. 3 Hours.**

This is a one-semester course that extends fundamental concepts in chemistry, such as kinetic phenomena and thermodynamics into an exploration of biology. The content includes structure and function of proteins and membranes, and catalysis of biological reactions through: 1) applying equilibrium processes to study biochemical reactions 2) analyzing the kinetic parameters of enzymes that cause disease states as well as exploration of how drugs are used to inhibit enzymes.

**CHEM 5337. MEDICINAL CHEMISTRY AND DRUG Discovery. 3 Hours.**

This course will provide students with an understanding of the history of the modern drug discovery process, drugs and drug ionization states, biological targets, lead molecule discovery and optimization, cell signaling and metabolism, the investigation of structure activity relationships, translation with preclinical models, intellectual property and commercialization, and the regulatory process from target/lead discovery to clinical use. History and introduction to Discovery; Foundations: predicting structural ionization states using concepts from pH/pKa/acids and bases/buffers; Biological Targets: Enzymes, Receptors, Oligonucleotides; Drug-Target Structures and Interactions, Lead identification and optimization, Structure Activity Relationships: Computational Approaches (ligand based; structure based); Cell signaling and Metabolism, cardiovascular diseases, diabetes, obesity, neurological disorders, and cancer; and current therapies; Translation and intellectual property; FDA regulations and clinical trials. To enroll students must have completed or be concurrently enrolled in CHEM 4311 or receive special permission of the instructor. Prerequisite: CHEM 4311 or permission of the instructor.

**CHEM 5341. INORGANIC CHEMISTRY. 3 Hours.**

Structures, bonding, and properties of main group and transition element compounds including: symmetry, coordination chemistry, reaction mechanisms, organometallic chemistry, and modern characterization techniques. Prerequisite: CHEM 4318 or permission of instructor.

**CHEM 5342. SOLID STATE CHEMISTRY. 3 Hours.**

Chemical synthesis and characterization methods of extended structures. Principles of solid-state synthesis, classical equilibrium approaches, diffusion and chemical transport, non-equilibrium and deposition methods; high temperature and high pressure synthesis; basic characterization techniques using X-rays, electrons, and neutrons; basic structure types and symmetry; optical, electrical and magnetic properties; examples will relate to materials used for energy harvesting, sensors, and catalysis.

**CHEM 5344. X-RAY DIFFRACTION, SCATTERING AND ABSORPTION. 3 Hours.**

The class will focus on modern applications of X-ray diffraction and absorption techniques in crystal and molecular structure determination. A practical component will address aspects of state of the art methods, including how to solve structures using data collected on powder and single-crystal diffractometers, X-ray photoelectron spectroscopy (XPS), etc.

**CHEM 5351. ADVANCED ORGANIC CHEMISTRY I - PHYSICAL ORGANIC CHEMISTRY. 3 Hours.**

Bonding, structure, stereochemistry, substituent effects, isotope effects, solvent effects, kinetics, and linear free-energy relationships in determining reaction mechanisms. Acids and bases, orbital symmetry, pericyclic reactions, photochemistry, and nucleophilic substitution reactions. Prerequisites: CHEM 2322 and CHEM 3322 or equivalent.

**CHEM 5354. ORGANIC CHEMISTRY II. 3 Hours.**

A survey of organic reaction mechanisms including addition and elimination reactions, nucleophilic carbon species, carbonyl reactions, electrophilic substitution reactions, rearrangement reactions, electron deficient species, and free radical reactions. Prerequisite: CHEM 5309 or permission.

**CHEM 5355. ADVANCED ORGANIC SYNTHESIS. 3 Hours.**

Synthetically important reactions, strategy in organic synthesis using retrosynthetic analysis and mechanistic understanding of reactions, synthons, asymmetric synthesis. Prerequisite: CHEM 5310 or permission of instructor.

**CHEM 5356. ADVANCED POLYMER CHEMISTRY. 3 Hours.**

Polymer synthesis and reactions including condensation, free-radical, ionic, and coordination polymerizations; principles of polymerization including thermodynamics and kinetic considerations; physical characterizations including determinations of absolute molecular weights, relative molecular weights, morphology, glass transitions, and polymer crystallinity; relationships between macromolecular structure, properties, and uses of polymeric materials. Also offered as MSE 5346. Prerequisite: CHEM 2321 and CHEM 2322 or permission of instructor.

**CHEM 5358. DETERMINATION OF MOLECULAR STRUCTURE BY PHYSICAL METHODS. 3 Hours.**

The use of modern instrumental techniques to determine structure: infrared, ultraviolet, and magnetic resonance spectroscopy, mass spectrometry, optical rotatory dispersion. Emphasis on interpretation of spectra.

**CHEM 5361. INTRODUCTION TO GRADUATE PHYSICAL CHEMISTRY. 3 Hours.**

Classical thermodynamics and statistical thermodynamics. Equilibrium and kinetic processes. Reaction dynamics. Principles of quantum chemistry and its application to spectroscopy. Introduction to bonding in molecules and solids.

**CHEM 5364. ADVANCED GRADUATE PHYSICAL CHEMISTRY. 3 Hours.**

Statistical thermodynamics and its application to kinetics and spectroscopy. Quantum theory, ab initio methods and density functional theory. Advanced spectroscopic methods to investigate bonding in molecules and solids. Prerequisite: CHEM 5301 or permission of the instructor.

**CHEM 5365. THERMODYNAMICS OF MATERIALS. 3 Hours.**

Applications of thermodynamics to the study of materials, thermodynamic properties of liquid and solid solutions and their relationship to surface and crystalline defects.

**CHEM 5366. CHEMICAL KINETICS. 3 Hours.**

Experimental and theoretical aspects of chemical reaction kinetics. Classical and modern techniques for mechanistic characterization, methods for approximation, analysis and interpretation. Simple and complex reaction matrices are considered (gas, liquid, solid state). Specific topics include microscopic reversibility, transition state theory, homo/heterogenous catalysis, and quantum/statistical mechanical estimation of rate constants and chemical activation. Relevant examples relating to atmospheric and environmental, biological, organic, and inorganic reactions will be discussed. Prerequisite: CHEM 5301 or by permission from the instructor.

**CHEM 5380. ADVANCED LABORATORY RESEARCH TOPICS IN CHEMISTRY. 3 Hours.**

This course will provide a pathway for PhD-bound students to identify laboratories with appropriate research goals that align with the students' own goals for their terminal degrees. At the end of CHEM 5380, students and faculty mentors will identify mutually satisfactory research plans for PhD research during the students' remaining tenure within the Department of Chemistry & Biochemistry.

**CHEM 5381. ADVANCED LABORATORY TECHNIQUES IN CHEMISTRY I. 3 Hours.**

The course will introduce to advanced laboratory techniques used in research laboratories in the Chemistry department. Handling of chemicals, synthesis procedures, characterization methods, data analysis, and safety regulations. Student will engage in reading primary literature and detailed process descriptions. Goal is to prepare students for successful work on their initial research project.

**CHEM 5382. ADVANCED LABORATORY TECHNIQUES IN CHEMISTRY II. 3 Hours.**

The course will continue to provide up-to-date laboratory techniques used in research laboratories in the Chemistry department. Synthesis procedures, analytical instrumentation, characterization methods, and data analysis. Free literature studies and assignments by instructor will prepare student for research and development. Goal is to support the research progress of students towards their comprehensive exam. Prerequisite: CHEM 5381.

**CHEM 5383. ADVANCED LABORATORY TECHNIQUES IN CHEMISTRY III. 3 Hours.**

The course will complete exposure to advanced laboratory techniques used in research laboratories in the Chemistry department and will make students ready for developing their own project proposal. Synthesis procedures, analytical instrumentation, characterization methods, and data analysis. Literature studies and explicit writing of scientific notes will prepare students for their comprehensive exam. Prerequisite: CHEM 5381, CHEM 5382.

**CHEM 5391. READINGS IN CHEMISTRY. 3 Hours.**

Conference course which may be repeated for credit, with credit granted according to work performed. Graded P/F/R only. Prerequisite: permission of instructor.

**CHEM 5392. RESEARCH IN CHEMISTRY. 3 Hours.**

Conference course with laboratory with credit granted according to work performed. May be repeated for credit. Graded P/F/R only. Prerequisite: permission of instructor.

**CHEM 5398. THESIS. 3 Hours.**

Graded R/F only. Prerequisite: permission of instructor.

**CHEM 5421. ANALYTICAL INSTRUMENTATION. 4 Hours.**

Theory of instrumentation and chemical signal source. Practical experiments utilizing atomic and molecular absorption and emission spectroscopy, chromatographic analysis, and electrochemical techniques.

**CHEM 5491. READINGS IN CHEMISTRY. 4 Hours.**

Conference course which may be repeated for credit, with credit granted according to work performed. Graded P/F/R only. Prerequisite: permission of instructor.

**CHEM 5492. RESEARCH IN CHEMISTRY. 4 Hours.**

Conference course with laboratory with credit granted according to work performed. May be repeated for credit. Graded P/F/R only. Prerequisite: permission of instructor.

**CHEM 5591. READINGS IN CHEMISTRY. 5 Hours.**

Conference course which may be repeated for credit, with credit granted according to work performed. Graded P/F/R only. Prerequisite: permission of instructor.

**CHEM 5592. RESEARCH IN CHEMISTRY. 5 Hours.**

Conference course with laboratory with credit granted according to work performed. May be repeated for credit. Graded P/F/R only. Prerequisite: permission of instructor.

**CHEM 5691. READINGS IN CHEMISTRY. 6 Hours.**

Conference course which may be repeated for credit, with credit granted according to work performed. Graded P/F/R only. Prerequisite: permission of instructor.

**CHEM 5692. RESEARCH IN CHEMISTRY. 6 Hours.**

Conference course with laboratory with credit granted according to work performed. May be repeated for credit. Graded P/F/R only. Prerequisite: permission of instructor.

**CHEM 5698. THESIS. 6 Hours.**

Graded P/F/R only. Prerequisite: permission of instructor.

**CHEM 5998. THESIS. 9 Hours.**

Graded P/F/R only. Prerequisite: permission of instructor.

**CHEM 6004. CHEMISTRY CAREER DEVELOPMENT. 0 Hours.**

Every PhD-bound student is required to spend time for professional development outside their UTA laboratory. Possible opportunities include traditional internships in an industrial setting, working at a national laboratory, international exchange programs, extended collaborative visits, teaching engagements, and other educational projects outside UTA. The career advancement may consist of one or multiple portions, in total time no less than three and not more than six months. Prerequisite: Permission of research supervisor and graduate advisor.

**CHEM 6011. TOPICS IN GRADUATE RESEARCH. 0 Hours.**

Lectures by departmental and university faculty on current chemical research at U.T. Arlington. All graduate students are required to take this course once. May not be counted toward degree requirements. Graded P/F only.

**CHEM 6012. ISSUES IN MODERN CHEMICAL RESEARCH. 0 Hours.**

Topics to be discussed include the use of the library, maintenance of a research notebook, ethics in research, aspects of technical writing and presentations, and how research is funded. May not be counted toward degree requirements.

**CHEM 6104. CHEMISTRY CAREER DEVELOPMENT. 1 Hour.**

Every PhD-bound student is required to spend time for professional development outside his UTA laboratory. Possible opportunities include traditional internships in an industrial setting, working at a national laboratory, international exchange programs, extended collaborative visits, teaching engagements and other educational projects outside UTA. The career advancement may consist of one or multiple portions, in total time no less than three and not more than six months. Prerequisite: Permission of research supervisor and graduate advisor.

**CHEM 6202. PRINCIPLES OF INDUSTRIAL CHEMISTRY. 2 Hours.**

Survey of industrial inorganic and organic chemical processes. Prerequisite: permission of instructor.



**CHEM 6203. REGULATORY ASPECTS OF THE CHEMICAL INDUSTRY. 2 Hours.**

Survey of chemical toxicology, regulatory aspects involved in the chemical industry, industrial safety, patents and patent law.

**CHEM 6304. CHEMISTRY CAREER DEVELOPMENT. 3 Hours.**

Every PhD-bound student is required to spend time for professional development outside his UTA laboratory. Possible opportunities include traditional internships in an industrial setting, working at a national laboratory, international exchange programs, extended collaborative visits, teaching engagements and other educational projects outside UTA. The career advancement may consist of one or multiple portions, in total time no less than three and not more than six months. Prerequisite: Permission of the research supervisor and Graduate Advisor.

**CHEM 6399. DISSERTATION. 3 Hours.**

Graded R/F only. Prerequisite: admission to candidacy for the degree of Ph.D. in Applied Chemistry.

**CHEM 6699. DISSERTATION. 6 Hours.**

Graded R/F/P/W. Prerequisite: admission to candidacy for the degree of Ph.D. in Applied Chemistry.

**CHEM 6904. CHEMISTRY CAREER DEVELOPMENT. 9 Hours.**

Every PhD-bound student is required to spend time for professional development outside his UTA laboratory. Possible opportunities include traditional internships in an industrial setting, working at a national laboratory, international exchange programs, extended collaborative visits, teaching engagements and other educational projects outside UTA. The career advancement may consist of one or multiple portions, in total time no less than three and not more than six months. Prerequisite: Permission of Graduate Advisor and research supervisor.

**CHEM 6999. DISSERTATION. 9 Hours.**

Graded P/F/R only. Prerequisite: admission to candidacy for the degree of Ph.D. in Applied Chemistry.

**CHEM 7399. DOCTORAL DEGREE COMPLETION. 3 Hours.**

This course may be taken during the semester in which a student expects to complete all requirements for the doctoral degree and graduate. Enrolling in this course meets minimum enrollment requirements for graduation, for holding fellowships awarded by The Office of Graduate Studies and for full-time GTA or GRA positions. Students should verify that enrollment in this course meets other applicable enrollment requirements. To remain eligible in their final semester of study for grants, loans or other forms of financial aid administered by the Financial Aid Office must enroll in a minimum of 5 hours as required by the Office of Financial Aid. Other funding sources may also require more than 3-hours of enrollment. Additional hours may also be required to meet to requirements set by immigration law or by the policies of the student's degree program. Students should contact the Financial Aid Office, other sources of funding, Office of International Education and/or their graduate advisor to verify enrollment requirements before registering for this course. This course may only be taken twice. Students who do not complete all graduation requirements while enrolled in this course must enroll in a minimum of 6 dissertation hours (6699 or 6999) in their graduation term. Graded P/F/R.

## COURSES

**CHIN 1441. BEGINNING CHINESE I. 4 Hours. (TCCN = CHIN 1411)**

Multimedia immersion in the culture and language of China. Designed to enable students to understand and communicate effectively in Chinese at the beginning level. No prerequisites.

**CHIN 1442. BEGINNING CHINESE II. 4 Hours. (TCCN = CHIN 1412)**

Continuation of beginning Chinese. Prerequisite: CHIN 1441 with a grade of C or better.

**CHIN 1491. CONFERENCE COURSE. 4 Hours.**

Independent study; consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: Permission of the instructor.

**CHIN 2301. LITERATURE IN TRANSLATION. 3 Hours.**

The works of major authors and intellectual trends of a given period or periods. May be repeated for credit as topics or periods vary. CHIN 2301 may be taken to fulfill the foreign language requirement. Prerequisite: ENGL 1301 and ENGL 1302.

**CHIN 2310. CHINESE CULTURE IN THE WORLD. 3 Hours.**

An overview of the cultures of the Chinese-speaking world in a global context, examining cultural products such as food, art, music, popular culture, literature, and/or film. Taught in English.

**CHIN 2311. TOPICS IN CHINESE LANGUAGE AND CULTURE FOR STUDY ABROAD. 3 Hours.**

This course provides study abroad students with firsthand experience in language and culture in the Chinese-speaking world. Students will engage directly with native speakers, practice language skills in real-world scenarios, and explore the cultural landscapes of China or Taiwan. Through this experience, students will develop linguistic proficiency and cultural awareness that go beyond classroom learning. May be repeated as the topic changes.

**CHIN 2313. INTERMEDIATE CHINESE I. 3 Hours. (TCCN = CHIN 2311)**

Continued immersion in the culture and language of China. Application of strategies and technology in mastering listening, speaking, reading, and writing at the intermediate level. Prerequisite: CHIN 1442 with a grade of C or better.

**CHIN 2314. INTERMEDIATE CHINESE II. 3 Hours. (TCCN = CHIN 2312)**

Continuation of intermediate Chinese. Prerequisite: CHIN 2313 with a grade of C or better.

**CHIN 2391. CONFERENCE COURSE. 3 Hours.**

Independent study; consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: Permission of the instructor.

**CHIN 3303. CHINESE CONVERSATION. 3 Hours.**

Practice in oral expression with an emphasis on vocabulary building, listening comprehension, and speaking skills. Of special interest to students who wish to improve their skills in pronunciation, comprehension, and oral expression. Credit will not be granted to native speakers of Mandarin Chinese. However, heritage students may register for this course when they pass the Chinese CLEP test administered by the instructor. Prerequisite: CHIN 2314 with a grade of C or better.

**CHIN 3304. CHINESE CONVERSATION AND CULTURE II. 3 Hours.**

Students continue to develop conversational skills and cultural knowledge through the use of readings, film, and other media. Extensive conversation practice allows students to develop advanced-intermediate level oral skills in a broad range of communicative and cultural contexts. Students learn to express abstract ideas through description, comparison, and narration. Credit will not be granted to native speakers of Mandarin Chinese. Heritage speakers may register for the course with consent of the department. Prerequisite: CHIN 2314 with a grade of C or better.

**CHIN 3305. CHINESE READING AND COMPOSITION. 3 Hours.**

Analysis of Chinese texts and composition with emphasis on reading comprehension, grammar and vocabulary, and writing techniques. Readings may include newspaper/website articles and short stories, online postings, text messages, comic books, print advertisements, and essays on various topics of Chinese culture. Prerequisite: CHIN 2314 with a grade of C or better.

**CHIN 3310. CHINESE LOCALIZATION AND TRANSLATION. 3 Hours.**

Introduction to cultural and linguistic issues in the translation of Chinese language texts. Students will explore current technologies used in various real-world translation contexts and how to adapt texts, products, and services to the locale for which they are intended. Prerequisite: CHIN 2314 or the equivalent with a grade of B or better. May not be repeated for credit.

**CHIN 3311. CHINESE LOCALIZATION AND TRANSLATION II. 3 Hours.**

Continued study of cultural and linguistic issues in the translation of Chinese and English language texts. Systematic development of advanced skills in localization and computer-aided translation and in using TMX/TBX (international standards for translation memory and terminology exchange) tools. Translation practice, individually and in translation teams, with increasingly longer and more specialized texts. Prepares localization and translation specialists for real-world careers in the language-services industry. May not be repeated. Prerequisite: CHIN 3310 with a grade of B or better.

**CHIN 3345. INTRODUCTION TO COMPUTER-ASSISTED TRANSLATION. 3 Hours.**

Introduction to computer-assisted translation (CAT), machine translation (MT), translation memory (TM) and terminology management tools in modern translation and localization workflows. Prepares students for real-world careers in the language services industry. Exclusively for students pursuing a minor in Localization and Translation-Chinese. CHIN 3310 is strongly recommended before CHIN 3345.

**CHIN 3391. CONFERENCE COURSE. 3 Hours.**

Independent study; consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: Permission of Instructor.

**CHIN 3393. CHINESE INTERNSHIP. 3 Hours.**

A combination of field-related experience in the business or service sector with an academic component. Coursework may include journal writing, outside readings, reflection papers, and formal presentations. Prerequisite: Permission of Instructor.

**CHIN 4334. CONTEMPORARY CHINESE CULTURE. 3 Hours.**

Examination of contemporary Chinese culture, with a focus on current events relevant to the Chinese-speaking world. Topics may include: language and culture, literature, film, business culture, and traditions. Students may take the course in English or in Chinese.

**CHIN 4335. BUSINESS CHINESE. 3 Hours.**

Study of skills and etiquette vital to functioning in business environments using Chinese. Emphasis is placed on Chinese cultural traditions including traditions of Chinese philosophy and major differences in ideological perspectives between the East and West. Business etiquette and terminology for use in business environments are introduced and practiced. Vocabulary and cultural knowledge are reinforced through lecture, translation, peer discussion, readings, and digital media. Taught in English. No prior Chinese language background is required.

**CHIN 4336. CLASSICAL CHINESE THOUGHT: THE ART OF WAR BY SUN TZU. 3 Hours.**

This course examines the world renowned Chinese classical book The Art of War by Sun Tzu, a highly recommended reading among generals, political strategists, and business leaders worldwide for two millennia. May include textual analysis and discussion of conflict management strategies and their application from ancient to modern times. Students of Chinese can read the material in Chinese. No prior Chinese language background required.

**CHIN 4391. CONFERENCE COURSE. 3 Hours.**

Independent study in the preparation of a paper or a translation on a research topic; consultation with instructor on a regular basis. May be repeated for credit.

**CHIN 4393. CHINESE INTERNSHIP. 3 Hours.**

This course is a combination of field-related experience in the business or service sector with an academic component. Coursework may include journal writing in Chinese, outside readings, and formal presentations. Prerequisite: Two CHIN 3000 level courses and permission of the instructor.

**COURSES****CLAS 1300. INTRODUCTION TO CLASSICAL MYTHOLOGY. 3 Hours.**

Major Greek and Roman myths and their influence, with emphasis on the visual arts from antiquity to the present, including popular films.

**CLAS 2105. CLASSICAL STUDIES ABROAD. 1 Hour.**

Short-term excursion to sites of importance in the ancient Greco-Roman world. Offered in summer term, Wintermester, or Maymester. May be taken more than once as topic varies.

**CLAS 2300. HOLLYWOOD CLASSICS: THE ANCIENT WORLD IN FILM. 3 Hours.**

Comparative study of contemporary films set in the ancient world and the literary sources on which they are based, with emphasis on the reception and reshaping of the Classical heritage by filmmakers to reflect the cultural values and interests of contemporary audiences.

**CLAS 2303. THE CLASSICAL ROOTS OF ENGLISH VOCABULARY. 3 Hours.**

The study of etymology (word origins) focusing on the large stock of English words derived from ancient Greek and Latin prefixes, roots and suffixes. Recommended for students seeking to improve their general vocabulary and reading comprehension, and as preparation for graduate and professional school entrance exams.

**CLAS 2305. TOPICS IN CLASSICAL CIVILIZATION. 3 Hours.**

Survey of a particular topic in the realm of Classical studies. May include literature, history, mythology, religion, and the visual arts. Can be offered on campus or as a study-abroad course. May be repeated as topic changes.

**CLAS 2307. WOMEN IN THE ANCIENT WORLD. 3 Hours.**

Exploration of roles and images of women in ancient Greece and Rome, using a variety of primary (ancient) sources: literature, legal and medical texts, visual art, and inscriptions. Offered as CLAS 2307 and GWSS 2307. Credit will be granted only once.

**CLAS 3310. INTRODUCTION TO GREEK CIVILIZATION. 3 Hours.**

Ancient Greek culture through the death of Alexander the Great (323 B.C.). Topics covered include politics and society, literature, art, philosophy, and religion. Credit may not be received for both CLAS 2310 (as the course was previously numbered) and CLAS 3310.

**CLAS 3320. INTRODUCTION TO ROMAN CIVILIZATION. 3 Hours.**

Roman life and thought through the second century A.D. A broad cultural survey including politics and society, literature, art, philosophy, religion and law. Credit may not be received for both CLAS 2320 (as the course was previously numbered) and CLAS 3320.

**CLAS 3323. TOPICS IN CLASSICAL MYTHOLOGY. 3 Hours.**

Advanced study of Greek and/or Roman myths, with emphasis on the cultural context and methods of myth interpretation (anthropological, psychoanalytical, structuralist, etc.). May be repeated for credit with departmental permission.

**CLAS 3335. TOPICS IN CLASSICAL STUDIES. 3 Hours.**

Studies in the social, political, and cultural development of the ancient Greeks and Romans, including their influence on subsequent societies. May be repeated for credit with departmental permission.

**CLAS 4391. CONFERENCE COURSE. 3 Hours.**

Independent study in the preparation of a paper on a research topic; consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: consent of the department and completion of or concurrent enrollment in a 3000 level course.

**CLAS 4394. SENIOR THESIS/HONORS THESIS. 3 Hours.**

A thesis or project completed during the senior year under the direction of a faculty member. Required of all students in the University Honors College.

**CLAS 5392. TOPICS IN CLASSICAL STUDIES. 3 Hours.**

Studies in the social, political and cultural systems of the ancient Greeks and Romans, including their influence upon subsequent societies. May be repeated for credit as the topic changes.

## COURSES

**CM 1311. CONSTRUCTION DRAFTING. 3 Hours.**

Introduction to computer aided drafting, using AutoCAD.

**CM 1331. CONSTRUCTION SURVEYING. 3 Hours.**

Introduction to surveying including distance measurement, corrections, leveling, measurement of angles and directions, traverse adjustment, volumes, cross section and area computations, and error theory. Methods and technologies such as Excel, MathCAD, global positioning system and geographic information systems used to manage data in surveying. Emphasis on the use of total stations. Prerequisite: Grade of C or better in CM 1311.

**CM 2311. INTRODUCTION TO CONSTRUCTION MANAGEMENT. 3 Hours.**

Characteristics of the construction industry; types of construction companies, contracts, people involved in a project, their responsibilities and interrelationships; ethical conduct; evolution of a project; interpreting working drawings; construction bonds; contract documents.

**CM 2313. CONSTRUCTION MATERIALS AND METHODS. 3 Hours.**

Materials, methods and sequences of the construction process; emphasis on design, specification, purchase and use of concrete, steel, masonry and wood. An understanding of the uses of construction materials. Prerequisite: Grade of C or better in CM 2311.

**CM 2315. INTRODUCTION TO MECHANICS FOR CONSTRUCTION. 3 Hours.**

Structural behavior in buildings; forces, moments, support reactions; free-body diagrams, equilibrium; internal forces in columns and beams; deflection; buckling. Prerequisite: Grade of C or better in MATH 1303 and PHYS 1441.

**CM 2331. CONSTRUCTION DOCUMENTS. 3 Hours.**

Introduction to construction documents and applicable software for use in communicating building design intentions to field personnel, including an understanding of how to interpret, explain, quantify and use construction documents to bid, construct and manage construction projects. Prerequisite: Grade of C or better in CM 2311.

**CM 2391. PROBLEMS IN CONSTRUCTION MANAGEMENT. 3 Hours.**

Selected problems in construction management on an individual or group basis. Reference material is assigned and progress conferences are held frequently, by arrangement, with a faculty supervisor. Prerequisite: Permission of the chair of the department.

**CM 3313. CONSTRUCTION ESTIMATING I. 3 Hours.**

Systems approach to determining required quantities of construction materials; quantification of various types of foundation systems, structural systems and building envelope systems; excerpts of contract documents from a variety of different building projects and materials; plan reading. Prerequisite: Grade of C or better in MATH 1303 and CM 2331; Permission of the CE Chair or admission to the CM Professional Program.

**CM 3315. CONSTRUCTION LAW AND ETHICS. 3 Hours.**

Introduction to basic contract and tort issues and their application in the construction industry; delineation of the various types of contracts and remedies available to parties involved in a construction project; additional related topics including bidding, delays, mechanics liens, site conditions, warranties and the Uniform Commercial Code as it relates to the construction industry. Prerequisite: Grade of C or better in CM 2331; Permission of the CE Chair or admission to the CM Professional Program.

**CM 3331. MECHANICAL AND ELECTRICAL SYSTEMS. 3 Hours.**

Mechanical and electrical systems with a major emphasis on estimating and installation, design and control of the electrical, heating, ventilation and cooling system, site planning and acoustical treatments. Prerequisite: Grade of C or better in PHYS 1442; Permission of the CE Chair or admission to the CM Professional Program.

**CM 3333. CONSTRUCTION DESIGN I. 3 Hours.**

The principles flexure and shear, deflections, buckling are used to consider design/build construction including building systems, building codes, criteria and selection, economic feasibility, value engineering, customer control, and value-added construction services as well as an introduction to Building Information Modeling BIM. Prerequisite: Grade of C or better in CM 2315; Permission of the CE Chair or admission to the CM Professional Program.

**CM 3335. SOILS AND FOUNDATION IN CONSTRUCTION. 3 Hours.**

Introduction to soil types found on construction projects; properties and classification of soil, embankment control, dewatering, excavation supports, foundations, piers, and pilings. Prerequisite: Grade of C or better in CM 2315; Permission of the CE Chair or admission to the CM Professional Program.

**CM 3337. CONSTRUCTION ADMINISTRATION AND ECONOMICS. 3 Hours.**

Project planning, cost controls, and construction related financial documents including: schedule of values, labor and operations cost reports, income statements, balance sheets and construction budgets; emphasis on the development of techniques required to ethically and effectively monitor the financial aspects of a construction project. Prerequisite: Grade of C or better in CM 2331 and MATH 1303; Permission of the CE Chair or admission to the CM Professional Program.

**CM 3339. CONSTRUCTION SAFETY. 3 Hours.**

Examines the application of OSHA 29CFR 1926 for the construction industry along with applicable state and federal construction safety laws pertaining to construction, alterations, or repair work at a construction site. Prerequisite: Grade of C or better in CM 2331; Permission of the CE Chair or admission to the CM Professional Program.

**CM 3341. CONSTRUCTION DESIGN. 3 Hours.**

Application of statics and strength of materials for design and construction of concrete, masonry, steel, and timber building structures. Prerequisite: Grade of C or better in CM 2315; Permission of the CE Chair or admission to the CM Professional Program.

**CM 4111. CONSTRUCTION MANAGEMENT CAPSTONE I. 1 Hour.**

This course is the first in the Construction Management capstone series and provides project definition, project planning, scheduling, and results in a presentation and plan for implementing during Capstone II. Prerequisite: Grade of C or better in CM 3333; Permission of the CE Chair or admission to the CM Professional Program.

**CM 4300. ADVANCED TOPICS IN CONSTRUCTION MANAGEMENT. 3 Hours.**

Advanced topics of current interest in any one of the various fields of construction management. The subject title to be listed in the class schedule. May be repeated for credit when topic changes. Prerequisite: Admission to the professional program and consent of the department chair.

**CM 4301. ADVANCED TOPICS IN CONSTRUCTION MANAGEMENT WITH LAB. 3 Hours.**

Advanced topics of current interest in any one of the various fields of construction management. The subject title to be listed in the class schedule. May be repeated for credit when topic changes. Prerequisite: Admission to the professional program and permission of the chair of the department.

**CM 4304. CONSTRUCTION CONTRACTS. 3 Hours.**

Types of construction contracts, contractual relationship between general contractor and owner, contractual relationship between general contractor and subcontractors, legal issues in construction administration, insurance, and concepts in value engineering. Reading and evaluating specifications, CSI Master Format. Prerequisite: Grade of C or better in CM 3315 and CM 3337; Admission to the CM Professional Program.

**CM 4306. BUILDING CONSTRUCTION CONTRACTS. 3 Hours.**

Types of construction contracts, contractual relationship between general contractor and owner, contractual relationship between general contractor and subcontractors, legal issues in construction administration, insurance, and concepts in value engineering. Reading and evaluating specifications, CSI Master Format. Prerequisite: Grade of C or better in CM 3315; Grade of C or better in CM 3337; Admission to the CM Professional Program.

**CM 4313. CONSTRUCTION DESIGN II. 3 Hours.**

Application of statics and strength of materials for construction of steel buildings with computer analysis and design. Prerequisite: Grade of C or better in CM 3333 and Admission to the CM Professional Program.

**CM 4315. CONSTRUCTION ESTIMATING II. 3 Hours.**

Quantification and pricing of direct field costs and general condition costs from construction documents; the preparation of complete lump sum bid package ready for project execution; utilization of complete set of contract documents required; plan reading. Prerequisite: Grade of C or better in ACCT 2301 and CM 3313 and Admission to the CM Professional Program.

**CM 4317. CONSTRUCTION SCHEDULING. 3 Hours.**

An introduction to construction project management scheduling covering concepts of project selection and scheduling, utilizing the estimate to predict the schedule, scheduling subcontracting, cost controls, project documentation, construction bonds, insurance, payments and the elements of close out; development of professional communication skills through student prepared multi-media presentations. Prerequisite: Grade of C or better in CM 3313 and Admission to the CM Professional Program.

**CM 4331. CONSTRUCTION MANAGEMENT CAPSTONE. 3 Hours.**

Utilize information from all previous courses to give an understanding of the construction management profession culminating in a semester project and presentation. A response to an RFP announcement or bid will be prepared for each team project. Prerequisite: Grade of C or better in CM 4315, CM 4317, CM 4351, and CM 4357; Completion of all required 3000 level CM courses; Admission to the CM Professional Program.

**CM 4332. CONSTRUCTION FIELD OPERATIONS. 3 Hours.**

Introduction to the construction industry and the methods, equipment, and management techniques used. Topics include equipment operating characteristics, underground construction, job site safety, and field management. Prerequisite: Grade of C or better in CM 2313 and CM 3335; Admission to the CM Professional Program.

**CM 4334. DRONES & ADVANCED CONSTRUCTION TECHNOLOGY. 3 Hours.**

A practical course for technologies and their applications used on construction job sites. Topics include drones (also known as sUAS, or small unmanned aircraft systems), robotics, extended reality, artificial intelligence, blockchain, wearables, etc. Practical sessions are included to train students to operate drones for various construction applications. Prerequisite: Grade of C or better in CM 2311 and admission to the BSCM Professional Program.

**CM 4335. GEOTECHNICAL ASPECTS OF CONSTRUCTION. 3 Hours.**

Review of engineering geology and soil mechanics; interpretation of geotechnical reports; site preparation; ground improvement; excavation including supports and dewatering; foundations including consideration of deep foundations and expansive soils; tunneling in soils and rock. Prerequisite: Grade of C or better in CM 3335 and admission to the CM Professional Program.

**CM 4337. LAND AND SITE DEVELOPMENT. 3 Hours.**

Introduction to site planning and its process. This course covers important characteristics of Site Planning involved in a construction project including land features, uses, buildings, regulations, local community cultures, and site analysis and planning. Students will work on developing a site plan for the end of semester project. Prerequisite: Grade of C or better in CM 1331 and CM 3335; Admission to the CM Professional Program.

**CM 4351. BUILDING INFORMATION MODELING FOR CONSTRUCTION MANAGEMENT. 3 Hours.**

Introduction to techniques used in development and management of Building Information Models. Emphasis on constructability and management. Prerequisite: Grade of C or better in CM 3341 and admission to the CM Professional Program.

**CM 4353. RESIDENTIAL AND COMMERCIAL CONSTRUCTION. 3 Hours.**

A senior course for students preparing to enter the project management of residential and commercial construction projects, including: aspects of design, bidding/estimating, presentation, value engineering, contracts/negotiation, subcontractor relations, cost controls, management during construction, close out, and post-construction requirements. Prerequisite: Admission to the CM Professional Program.

**CM 4357. SUSTAINABLE BUILDING PRACTICE. 3 Hours.**

Ethics and application of environmental sustainability practice in building construction. Introduction to U.S. Green Building Council LEED program standards, methods, and procedures as applied to construction documents interpretation and construction. Prerequisite: Admission to the CM Professional Program.

**CM 4359. INDUSTRIAL INTERNSHIP I. 3 Hours.**

Program provides for a learning experience in a construction management environment appropriate to the undergraduate level of work with a minimum of 150 hours of work. A written report of the experience and a presentation are required. Prerequisite: Permission of instructor and admission to the CM Professional Program.

**CM 4360. INDUSTRIAL INTERNSHIP II. 3 Hours.**

Student to experience industrial internship under supervision of an industrial mentor and internship instructor. Prerequisite: CM 4359; Admission to the CM Professional Program.



**CM 4391. PROBLEMS IN CONSTRUCTION MANAGEMENT. 3 Hours.**

Selected problems in construction management on an individual or group basis. Reference material is assigned and progress conferences are held frequently, by arrangement, with a faculty supervisor. Prerequisite: Permission of the chair of the department and admission to the CM Professional Program.

**CM 5300. TOPICS IN CONSTRUCTION MANAGEMENT. 3 Hours.**

Topics of current interest in the field of construction management. The subject title is listed in the class schedule and in the student's record. Topics vary. May be repeated for credit when topic changes. Prerequisite: Consent of instructor.

**CM 5301. TOPICS IN CONSTRUCTION MANAGEMENT WITH LAB. 3 Hours.**

Topics of current interest in the field of construction management. The subject title is listed in the class schedule and in the student's record. Topics vary. May be repeated for credit when topic changes. Prerequisite: Consent of instructor.

**CM 5313. GEOTECHNICAL ASPECTS OF CONSTRUCTION. 3 Hours.**

Review of engineering geology and soil mechanics and teaching of the foundation and underground excavation construction solely to graduate students specializing in construction engineering & management. Topics include interpretation of geotechnical reports, embankment construction, foundations on expansive soils, excavation supports, excavation dewatering, deep foundation construction, tunneling in soft ground as well as in soft/hard rock, and trenchless technology piping. Prerequisite: CM 5378.

**CM 5339. STATISTICS FOR CONSTRUCTION. 3 Hours.**

Point estimation, interval estimation, sample size determination, tests of hypothesis, analysis of variance, linear regression, matrix methods for multiple linear regression, polynomial regression, transformations, non-linear regression. Prerequisite: Grade of C or better in CE 3301.

**CM 5340. CONSTRUCTION PROJECT ACQUISITION. 3 Hours.**

Fundamentals of acquiring the required goods and services necessary to fulfill the obligations of the construction contract. Service and subcontractor contracts, negotiating tactics and strategies, material pricing; and dispute resolution. The course includes negotiation practice based on typical construction acquisition situations to help prepare the student with experience of negotiating in the real world of construction and business. Prerequisite: Consent of instructor.

**CM 5342. CONSTRUCTION PROJECT ADMINISTRATION. 3 Hours.**

Topics in construction management and project administration, such as project delivery system, documentation and specification, electronic project administration, construction safety, risk allocation and liability sharing, changes and extra work, claims and disputes, and project closeout. Credit not granted for CE 4303 and CM 5342.

**CM 5343. ADVANCED BUILDING INFORMATION MODELING. 3 Hours.**

Introduction to current Building Information Modeling (BIM); Discussion of the role of BIM in Construction Engineering and Management; Revit Architecture, Structure, and MEP; Creating sets, building elements, structural systems, and MEP systems; BIM and clash detection; BIM and Construction Cost Estimating and Scheduling.

**CM 5344. CONSTRUCTION METHODS: FIELD OPERATIONS. 3 Hours.**

Introduction to the methods, equipment, and management techniques used in the construction industry. Topics include equipment operating characteristics, job site safety, and field management. Credit not granted for CE 4332 and CM 5344.

**CM 5345. INFRASTRUCTURE EVALUATION, MAINTENANCE, AND RENEWAL. 3 Hours.**

This course is designed for engineers and managers involved in infrastructure development, sustainability, and replacement. Topics include asset management, inspection, evaluation, maintenance, and renewal alternatives for waste collection and water distribution systems, surface and subsurface drainage, pavements, bridges, culverts, buildings, and other structures. Prerequisite: Consent of instructor.

**CM 5350. RISK MANAGEMENT. 3 Hours.**

The risk management process including risk identification, monitoring, and control; integrated quantitative cost and schedule risk analysis.

**CM 5355. CONSTRUCTION MATERIALS. 3 Hours.**

Principles of construction related to construction regulations and standards, loads, fire safety, acoustics, joints and sealants. Systems of construction involving concrete, steel, wood, masonry, sealants, and soil, and including excavations, below grade construction, formwork, cladding, joints, windows, doors, roofing, and ceilings.

**CM 5377. CONSTRUCTION FINANCE. 3 Hours.**

Financial aspects and job costing of a construction project. Includes project management principles, budgets, cost codes, cost-to-complete, and financial reports specific to the management of a construction company and project control.

**CM 5378. CONSTRUCTION CONTRACTS, SPECIFICATIONS, & ADMINISTRATION. 3 Hours.**

Types of construction contracts, contractual relationship between general contractor and owner, contractual relationship between general contractor and subcontractors, legal issues in construction administration, insurance, and concepts in value engineering. Reading and evaluating specifications, CSI Master Format. Credit not granted for CE 4304 and CM 5378. Prerequisite: Consent of instructor.

**CM 5379. CONSTRUCTION COST ESTIMATING. 3 Hours.**

Types of estimates, development of unit costs, quantity takeoff, cost estimating using manual methods and computerized cost estimating, budgets, and costs.

**CM 5381. PUBLIC PRIVATE PARTNERSHIP FOR INFRASTRUCTURE PROJECTS. 3 Hours.**

Public-private partnership (P3) arrangements as an innovative approach to deliver public infrastructure projects. Topics include P3 benefits, limitations, contracting and implementation strategies. Prerequisite: Grade of C or better in CE 3310 or IE 2308, or consent of instructor.

**CM 5382. CONSTRUCTION SUSTAINABILITY. 3 Hours.**

Introduction to International Code Council's 2012 International Building Code and USGBC's LEED® New Construction Guidelines v.3 for constructing sustainable/green buildings. Review of building occupancy categories, construction types, allowable height and area, life safety requirements, rated building assemblies, and egress. Site selection, energy and water efficiency, material reuse and indoor air quality. Credit not granted for CE 4307 and CM 5382.

**CM 5386. CONSTRUCTION PLANNING & SCHEDULING. 3 Hours.**

Construction productivity, planning, & scheduling of operations, flow charts, linear programming, critical path method (CPM), program evaluation review techniques (PERT), precedence networks. Computer methods.

**CM 5387. CONSTRUCTION PRODUCTIVITY. 3 Hours.**

Evaluation of construction project management's effectiveness. An investigation of the advanced techniques required for improvement of construction projects including time, cost, quality management, preplanning, field evaluation techniques, time-lapse photograph, safety, human factors, and communications. Prerequisite: CM 5379.

**CM 5388. PIPELINE CONSTRUCTION AND TRENCHLESS TECHNOLOGY. 3 Hours.**

Pipeline and utility design, construction and renewal. Topics include pipeline infrastructure structural considerations, planning and construction considerations, pipe materials, and trenchless technologies. Credit not granted for CE 4305 and CE 5388. Prerequisite: Consent of instructor.

**CM 5389. PIPELINE SYSTEMS ASSET MANAGEMENT. 3 Hours.**

Pipeline systems asset management, inventory, inspection, and life cycle costs. Topics include pipeline deterioration parameters, asset management technologies, risk assessment, government regulations, renewal technologies, and case studies. Credit not granted for CE 4306 and CE 5389. Prerequisite: Consent of instructor.

## COURSES

**COMM 1300. INTRODUCTION TO COMMUNICATION. 3 Hours. (TCCN = COMM 1307)**

Application of communication theories and principles to human communication; from the oral tradition to the printing press, photography, electronic media, and information technology.

**COMM 2195. COMMUNICATION CAREER PRACTICUM. 1 Hour.**

Individual experience with direct supervision of a communication professional while working with approved profit and non-profit professional organizations. Individual conference should be arranged with supervising professor. See department for course qualifications. May be repeated up to a total of three times. Prerequisite: Department of Communication Majors only and permission of the department. Graded Pass/Fail.

**COMM 2311. WRITING FOR MASS MEDIA. 3 Hours. (TCCN = COMM 2311)**

Writing techniques in Associated Press style with practice in research and news writing. Credit will not be given for both COMM 2311 and JOUR 1345.

**COMM 2313. DIGITAL CULTURE AND MEDIA. 3 Hours.**

This course will inform students about how digital culture impacts worldviews. Students will learn how each aspect of the cultural diamond (producer, audience, content, and context) influences the creation, consumption, and interpretation of digital messages.

**COMM 2393. SPECIAL TOPICS. 3 Hours.**

Special studies in communication. Topic varies from semester to semester. May be repeated when topics change. Prerequisite: Permission of the department.

**COMM 3300. COMMUNICATION TECHNOLOGY. 3 Hours.**

Grounded on theories of mediated communication, this course examines the adoption and effects of current and emerging communication technologies. The course also examines the implications of technology convergence as well as social, economic, organizational factors that shape the design and use of communication technology. Prerequisite: 30 hours earned.

**COMM 3303. COMMUNICATION GRAPHICS. 3 Hours.**

History, current practice, principles and trends in typography, imaging, pre-press and production, sheet finishing, bindery, paper and ink, logo design, advertising layout, publication design, and computer layout, design, and publishing. Prerequisite: 30 hours earned.

**COMM 3310. COMMUNICATION LAW & ETHICS. 3 Hours.**

Study of constitutional, statutory, administrative, and ethical governance of communication and the mass media, including journalism, the Internet, advertising, and film. Rights and responsibilities of citizens, professional communicators, and corporations are addressed. Prerequisite: 60 or more hours earned.

**COMM 3315. COMMUNICATION THEORY. 3 Hours.**

Study of communication theories; interpersonal, organizational, mass media, and intercultural. This course also satisfies the requirements for UNIV 1101. Prerequisite: 30 hours earned.

**COMM 3345. VISUALIZING CULTURE: MEDIA, IDENTITY AND POLITICS IN THE GLOBAL WORLD. 3 Hours.**

Introduces students to key concepts in Visual Anthropology. This course highlights the contribution of anthropological methods in theorizing the visual in everyday life for the construction of nationalist, gender, ethnic, and class identities. Readings are drawn from diverse geographical regions. Visual material discussed in class may include ethnographic films, art, graphic novels, comics, illustrated magazines, virtual exhibitions and soap operas. Assignments include a writing and research component, and team-based exercises. Offered as ANTH 3345 and COMM 3345; credit will be granted only in one department.

**COMM 3346. DISABILITY IN MASS MEDIA. 3 Hours.**

Explores how mass media frames disability and neurodiversity for the general public. Focuses on issues related to disability and mass media representation, including journalism, TV, film, advertising, photography, documentary, video games, and the Internet. Topics may include media models of representation, inspiration porn, disability blogs, accessible media, and disabled mimicry in TV and film, among others. Offered as DS 3346 and COMM 3346; credit will be granted in only one department.

**COMM 3350. HEALTH COMMUNICATION. 3 Hours.**

Overview of health communication in interpersonal and organizational contexts as well as the role of mediated communication on human behavior and policy. Topics include the patient-provider relationship, mental health and illness, risky behaviors, and the role of media and technology in health communication. Prerequisite: 30 hours earned.

**COMM 4191. READINGS IN COMMUNICATION. 1 Hour.**

Readings addressing contemporary issues in communication. Proficiency in writing and research skills emphasized. Primarily for Communications majors. Prerequisite: 90 or more hours earned; 12 hours of 3000/4000 level in the department.

**COMM 4300. COMMUNICATION RESEARCH. 3 Hours.**

Introduction to communication research, design, and methodology. Readings and criticism in interpersonal, public address, and mass communication research; project required. Prerequisite: COMM 3315 and 60 hours earned.

**COMM 4305. COMMUNICATION & SOCIETY. 3 Hours.**

Readings and analysis of the role of communication in modern society; its impact on contemporary social, cultural, political, health, and intellectual trends. Prerequisite: COMM 3315 and 60 hours earned.

**COMM 4306. RACE, GENDER, AND MEDIA. 3 Hours.**

Examines issues related to race, gender, and media. Students learn how to think critically about media patterns of representation, ways they become interwoven in media structures, and how the media produce identities. Prerequisite: COMM 3315 and 60 hours earned, or permission of the department.

**COMM 4318. MEDIA SALES AND PROMOTION. 3 Hours.**

Study of broadcast rating services and terminology used to determine the audience of a particular radio or television operation. Demonstrates the importance of sales skills needed in the media, and the importance of account executives to radio and television stations. Emphasizes positioning media among competitors with respect to promotional and marketing plans designed to build and maintain an audience. Relationship of media ratings to programming and sales. Credit will not be granted for both BCMN 3318 and COMM 4318. Prerequisite: COMM 3315 and 60 hours earned.

**COMM 4325. COMMUNICATION HISTORY. 3 Hours.**

Evolution and trends in forms of human communication; development of symbols and media technology with attention to their effects on society. Prerequisite: COMM 3315 and 60 hours earned.

**COMM 4330. POLITICAL COMMUNICATION. 3 Hours.**

Communication theories, principles, and strategies in modern political campaigns and events. Prerequisite: COMM 3315 and 60 hours earned.

**COMM 4335. INTERCULTURAL COMMUNICATION. 3 Hours.**

Examination of verbal and nonverbal barriers to effective intercultural communication such as ethnocentrism, stereotyping, prejudice, racism, proxemics, kinesics, haptics, and chronemics. Developing effective communication in intercultural contexts. Prerequisite: COMM 3315 and 60 hours earned.

**COMM 4340. CORPORATE COMMUNICATION. 3 Hours.**

Examines organizational communication strategies with special emphasis on how communication affects corporate constituencies. Corporate image and identity are linked to corporate advertising, press releases, financial communication, internal communication and crisis communication. Prerequisite: COMM 3315 and 60 hours earned.

**COMM 4343. COMMUNICATION AND LEADERSHIP AMBASSADORS. 3 Hours.**

Study of leadership and persuasion. Students will participate in the Communication Ambassador Program and represent the Department of Communication at on- and off-campus recruitment events. The course focuses on leadership growth, offering hands-on experience in public speaking, event planning and coordination, and digital communication. Prerequisite: 60 hours earned, COMM 3315, and permission of the department.

**COMM 4351. FAMILY AND HEALTH COMMUNICATION. 3 Hours.**

Examines how the dynamics of family communication contribute to wellness through physical, psychological, and social domains. Investigates how family communication (e.g., parent-child, sibling, romantic, multigenerational, blended) affects our experience with health transitions, contributes to health outcomes, and is central to health promotion behavior. Prerequisite: COMM 3350 and 60 hours earned.

**COMM 4352. COMMUNICATION AND HEALTH DISPARITIES. 3 Hours.**

Examine health disparities experienced by populations due to factors such as race or ethnicity, gender, education or income, disability, geographic location (e.g., rural or urban), or sexual orientation. Explore issues of health disparities and health equity through the lens of communication. Study the role of communication in fostering health equity. Prerequisite: 60 hours earned.

**COMM 4360. EMERGING MEDIA STRATEGY. 3 Hours.**

Branding strategy for creating an effective professional presence across multiple communication platforms. Prerequisites: BCMN 2370, PREL 3320, COMM 3303, CTEC 2350, or permission of the Department.

**COMM 4391. CONFERENCE COURSE. 3 Hours.**

Topic assigned on an individual basis, covering individual research or study in the designated areas. May be repeated when topic changes. Prerequisite: 60 or more hours earned and permission of the department.

**COMM 4392. ADVOCACY AND POLITICS. 3 Hours.**

An introduction to challenges individuals face when advocating for an issue, an idea, or even themselves. The goal of the course is to help students grasp concepts relevant to their internship experiences as Archer Fellows in Washington D.C. Enrollment is restricted to designated Archer Fellows. Prerequisite: POLS 2311 and POLS 2312.

**COMM 4393. COMMUNICATION TOPICS. 3 Hours.**

Seminar in interdisciplinary topics. May be repeated when topic changes, for a maximum of nine credit hours. Prerequisite: 60 or more hours earned.

**COMM 4394. HON THESIS / SENIOR PROJECT. 3 Hours.**

Required of all students in the University Honors College. During the senior year, the student must complete a thesis or a project under the direction of a faculty member in the major department.

**COMM 5300. ADVANCED THEORIES IN COMMUNICATION. 3 Hours.**

Advanced study of communication theories: interpersonal, organizational, mass media and intercultural.

**COMM 5301. SUPERVISED TEACHING. 3 Hours.**

Application of theory to the practices of teaching college courses in communication. Students will handle all aspects of the classroom including lecturing, conducting class discussions, issuing assignments, grading and assigning grades under the supervision of the course director. No unit credit will be allowed toward advanced degree.

**COMM 5305. COMMUNICATION RESEARCH METHODS. 3 Hours.**

Study and application of communication research, design and methodology. Students will apply statistics in communication research and complete a research project/paper.

**COMM 5306. QUALITATIVE RESEARCH METHODS. 3 Hours.**

Advanced study and application of qualitative communication research, design and methodology. Prerequisite: COMM 5300 and COMM 5305.

**COMM 5307. HISTORICAL RESEARCH METHODS IN COMMUNICATION. 3 Hours.**

This course provides students with an introduction to historical methods that are relevant to research in communication.

**COMM 5310. THEORIES IN PERSUASION. 3 Hours.**

A comparison of traditional with contemporary behavioral science theories of persuasive discourse and their supporting research.

**COMM 5316. CORPORATION COMMUNICATION STRATEGIES. 3 Hours.**

Examines organizational communication strategies with special emphasis on how communication affects corporate constituencies. Corporate image and identity are linked to corporate advertising, press releases, financial communication, internal communication and crisis communication.

**COMM 5320. ADVANCED VISUAL COMMUNICATION. 3 Hours.**

Theory of visual communication in technical communication. Practice includes conceptualization, development and production.

**COMM 5321. ADVANCED INTERNET MARKETING COMMUNICATION. 3 Hours.**

Study of the use of information technology to optimize advertising, promotion, public relations and sales functions. Examines an infrastructure of the Internet and how it affects information retrieval, Web design, Web site management and Web site security. Discusses research strategies, usage trends and social implications.

**COMM 5323. COMPUTER-MEDIATED COMMUNICATION. 3 Hours.**

Study of theoretical and practical issues associated with modern communication technology and computer-mediated communication in interpersonal and organizational communication contexts.

**COMM 5332. ADVANCED PROFESSIONAL COMMUNICATION. 3 Hours.**

Advanced study of the theory and practice in written and oral presentations with emphasis on the application of communication theory in organizational and technical professions.

**COMM 5335. GLOBAL COMMUNICATION. 3 Hours.**

Examination of verbal and nonverbal barriers to effective intercultural and international communication. Developing effective communication in advanced study of communication theories: interpersonal, organizational, mass media and intercultural contexts and exploring the definition and impact of global communication.

**COMM 5341. MEDIA MANAGEMENT. 3 Hours.**

Study of media policy and regulation; media, cultural, and management theories; media economics; accounting and finance; business strategy, management and marketing.

**COMM 5345. COMMUNICATION CAMPAIGNS. 3 Hours.**

Advanced study of communication theories and research with the goal of developing strategic communication plans, including the selection of the appropriate vehicles and creative tactics. Team project required.

**COMM 5346. MEDIA AND PUBLIC POLICY. 3 Hours.**

Advanced study of communication theories and research related to understanding the linkage between media, public opinion and public policy. Individual and/or team project required.

**COMM 5347. CRISIS COMMUNICATION. 3 Hours.**

Advanced study of communication theories related to crisis communication and strategies used to communicate with stakeholders before, during and after crisis situations.

**COMM 5349. COMMUNICATION IN VIRTUAL ORGANIZATIONS. 3 Hours.**

This course examines the communication processes in virtual organizations. Communication, organizational, and management theories related to virtual organizations will be introduced. Students will learn to critically analyze specific communication issues in virtual organizations, such as organizational trust, knowledge management, communication and knowledge networks, employee relationships, and organizational identification.

**COMM 5350. HEALTH COMMUNICATION. 3 Hours.**

This course provides an overview of health communication in interpersonal contexts as well as the role of mediated communication on human behavior and policy.

**COMM 5351. POLITICAL COMMUNICATION. 3 Hours.**

This course emphasizes theoretical perspectives while also exploring, analyzing and evaluating the applied aspects of communication in politics. Students will engage in research according to their own specific interests within communication.

**COMM 5352. SOCIAL MEDIA THEORY AND PRACTICE. 3 Hours.**

At the intersection of mass and interpersonal communication, social media has reshaped how millions of people experience popular culture, journalism and politics. This course will involve advanced study of networked communication, social implications of these networks and the application of professional techniques for communicating via social media and measuring progress using available platform analytics.

**COMM 5353. DIGITAL MEDIA DATA ANALYTICS. 3 Hours.**

Study theories and practices related to the collection, analysis, presentation, and interpretation of data for digital communication purposes. Students will work on data analytics and data visualization projects.

**COMM 5391. CONFERENCE COURSE. 3 Hours.**

Topic assigned on an individual basis, covering individual research or study in the designated areas. Can be taken no more than two times for credit. Prerequisite: permission of the department.

**COMM 5392. SEMINAR. 3 Hours.**

Special topics. Topic varies from semester to semester. May be repeated when topic changes.

**COMM 5398. THESIS. 3 Hours.**

Student completion of a research project on a subject of primarily theoretical interest, intended for an academic audience. Prerequisite: satisfactory completion of coursework and consent of thesis advisor.

**COMM 5399. GRADUATE COMMUNICATION INTERNSHIP. 3 Hours.**

Practical training and experience in the field of communication. Applied communication research project is required. Course counts as an elective and has a pass/fail grade. No credit will be given for current employment, previous experience or activities. Prerequisite: Minimum nine graduate semester hours completed. Subject to departmental approval.

**COMM 5698. THESIS. 6 Hours.**

Student completion of a research study on a subject of primarily theoretical interest, intended for an academic audience. Prerequisite: satisfactory completion of thesis proposal defense and consent of thesis advisor.

## COURSES

**COMS 0185. FORENSICS. 1 Hour.**

Preparation for and participation in intercollegiate and intersquad forensic activities. Students engage in supervised research, development of debate skills and individual speaking activities. Prerequisite: permission.

**COMS 1301. FUNDAMENTALS OF PUBLIC SPEAKING. 3 Hours. (TCCN = SPCH 1315)**

Stress on development of the individual's speaking abilities and confidence in a variety of speaking situations.

**COMS 1302. VOICE AND DICTION. 3 Hours. (TCCN = SPCH 1342)**

Designed to improve the quality of the individual's speech. Enunciation, articulation, pronunciation, and the fundamentals of voice production. The phonetic alphabet as a visual means of teaching auditory differences.

**COMS 2302. PROFESSIONAL AND TECHNICAL COMMUNICATION FOR SCIENCE AND ENGINEERING. 3 Hours.**

Theory and practice in written and oral presentations with an emphasis on professional and technical communication for science and engineering. Prerequisites: 30 or more hours earned and ENGL 1301 or Student Group.

**COMS 2304. GROUP COMMUNICATION PRINCIPLES. 3 Hours. (TCCN = SPCH 2333)**

Principles and practice of effective interaction within small groups including meeting planning, agenda setting, conflict management, and decision making.



**COMS 2305. BUSINESS AND PROFESSIONAL COMMUNICATION. 3 Hours. (TCCN = SPCH 1321)**

Insight into communication skills. Designed to give the student experience in interviewing, business presentations, organizational reports, and the relationship of visual and oral presentations to business.

**COMS 3309. ORGANIZATIONAL COMMUNICATION. 3 Hours.**

Communication functions within formally structured social systems such as business, government, and education. Emphasis on conceptual schemes for conducting analysis of training programs in organizational communication. Credit will not be given for both COMS 3309 and PCOM 3309. Prerequisite: COMS 2304 with a grade of C or better (2.0/4.0), COMS 1301, and 3 hours of Math.

**COMS 3310. GROUP COMMUNICATION THEORY. 3 Hours.**

Characteristics of group communication including group function and formation, norms, cohesion, problem solving, leadership, and ethics. Prerequisite: COMS 2304 with a grade of C or better (2.0/4.0) and 3 hours of Math.

**COMS 3312. BACKGROUNDS OF PUBLIC ADDRESS. 3 Hours.**

Traditional works pertinent to theories of communication. Emphasis on discovering the traditional bases shared by empirical and critical studies of rhetorical communication. Prerequisite: COMS 1301 and COMS 2304 with a grade of C or better (2.0/4.0), or permission of the department.

**COMS 3315. COMMUNICATION FOR EDUCATORS. 3 Hours.**

Basic concepts, theories, research and processes relevant to formal and informal instructional situations. Units of study will focus on intrapersonal, interpersonal, small group, and presentational communication. Prerequisite: COMS 1301 and COMS 2304 with a grade of C or better (2.0/4.0), or permission of the department.

**COMS 3316. COMMUNICATION IN HUMAN RELATIONS. 3 Hours.**

The human communication process within social, business, and family contexts. Theories and principles of interpersonal communication. Prerequisites: 45 or more hours earned.

**COMS 3320. INTERVIEW PRINCIPLES. 3 Hours.**

Theory and practice in interviewing as it relates to information-gathering, questioning, and response analysis in probing, persuasive, employment, and survey interviews; practical and legal application in employment interviews; preparation of resume and cover letter. Prerequisite: One of the following: COMS 1301, COMS 2302, or COMS 2305.

**COMS 3321. ORAL INTERPRETATION OF LITERATURE. 3 Hours.**

The fundamental principles of oral interpretation and techniques of interpretation. Stresses background research concerning author and type of material. Prerequisite: COMS 1301. A grade of C or better in one of the following courses: COMS 2302, COMS 2304, COMS 2305.

**COMS 3323. ORAL INTERPRETATION OF CHILDREN'S LITERATURE. 3 Hours.**

Traditional oral interpretation principles and performance techniques as applied to various genres of children's literature. Prerequisite: COMS 1301, a grade of C or better in one of the following courses: COMS 2302, COMS 2304, COMS 2305.

**COMS 4300. PERSUASIVE COMMUNICATION. 3 Hours.**

Analysis of the means by which persuasive communication affects individuals and society. Extensive reading of theories of techniques of persuasion. Study of the adaptation of motivational appeals, structural strategies, and other persuasive techniques in interpersonal and public contexts. Prerequisite: COMM 3315 and COMS 1301; COMS 2304 with a grade of C or better (2.0/4.0).

**COMS 4302. MODERN PUBLIC ADDRESS. 3 Hours.**

Analysis of major 20th-century forms of public address and speakers. Application of various models for criticism and public address. Prerequisite: COMM 3315, COMS 1301, and a grade C or better in one of the following courses: COMS 2302, COMS 2304, COMS 2305; or permission of the department.

**COMS 4315. PROFESSIONAL PRESENTATIONS. 3 Hours.**

The role of internal and external informative and persuasive presentations in organizations. Extensive readings and practice with an emphasis on research, development, organization, and critical evaluation of oral and visual presentations. Credit will not be given for both COMS 4315 and PCOM 4315. Prerequisite: 60 hours complete and a C or better in one of the following courses: COMS 1301, COMS 2302, COMS 2304, or COMS 2305.

**COMS 4320. MANAGERIAL COMMUNICATION. 3 Hours.**

Analysis of the role of the business manager; readings in research and theory with emphasis on problem-solving and motivation. Credit will not be given for both COMS 4320 and PCOM 4320. Prerequisite: COMM 3315 and COMS 3309 with a grade of C or better (2.0/4.0), or permission of the department.

**COMS 4321. READERS THEATRE. 3 Hours.**

Readers interpret various kinds of literature for an audience. Analysis and criticism of literature are stressed. Prerequisite: COMM 3315, a grade of C or better (2.0/4.0) in COMS 3321 or COMS 3323, or permission of the department.

**COMS 4322. COMMUNICATION TRAINING AND DEVELOPMENT. 3 Hours.**

The process of analyzing communication problems and providing training skills for businesses and organizations. Emphasizes practical knowledge of facilitating skill improvement in verbal and nonverbal communication. Prerequisite: 60 hours complete and a C or better in one of the following courses: COMS 1301, COMS 2302, COMS 2304, or COMS 2305.

**COMS 4391. CONFERENCE COURSE. 3 Hours.**

Topics assigned on an individual basis, covering research or study in the designated areas. May be repeated when topic changes. Prerequisite: 60 or more hours earned and permission of the department.

**COMS 4393. COMMUNICATION TOPICS. 3 Hours.**

Special studies in speech. Topics will vary from semester to semester. May be repeated once when topics vary. Prerequisite: 60 hours earned, and permission.

**COMS 4395. PROFESSIONAL INTERNSHIP. 3 Hours.**

Individual research while working with business and industry. Individual conference to be arranged. Graded Pass/Fail. Prerequisite: 60 or more hours earned, and permission.

**COURSES****CRCJ 2334. INTRODUCTION TO THE CRIMINAL JUSTICE SYSTEM. 3 Hours. (TCCN = CRIJ 1301)**

An overview of the entire criminal justice system; history and development, law enforcement, prosecution and defense, courts and trial processes, and corrections. Formerly CRCJ 3334; credit will not be granted for both CRCJ 3334 and CRCJ 2334.

**CRCJ 2335. ETHICS AND THE CRIMINAL JUSTICE SYSTEM. 3 Hours.**

An examination of ethical issues confronted by criminal justice personnel and organizations. The course explores the standards and professional responsibilities of criminal justice practitioners, including law enforcement officers, officers of the courts, and juvenile and corrections officials.

**CRCJ 2340. CRIMINAL INVESTIGATION. 3 Hours. (TCCN = CRIJ 2314)**

Fundamentals of criminal investigation, including theory and history, conduct at crime scenes, sources of information, collection and preservation of evidence, case and trial preparation. Formerly CRCJ 2314; credit will be given for CRCJ 2340 or CRCJ 2314, but not both.

**CRCJ 2350. INTRODUCTION TO LAW ENFORCEMENT. 3 Hours.**

An overview of the historical and organizational development of police systems. Emphasis is placed on the function and organizational structure of law enforcement agencies and how these agencies interface with other components of the criminal justice system.

**CRCJ 3300. THEORETICAL CRIMINOLOGY. 3 Hours.**

The methodological and theoretical perspectives of the social and biological sciences as integrated into the criminal justice system. Prerequisite: CRCJ 2334.

**CRCJ 3307. INTRODUCTION TO SECURITY SYSTEMS. 3 Hours.**

Historical development of private security, its form and practice in modern society. Emphasis on three major divisions within the field: industrial, commercial and governmental security organizations and issues.

**CRCJ 3310. PROFESSIONAL WRITING FOR CRCJ MAJORS. 3 Hours.**

Designed to develop or enhance skills in varied writing styles used in the study of criminology and criminal justice. Legal, technical, and academic writing requirements are presented with emphasis on purpose, form and content. Specific focus is on technical reports for law enforcement agencies, legal research, field investigations, as well as proper citation and reference style. Open to CRCJ majors or minors only.

**CRCJ 3320. CYBERCRIME. 3 Hours.**

The course presents a conceptual overview of cybercrime and information security. Topics include: history of cybercrime, cybercrime techniques, cyberterrorism, forensics, and information security fundamentals.

**CRCJ 3330. FUNDAMENTALS OF LAW. 3 Hours.**

This course introduces students to areas of the law that affect the daily lives of U.S. residents. Emphasis is on fundamental criminal law and constitutional law principles which provide a platform for consideration of important public policy issues concerning crime, discrimination, health care, and immigration.

**CRCJ 3336. POLICE MANAGEMENT AND ADMINISTRATION. 3 Hours.**

Examines the principles of administration, management, politics and leadership with emphasis on their applicability to police planning, organization, direction, control and personnel management.

**CRCJ 3337. ADVANCED CRIMINAL PROCEDURE. 3 Hours.**

The processes involved in the criminal justice system; the rules of evidence; the laws of arrest, search and seizure; and the judicial process from offense to conviction.

**CRCJ 3338. JUVENILE JUSTICE SYSTEMS. 3 Hours.**

Organization, processes, and functions of the juvenile justice system in the United States, its historical antecedents, and contemporary challenges. Consideration also given to sociopolitical factors in juvenile justice decision-making. This course satisfies the requirements for UNIV 1101.

**CRCJ 3340. CRIMINAL JUSTICE STATISTICS. 3 Hours.**

An introduction to basic concepts and techniques necessary for a preliminary and proficient understanding of criminal justice research. Focus is on analyzing and interpreting research findings including types of data, central tendency, and both descriptive and inferential statistics. Prerequisite: CRCJ 2334 and CRCJ 3350 or equivalent.

**CRCJ 3350. INTRODUCTION TO RESEARCH METHODS IN CRIMINOLOGY AND CRIMINAL JUSTICE. 3 Hours.**

This course introduces students to the research methodology used in criminological research. Emphasis is on the development of a general understanding of why and how research can be and is conducted in the field of criminology and criminal justice. Other dimensions of research are discussed including the nature of scientific thought, the link between research methods and criminological theory, and the various ethical issues concerning research in the field of criminology.

**CRCJ 3370. INTRODUCTION TO FORENSICS. 3 Hours.**

This course provides an overview of forensic science. Emphasis is on crime scene investigation, physical evidence, organic and inorganic analysis, forensic toxicology and use of DNA in investigations.

**CRCJ 3371. CRIME SCENE INVESTIGATION. 3 Hours.**

Provides an in-depth examination of the principles of crime scene investigation. Aspects of forensic crime scene investigation from receiving the call, arriving at the scene, processing of the scene, evidence collection, and safety protocols are examined from scientific, procedural, and legal perspectives. In addition, the tools, techniques, and protocols necessary to perform systematic and thorough crime scene investigation will be presented. Prerequisite: CRCJ 3370.

**CRCJ 3380. RACE, CRIME, AND JUSTICE. 3 Hours.**

An examination of race in the context of the criminal justice system. Emphasis is on social construction of crime; and the treatment of racial minorities as victims and offenders by law enforcement, courts, and corrections. Offered as CRCJ 3380 and MAS 3380; credit will be granted only once. Offered as AAST 3380 and CRCJ 3380; credit will be granted in only one department. Prerequisite: CRCJ 2334.

**CRCJ 3385. WOMEN AND CRIME. 3 Hours.**

This course examines criminology and criminal justice issues as they relate specifically to women. The three major areas of coverage include (1) women and girls as victims of crime, (2) women and girls as criminal offenders; and (3) women working in the criminal justice system. Offered as DIVR 3385, CRCJ 3385 and GWSS 3385; credit will be granted only once.

**CRCJ 3390. VICTIMOLOGY. 3 Hours.**

The relationship between victims of crime and the criminal justice system. Includes an analysis of the characteristics of crime victims, victim reporting and nonreporting patterns, treatment of victims by the various segments of the criminal justice system, victim assistance programs, and the issue of compensation and/or restitution for victims of crime.

**CRCJ 3395. DRUG USE AND ABUSE. 3 Hours.**

An examination of the description, classification, and analysis of the problem of illegal drug use. Focus is on current drug policies in the United States, and a comparison of worldwide drug policies, and critical analysis of each.

**CRCJ 4191. CONFERENCE COURSE. 1 Hour.**

Directed individual study; research and study on a topic agreed upon by instructor and student. No more than six hours credit will be granted for conference courses in criminal justice. Prerequisite: permission of the instructor.

**CRCJ 4291. CONFERENCE COURSE IN CRIMINAL JUSTICE. 2 Hours.**

Directed individual study; research and study on a topic agreed upon by instructor and student. No more than six hours credit will be granted for conference courses in criminal justice. Prerequisite: permission of the instructor.

**CRCJ 4301. THE AMERICAN JUDICIAL SYSTEM. 3 Hours.**

Federal, state, and local judicial systems, with special emphasis on state trial courts having criminal jurisdiction. Court structure and function, court management, and judicial behavior.

**CRCJ 4302. MOCK TRIAL I. 3 Hours.**

The purpose of this course is to enhance the student's knowledge of the American adversarial judicial system through in-depth study of trial procedure and evidentiary rules. The primary teaching vehicle is a simulated trial based on the official hypothetical case published by the American Mock Trial Association for the current school year. Cases alternate between criminal and civil cases. The current state of our nation affords us a unique opportunity to explore ways to incorporate digital modalities of jury trials and their impact on our justice system.

**CRCJ 4303. MOCK TRIAL II. 3 Hours.**

In-depth examination of the structure, functions and operations of U.S. civil and criminal trials, with special attention to modern jury decision making and its impact on the criminal justice process by learning practical skillsets related to the voir dire and trial court process.

**CRCJ 4309. PRIVATE SECURITY ADMINISTRATION. 3 Hours.**

The essentials of governmental and proprietary security development and program planning; including personnel recruitment and training, developing and conducting security audits, records and information protection, and general applications of modern management techniques to security organization. Prerequisite: CRCJ 3307.

**CRCJ 4313. SERIAL KILLERS. 3 Hours.**

The main objective of this course is to examine various dimensions of criminology with an emphasis placed on the theoretical explanations, motivations, and behaviors of those who commit serial murder and mass violence. In this course students will be asked to think critically about theories of crime causation, crime typologies, and the victimology.

**CRCJ 4315. WHITE-COLLAR AND CORPORATE CRIME. 3 Hours.**

This course provides an overview of the structure, extent, cost, and control of white-collar and corporate crimes. Landmark cases and everyday instances will be detailed. Theoretical explanations and policy implications will be discussed.

**CRCJ 4325. GANGS. 3 Hours.**

An examination of historical and contemporary street and correctional institutional gangs. Addresses the nature and definition of gangs, types and diversity of membership of gangs, theoretical explanations, criminal and deviant behavior, law enforcement responses, intervention and prevention strategies, and public policy issues.

**CRCJ 4332. COMMUNITY CORRECTIONS. 3 Hours.**

Evaluation of practices, issues, and trends in community corrections. Emphasis is on the de-institutionalization movement, probation, parole, intermediate punishments, and other community alternatives to incarceration.

**CRCJ 4333. INSTITUTIONAL CORRECTIONS. 3 Hours.**

Examination and evaluation of practices, issues, and trends in institutional corrections. Emphasis is on administration, organization, and effectiveness of incarceration.

**CRCJ 4340. FORENSIC DEATH INVESTIGATION. 3 Hours.**

An exploration of death investigations including an overview of protocols utilized to investigate a death as well as autopsy perspectives. Focus is on the numerous causes of death and the working relationship of police investigators, death investigators, forensic pathologists, and forensic laboratories. Prerequisite: CRCJ 3370.

**CRCJ 4341. FORENSIC EXAMINATION OF IMPRESSION EVIDENCE. 3 Hours.**

Explores how impression evidence is formed, how to collect and enhance impression evidence and how to compare this type of evidence. The student will also learn how impression evidence is presented and utilized in a courtroom setting. Prerequisites: CRCJ 3370 and CRCJ 3371 or permission of the instructor.

**CRCJ 4342. FORENSIC HAIR AND FIBER IDENTIFICATION. 3 Hours.**

Introduces the student to forensic hair and fiber examination by microscopy, including the presentation of the techniques, skills, and limitations of the hair and fiber examiner in a modern crime laboratory setting. Collection techniques utilized at the crime scene and from items of evidence will also be examined. The impact of these techniques on the criminal justice system, in particular the court system, will be explored. Prerequisite: CRCJ 3370 or permission of the instructor.

**CRCJ 4343. FORENSIC EXPERT TESTIMONY. 3 Hours.**

Survey of the techniques for providing testimony as an expert witness in a court of law, including proper physical appearance, demeanor, qualifications, presentation of evidence, offering opinion, and ethics of providing testimony. Prerequisite: CRCJ 3370.

**CRCJ 4344. CRIME ACROSS THE LIFE COURSE. 3 Hours.**

This course will introduce students to developmental and life-course criminology, which seeks to understand the development of offending over time. In particular, the class will focus on early precursors to criminal behavior, stability and factors impacting change in criminal behavior, and how genetics and the environment may impact criminal behavior.

**CRCJ 4345. CRIME AND THE CRIMINAL JUSTICE SYSTEM IN THE MEDIA. 3 Hours.**

An examination of crime and the criminal justice system as depicted in the media; special emphasis on the roles of the media in influencing individual and societal perceptions of, and reactions to, crime and the criminal justice system.

**CRCJ 4352. TERRORISM AND MASS VIOLENCE. 3 Hours.**

Examination of historic and current trends in civil disruption from domestic/international perspectives. Considers literature and philosophical basis of political terrorism; costs of terrorism; future trends and deterrence by civil or military intervention. Formerly CRCJ 3352; credit will not be granted for both CRCJ 4352 and CRCJ 3352.

**CRCJ 4355. ORGANIZED CRIME: NATIONAL AND INTERNATIONAL. 3 Hours.**

An examination of organized crime in the United States and internationally, including history, development, ethnic links, impact upon society and the economy, and international cooperation aimed at eradicating the occurrence and proliferation of this form of criminality.

**CRCJ 4357. FORENSIC FIREARMS IDENTIFICATION. 3 Hours.**

This course introduces students to the field of forensic firearm and tool mark identification. Topics include development, manufacture, evaluation and comparison of firearms, ammunition and tool mark evidence. Students will also acquire an understanding of the firearm examiner's responsibilities as they impact the criminal justice system. Prerequisite: CRCJ 3370.

**CRCJ 4365. CAPITAL PUNISHMENT. 3 Hours.**

An examination of historic and current trends in capital punishment. Considers the literature and philosophical basis of capital punishment, the costs of capital punishment, and future trends of capital punishment. Provides an in-depth examination of capital punishment from a criminal justice policy perspective.

**CRCJ 4380. COMPARATIVE CRIMINAL JUSTICE SYSTEMS. 3 Hours.**

An overview of criminal justice systems in other countries. Includes an intensive study and analysis of materials on their law enforcement, judicial, and corrections components; review of comparative studies on a variety of criminal justice topics.

**CRCJ 4386. TOPICS IN CORRECTIONS. 3 Hours.**

May be repeated for credit as the topics vary, but credit will not be granted for more than 12 semester hours of CRCJ-prefix topics courses without permission of advisor.

**CRCJ 4387. TOPICS IN CRIME AND CRIMINOLOGY. 3 Hours.**

May be repeated for credit as the topics vary, but credit will not be granted for more than 12 semester hours of CRCJ-prefix topics courses without permission of advisor.

**CRCJ 4388. TOPICS IN LAW AND JUDICIAL PROCESSES. 3 Hours.**

May be repeated for credit as the topics vary, but credit will not be granted for more than 12 semester hours of CRCJ-prefix topics courses without permission of advisor.

**CRCJ 4389. TOPICS IN LAW ENFORCEMENT AND PRIVATE SECURITY. 3 Hours.**

May be repeated for credit as the topics vary, but credit will not be granted for more than 12 semester hours of CRCJ-prefix topics courses without permission of advisor.

**CRCJ 4390. INTERNSHIP IN CRIMINAL JUSTICE. 3 Hours.**

Provides the student with an opportunity to apply academic experience to practical situations by serving for a specified number of hours as participant-observer in a criminal justice agency. May be taken for a total of six semester hours. Internships must be arranged with internship supervisor in the semester prior to enrolling for this course. Prerequisite: permission of the instructor.

**CRCJ 4391. CONFERENCE COURSE IN CRIMINAL JUSTICE. 3 Hours.**

Directed individual study; research and study on a topic agreed upon by instructor and student. No more than six hours credit will be granted for conference courses in criminal justice. Prerequisite: permission of the instructor.

**CRCJ 4394. HONORS THESIS/SENIOR PROJECT. 3 Hours.**

Required of all students in the University Honors College. During the senior year, the student must complete a thesis or a project under the direction of a faculty member in the major department.

**CRCJ 5196. CONFERENCE COURSE CRJU. 1 Hour.****CRCJ 5301. PROSEMINAR IN CRIMINOLOGY AND CRIMINAL JUSTICE. 3 Hours.**

This course is a comprehensive introduction to the discipline, with particular emphasis on the specialties of department faculty, academic research, and writing style. Classic and contemporary literature will be used to examine criminal behavior and the structure, function, operation, and interaction of the criminal justice system components as well as current practices and future trends in criminology and criminal justice.

**CRCJ 5309. RESEARCH METHODS IN CRIMINAL JUSTICE. 3 Hours.**

Examination of research methodology in criminal justice. Special emphasis on methods and techniques for conducting research in criminal justice, including a review of problems encountered in sampling and survey research, field research, public policy implementation, and program evaluation.

**CRCJ 5310. STATISTICS & RESEARCH PRACTICES IN CRIMINAL JUSTICE. 3 Hours.**

Advanced methods and techniques of research and research design in criminology and criminal justice. Course will cover pure and applied research and expose students to contemporary methodological and analytical issues. Students will be instructed on the use of existing CRCJ databases as well as the collection of new data and particular aspects of SPSS (Statistical Package for the Social Sciences software) and advanced data analysis. Prerequisite: CRCJ 5309 or equivalent.

**CRCJ 5318. CRIMINAL JUSTICE PERSONNEL ADMINISTRATION. 3 Hours.**

Personnel administration and management in criminal justice agencies and institutions; analyzes functions of recruitment, selection, hiring, placement, evaluation, dismissal, benefits systems, minority recruitment, training, education, promotion, career development, and retirement.

**CRCJ 5319. ISSUES IN POLICING. 3 Hours.**

In-depth analysis of historical, current, and future issues in policing and police administration. Emphasis will be placed on the role of police in society, police-citizen relationships, and empirical evaluations of police effectiveness, police behavior, and programs and strategies.

**CRCJ 5327. CONSTITUTIONAL ISSUES IN THE CRIMINAL JUSTICE SYSTEM. 3 Hours.**

Examination of a variety of legal issues critical to a thorough understanding of the various aspects of the criminal justice system. Special attention is given to contemporary constitutional issues and court decisions and their impact on the criminal justice process.

**CRCJ 5332. CORRECTIONAL THEORY AND PRACTICE. 3 Hours.**

Examination of social, psychological, political, and historical bases of interventions in the control and disposition of offenders. Emphasis on contemporary policies, practices, and problems in institutional, semi-institutional, and community-based corrections.

**CRCJ 5342. ETHICS IN CRIMINAL JUSTICE. 3 Hours.**

This course focuses on the ethical decisions and dilemmas encountered in the criminal justice system. Topics covered include criteria for ethical decision making, professional codes of ethics, and ethical and legal dilemmas faced by criminal justice professionals.

**CRCJ 5350. THEORETICAL CRIMINOLOGY. 3 Hours.**

Explores the etiology of crime, theory development and crime causation. Emphasis is on theoretical perspectives and policy implementation.

**CRCJ 5351. TERRORISM AND CRIME. 3 Hours.**

This course examines the origins, nature, and operational characteristics of terrorist groups. Students are exposed to topics ranging from the definition of "terrorism" to the unique characteristics of terrorist cells in the United States and abroad. Particular emphasis is on historical and contemporary terrorist attacks against the United States.

**CRCJ 5352. WOMEN, CRIME & CRIMINAL JUSTICE. 3 Hours.**

A summary of issues related to women as criminal offenders, victims of crime, and professionals in the criminal justice system. The course focuses on crimes women are most likely to commit and/or be processed through the criminal justice system for, the punishment of female offenders, the types of victimizations most often experienced by women, and employment issues unique to women employed in the criminal justice system. While the main emphasis of the course will be on the experiences of women in the U.S., attention will also be given to women on a global scale.

**CRCJ 5353. CRIMINAL JUSTICE ORGANIZATIONAL THEORY & MANAGEMENT THOUGHT. 3 Hours.**

An examination of organizational theory with specific application to the operation and management of criminal justice agencies. The historical precedents and emergence of contemporary perspectives are presented with their implication for effective functioning of the criminal justice system.



**CRCJ 5354. COMPARATIVE CRIMINAL JUSTICE SYSTEMS. 3 Hours.**

This course is an overview of crime, criminal behavior, and criminal justice systems throughout the world. This course includes an intensive study and analysis of materials on law enforcement, judicial, and corrections components; a review of comparative studies on a variety of criminal justice topics; and a basic worldwide understanding of philosophies of law and justice. This is a global learning course.

**CRCJ 5360. RACE, CRIME JUSTICE & THE LAW. 3 Hours.**

This course explores the role of race and ethnicity within the juvenile and criminal justice system. Emphasis is on the social construction of crime, racial and ethnic inequalities, the law and policies/practices that impact blacks and other racial minorities.

**CRCJ 5364. CRIME AND THE MEDIA. 3 Hours.**

Utilizing a social constructionist perspective, the course examines the mass media's role in engendering and cultivating American society's perception of crime. This course examines factors influencing the social reality of crime, and attempts to deconstruct perceptions of crime-related mass media events.

**CRCJ 5366. JUVENILE DELINQUENCY AND JUVENILE CORRECTIONS. 3 Hours.**

Correctional modes are discussed and applied to juvenile offenders. Theoretic approaches to causation, modification, and control of delinquent behaviors are presented, and policy implications and limitations are discussed. Historical and contemporary perspectives and approaches are presented in the context of evolving and emerging practices and procedures.

**CRCJ 5368. CYBERCRIME AND CYBERSECURITY. 3 Hours.**

The main objective of this course is to introduce students to the nature of cybercrime and cybersecurity in the field of criminal justice. Major topics include computing and networking systems, types of cybercrime and cybercriminals, theoretical explanations of cybercriminals, and cybersecurity.

**CRCJ 5370. PRACTICUM. 3 Hours.**

Professional or pre-professional experience in a criminal justice related agency or institution with the approval and direction of the student's supervising professor; intended for non-thesis option students who do not have professional experience related to criminal justice.

**CRCJ 5373. WHITE-COLLAR AND CORPORATE CRIME. 3 Hours.**

This course exposes students to the basic concepts associated with incorporation and corporate liability, the definitional complexity of white-collar crime and the idea of crime as a socially constructed phenomenon. The types of behaviors encompassed by the terms "white-collar crime" and "corporate crime", the similarities and differences between white-collar and street-level offenders, and various theoretical explanations for white-collar crime are explored. In addition, the course includes an examination of the physical and economic costs of white-collar crime, landmark cases and issues related to detection, enforcement, and sentencing of white-collar offenders. This course has been offered previously as CRCJ 5393-Special Topics. To be cross-listed with CRCJ 4373. White-Collar and Corporate Crime. Prerequisite: CRCJ 5301.

**CRCJ 5380. CRIMINAL JUSTICE SEMINAR. 3 Hours.**

Synthesis course for advanced graduate students. Special emphasis on examination of constructs of crime/criminals, justice and systems. Requires individual research in area of particular concern to student.

**CRCJ 5381. CRIME & PUBLIC POLICY. 3 Hours.**

This course addresses crime and criminal justice policy. Emphasis is on the examination of media and political forces that shape criminal justice responses and policy initiatives. In the context of theoretical paradigms, the impact of race, class, economics, and gender on development of criminal justice public policy is examined.

**CRCJ 5382. COMPREHENSIVE ISSUES IN CRIME AND JUSTICE. 3 Hours.**

An advanced course covering a broad array of issues related to criminology, crime, and the justice system. This course is designed to review topics related to the comprehensive examination.

**CRCJ 5393. TOPICS IN CRIME AND CRIMINOLOGY. 3 Hours.**

May be repeated for credit as the topic changes.

**CRCJ 5394. TOPICS IN JUSTICE ISSUES. 3 Hours.**

May be repeated for credit as the topic changes.

**CRCJ 5396. CONFERENCE COURSE IN CRIMINAL JUSTICE. 3 Hours.**

Reading and research in a specialized area of criminal justice under the direction of a member of the graduate faculty.

**CRCJ 5398. THESIS. 3 Hours.****CRCJ 5698. THESIS. 6 Hours.**

## COURSES

**CSE 1000. FRESHMAN UNDERGRADUATE RESEARCH. 0 Hours.**

Freshman level undergraduate research course. Prerequisites: Departmental good standing and permission of instructor. May be taken a maximum of 3 times.

**CSE 1105. INTRODUCTION TO COMPUTER SCIENCE AND ENGINEERING. 1 Hour.**

Introduction to engineering concepts, the computer science and engineering disciplines, skills for written communication, and departmental orientation.

**CSE 1106. INTRODUCTION TO COMPUTER SCIENCE AND ENGINEERING. 1 Hour.**

A practical approach to hands-on computer hardware and software systems in a laboratory environment. Students will be exposed to basic engineering concepts such as simple circuits, digital logic, embedded controllers, computer networking, software design, and Linux operating systems. Prerequisite: C or better in CSE 1310.

**CSE 1205. INTRODUCTION TO COMPUTER SCIENCE AND ENGINEERING. 2 Hours.**

A practical approach to hands-on computer hardware and software systems in a laboratory environment. Students will be exposed to basic engineering concepts such as simple circuits, digital logic, embedded controllers, computer networking, software design, and Linux operating systems. Some College of Engineering requirements are satisfied by the content of this course. Prerequisite: CSE 1310.

**CSE 1301. COMPUTER LITERACY. 3 Hours. (TCCN = COSC 1301)**

For those persons having an interest in finding out what a computer is (and is not), the types of problems suited for computers, and how to utilize a computer to solve problems. The organization and characteristics of computers; application of commercial software such as word processors, spreadsheets, database packages, and communications packages.

**CSE 1310. INTRODUCTION TO COMPUTERS & PROGRAMMING. 3 Hours. (TCCN = COSC 1320)**

An introduction to the computer, to the algorithmic process, and to programming using basic control and data structures, using a procedural language. Prerequisite: C or better in MATH 1302 or MATH 1402 or C or better in (or concurrent enrollment in) a subsequent mathematics course (Math 1421, Math 1426, Math 2425, Math 2326, Math 3330, HONR-SC 1426 or HONR-SC 2425) or a qualifying score on the ALEKS PPL and C or better in UNIV 1131 (or concurrent enrollment) or ENGR 1101 (or concurrent enrollment).

**CSE 1311. INTRODUCTION TO PROGRAMMING FOR ENGINEERS. 3 Hours.**

An introduction to the computer, to the algorithmic process, and to programming using basic control and data structures. This class is currently using the C language. Prerequisite: C or better in (or concurrent enrollment in) one of the following; (Math 1421, Math 1426, Math 2425, Math 2326, Math 3330, HONR-SC 1426, or HONR-SC 2425).

**CSE 1320. INTERMEDIATE PROGRAMMING. 3 Hours.**

Programming concepts beyond basic control and data structures. Emphasis is given to data structures including linked-lists and trees as well as modular design consistent with software engineering principles. Prerequisite: C or better in CSE 1310 and C or better in (or concurrent enrollment in) (Math 1421, Math 1426, Math 2425, Math 2326, Math 3330, HONR-SC 1426, or HONR-SC 2425) or a qualifying score on the ALEKS PPL and C or better in UNIV 1131 (or concurrent enrollment) or ENGR 1101 (or concurrent enrollment).

**CSE 1325. OBJECT-ORIENTED PROGRAMMING. 3 Hours.**

Object-oriented concepts, class diagrams, collection classes, generics, polymorphism, and reusability. Projects involve extensive programming and include graphical user interfaces and multithreading. Prerequisite: CSE 1320.

**CSE 1326. OBJECT-ORIENTED PROGRAMMING IN C++. 3 Hours.**

Object-Oriented concepts (abstraction, encapsulation, inheritance, polymorphism) in the context of programming in C++ 11 and later. Projects involve extensive programming in C++. Prerequisite: CSE 1320.

**CSE 1392. SPECIAL TOPICS. 3 Hours.**

New developments in the field of computer science and engineering. Topic may vary from semester to semester. May be repeated for credit when topic changes. Departmental approval required in advance to use for degree credit. Prerequisite: consent of advisor.

**CSE 2000. SOPHOMORE UNDERGRADUATE RESEARCH. 0 Hours.**

Sophomore level undergraduate research course. Prerequisites: Departmental good standing and permission of instructor. May be taken a maximum of 3 times.

**CSE 2100. PRACTICAL COMPUTER HARDWARE/SOFTWARE SYSTEMS. 1 Hour.**

A practical approach to hands-on computer hardware and software systems in a laboratory environment. Students will be exposed to basic design concepts using off-the-shelf hardware components and to tools that enable the design of complex software systems. Prerequisite: CSE 1320.

**CSE 2312. COMPUTER ORGANIZATION & ASSEMBLY LANGUAGE PROGRAMMING. 3 Hours.**

Computer organization from the viewpoint of software, including instruction set architectures, memory addressing, integer and floating-point representation and arithmetic, instruction pipelining, cache, memory virtualization, and I/O. The relationship of higher-level programming languages to assembly language and instruction set architecture is also explored. Prerequisite: a C or better in CSE 1320 and a C or better in CSE 1205 or CSE 1106.

**CSE 2315. DISCRETE STRUCTURES. 3 Hours.**

Propositional and predicate logic, mathematical proof techniques, sets, combinatorics, functions and relations, graphs, and graph algorithms. Prerequisite: C or better in CSE 1310 and C or better in MATH 1426 (or C or better in or concurrent enrollment in MATH 2425).

**CSE 2392. SPECIAL TOPICS. 3 Hours.**

New developments in the field of computer science and engineering. Topic may vary from semester to semester. May be repeated for credit when topic changes. Departmental approval required in advance to use for degree credit. Prerequisite: consent of advisor.

**CSE 2440. CIRCUIT ANALYSIS. 4 Hours.**

Basic principles of electrical circuits using resistors, capacitors and inductors. Filter analysis and synthesis using complex algebra. Introduction to operational amplifiers. Time domain and frequency domain analysis and taxonomy of signals. Concurrent laboratory experiments complement lecture topics. Prerequisite: Grade C or better in MATH 2425 and PHYS 1444.

**CSE 2441. DIGITAL LOGIC DESIGN I. 4 Hours.**

Analysis, design and testing of combinational and sequential logic circuits. Topics include Boolean algebra, logic circuit minimization techniques, synchronous sequential circuit design, algorithmic state machine design, design of arithmetic/logic and control units, and Verilog programming of FPGA devices. Prerequisite: CSE 1320 and CSE 2315.

**CSE 3000. JUNIOR UNDERGRADUATE RESEARCH JUNIOR UNDERGRADUATE RESEARCH. 0 Hours.**

Junior level undergraduate research course. Prerequisites: Departmental good standing and permission of instructor. May be taken a maximum of 3 times.

**CSE 3302. PROGRAMMING LANGUAGES. 3 Hours.**

Introduction, analysis, and evaluation of the important concepts found in a variety of programming languages. Formalisms useful in specifying language syntax and semantics; programming language paradigms such as algorithmic, functional, logic, and object-oriented. Prerequisite: C or better in each of the following: CSE 1325, CSE 2312 and CSE 3318.

**CSE 3310. FUNDAMENTALS OF SOFTWARE ENGINEERING. 3 Hours.**

Software engineering principles, processes, and techniques; software development approaches focusing on functional analysis and functional design methods. Configuration management, implementation strategies, and testing. Team project. Prerequisite: C or better in each of the following: CSE 1320, CSE 1325 and CSE 2315.

**CSE 3311. OBJECT-ORIENTED SOFTWARE ENGINEERING. 3 Hours.**

Study of an agile unified methodology and its application to object-oriented software development. Topics include requirements acquisition, use case derivation, modeling and design of interaction behavior and state behavior, introduction to design patterns, derivation of design class diagrams, implementation considerations and deployment. Team project. Prerequisite: C or better in each of the following: CSE 3310 and CSE 3318.

**CSE 3313. INTRODUCTION TO SIGNAL PROCESSING. 3 Hours.**

Examines models for presentation and processing of digital signals. Sampling theorem, correlation and convolution, time and frequency analysis of linear systems, Fourier transform, Z-transform, design of digital filters structures for discrete time systems. Prerequisite: C or better in each of the following: CSE 3318 and either CSE 3380 or MATH 3330.

**CSE 3314. PROFESSIONAL PRACTICES. 3 Hours.**

Ethics. Contemporary social aspects and responsibilities of computing in a global, societal context. Lifelong learning goals and resources. Entrepreneurship and intellectual property. Project involving written and oral communication. Prerequisite: C or better in CSE 3318 and COMS 2302.

**CSE 3315. THEORETICAL CONCEPTS IN COMPUTER SCIENCE AND ENGINEERING. 3 Hours.**

Selected theoretical concepts including regular and context free languages, finite state and pushdown automata, Turing machines, computability, and NP-completeness. Prerequisite: C or better in CSE 2315.

**CSE 3318. ALGORITHMS & DATA STRUCTURES. 3 Hours.**

Design and analysis of algorithms with an emphasis on data structures. Approaches to analyzing lower bounds on problems and upper bounds on algorithms. Classical algorithm design techniques including algorithms for sorting, searching, and other operations on data structures such as hash tables, trees, graphs, strings, and advanced data structures, dynamic programming and greedy approaches. Prerequisite: CSE 1320 and CSE 2315.

**CSE 3320. OPERATING SYSTEMS. 3 Hours.**

Functions and components of an operating system, including process synchronization, job scheduling, memory management, file systems protection, and deadlocks. Related system software, such as loaders, linkers, assemblers, and windowing systems. Prerequisite: C or better in CSE 2312.

**CSE 3323. ELECTRONICS. 3 Hours.**

Design, analysis and testing of electronic circuits. Topics include operational amplifiers, diodes, bipolar-junction transistors (BJTs), and field-effect transistors (FETs) and their applications. Concurrent laboratory experiments complement lecture topics. Prerequisite: C or better in CSE 2440.

**CSE 3330. DATABASE SYSTEMS AND FILE STRUCTURES. 3 Hours.**

Database system architecture; file structures for databases, including indexing hashing, and B+-trees; the relational model and algebra; the SQL database language; Entity-Relationship data modeling; functional dependencies and basic normalization. Prerequisite: C or better in each of the following: CSE 1325 and CSE 3318.

**CSE 3340. INTRODUCTION TO HUMAN COMPUTER INTERACTION. 3 Hours.**

Introduction to the interdisciplinary field of Human-Computer Interaction. Studio-based course that bridges cognitive science, ethnography, and anthropology to provide a profound understand of user experience, while concurrently fostering frontend development skills in software, hardware, and wireless communication for the crafting of state-of-the-art user interfaces. Emphasizing a human-centered design ethos, the course encourages the design of interfaces that are not only functional but also meaningful and critically reflective. Prerequisite: C or better in CSE 3318, and C or better in CSE 3310.

**CSE 3341. DIGITAL LOGIC DESIGN II. 3 Hours.**

Hierarchical organization, design, simulation, implementation, and testing of digital systems. Industrial standard computer-aided design tools including hardware description languages (HDLs), field-programmable gate arrays (FPGAs), and other prototyping hardware and software will be employed. Design of arithmetic and other algorithmic processes will be covered. A term project will be required. Prerequisite: C or better in CSE 2441.

**CSE 3380. LINEAR ALGEBRA FOR CSE. 3 Hours.**

Solving systems of equations, matrix algebra, determinants, vector spaces, orthogonality and least squares, with applications to computer science. Prerequisite: C or better in CSE 2315.

**CSE 3392. SPECIAL TOPICS. 3 Hours.**

New developments in the field of computer science and engineering. Topic may vary from semester to semester. May be repeated for credit when topic changes. Departmental approval required in advance to use for degree credit. Prerequisite: consent of advisor.

**CSE 3442. EMBEDDED SYSTEMS I. 4 Hours.**

Design of microcontroller-based systems, including microprocessor programming, component and system architectures, memory interfacing, asynchronous and synchronous serial interfaces, timer-based peripherals, analog to digital (A/D) and digital to analog (D/A) converters, and typical applications. Prerequisite: C or better in each of the following: CSE 2312, CSE 2440 and CSE 2441.

**CSE 4000. SENIOR UNDERGRADUATE RESEARCH SENIOR UNDERGRADUATE RESEARCH. 0 Hours.**

Senior level undergraduate research course. Prerequisites: Departmental good standing and permission of instructor. May be taken a maximum of 3 times.

**CSE 4191. INDIVIDUAL PROJECTS. 1 Hour.**

Special problems in computer science and engineering on an individual basis. Topics may change from semester to semester. May be repeated for credit. Departmental approval must be obtained in advance for degree credit. Prerequisite: consent of instructor and department chairperson.

**CSE 4303. COMPUTER GRAPHICS. 3 Hours.**

Theory and practice for the visual representation of data by computers including display devices, output primitives, planes and curved surfaces, two- and three-dimensional transformations, parallel and perspective viewing, removal of hidden lines and surfaces, illumination models, ray tracing, radiosity, color models, and computer animation. Prerequisite: Admitted into an Engineering Professional Program. C or better in each of the following: CSE 3318, and either CSE 3380 or MATH 3330.

**CSE 4304. GAME DESIGN AND DEVELOPMENT. 3 Hours.**

Fundamentals of what it takes to create a game that is simultaneously economically attractive enough to produce as well as being fun to play. The former characteristic is objective, though often tricky to bound adequately while the latter is subjective, though easily demonstrated. This is a team-based class; each team conceives, designs, and develops a complete game through a series of exercises that build upon each other and using freely available tools. Prerequisite: Admitted into an Engineering Professional Program. C or better in CSE 3380 or MATH 3330.

**CSE 4305. COMPILERS FOR ALGORITHMIC LANGUAGES. 3 Hours.**

Review of programming language structures, translation, and storage allocation. Theory and practice of compilers and issues in compiler construction including parsing, intermediate code generation, local optimization problems such as register allocation, data-flow analysis, and global optimization. Prerequisite: Admitted into an Engineering Professional Program. C or better in the following: CSE 3302 and CSE 3315.

**CSE 4308. ARTIFICIAL INTELLIGENCE. 3 Hours.**

An introduction to the field of artificial intelligence studying basic techniques such as heuristic search, deduction, learning, problem solving, knowledge representation, uncertainty reasoning and symbolic programming languages such as LISP. Application areas may include intelligent agents, data mining, natural language, machine vision, planning and expert systems. Prerequisite: Admitted into an Engineering Professional Program. C or better in each of the following: CSE 3318 and (IE 3301 or MATH 3313).

**CSE 4309. FUNDAMENTALS OF MACHINE LEARNING. 3 Hours.**

This course offers an introduction to machine learning. Topics include naive Bayes classifiers, linear regression, linear classifiers, neural networks and backpropagation, kernel methods, decision trees, feature selection, clustering, and reinforcement learning. A strong programming background is assumed, as well as familiarity with linear algebra (vector and matrix operations), and knowledge of basic probability theory and statistics. Prerequisite: Admitted into an Engineering Professional Program. C or better in each of the following: CSE 3318, MATH 2326 or consent of instructor, IE 3301 or MATH 3313, and CSE 3380 or MATH 3330.

**CSE 4310. FUNDAMENTALS OF COMPUTER VISION. 3 Hours.**

This course introduces students to basic concepts and techniques in computer vision. The topics covered include morphological operations, connected component analysis, image filters, edge detection, feature extraction, object detection, object recognition, tracking, gesture recognition, image formation and camera models, calibration, and stereo vision. A strong programming background is assumed, as well as familiarity with linear algebra (vector and matrix operations), and knowledge of basic probability theory and statistics. Prerequisite: Admitted into an Engineering Professional Program. C or better in each of the following: CSE 3318, IE 3301 or MATH 3313, and CSE 3380 or MATH 3330.

**CSE 4311. NEURAL NETWORKS AND DEEP LEARNING. 3 Hours.**

This course offers an introduction to neural networks and deep learning. Topics include perceptrons, single-layer neural networks, multi-layer neural networks, Tensorflow and Keras, convolutional neural networks, transfer learning, deep learning methods for object recognition and object detection in images, and sequential learning models for analyzing text. Auto-encoders and generative adversarial networks will be covered to some extent. A strong programming and algorithmic background is assumed, as well as familiarity with linear algebra (vector and matrix operations). Prerequisite: Admitted into an Engineering Professional Program. C or better in CSE 3380 or MATH 3330, and C or better in IE 3301 or MATH 3313.

**CSE 4314. PROFESSIONAL PRACTICES. 3 Hours.**

Ethics. Contemporary social aspects and responsibilities of computing in a global, societal context. Lifelong learning goals and resources. Entrepreneurship and intellectual property. Project involving written and oral communication. Prerequisite: Admitted into an Engineering Professional Program. C or better in COMS 2302.

**CSE 4316. COMPUTER SYSTEM DESIGN PROJECT I. 3 Hours.**

Analysis and design of an industry-type project that involves hardware and software components to meet desired needs within realistic constraints and standards. The project is to be completed in CSE 4317 the following semester. Multidisciplinary teams of CSE 4316 students are required to develop, review, and present problem definition, project planning, requirements formulation, and design specification. Prerequisites: Admitted into a CSE Professional Program. For academic plan CS\_\_CS or SE\_\_SE, C or better in CSE 3310 and CSE 3320, and C or better in CSE 3314 (or concurrently). For academic plan CSE\_CP, C or better in CSE 3320 and CSE 3442, and C or better in CSE 3314 (or concurrently).

**CSE 4317. COMPUTER SYSTEM DESIGN PROJECT II. 3 Hours.**

Implementation, integration, quality assurance through peer review and testing, and deployment of the project designed in CSE 4316; oral presentation, documentation and project demonstration. Prerequisite: Admitted into an Engineering Professional Program. C or better in CSE 4316 and continuation with the same team.

**CSE 4321. SOFTWARE TESTING & MAINTENANCE. 3 Hours.**

Study of software quality assurance, software testing, and software maintenance processes, methods and techniques including formal review techniques, software verification, validation, and testing, types of software maintenance, maintenance activities, and regression testing. Prerequisite: Admitted into an Engineering Professional Program. C or better in CSE 3310.

**CSE 4322. SOFTWARE PROJECT MANAGEMENT. 3 Hours.**

Introduction to software project management. Issues include effort estimation and costing, project planning and scheduling, option analysis, software quality assurance, and formal technical reviews. Prerequisite: Admitted into an Engineering Professional Program. C or better in CSE 3310.

**CSE 4323. QUANTITATIVE COMPUTER ARCHITECTURE. 3 Hours.**

Pipelined processors, parallel processors including shared and distributed memory, multicore, Very Long Instruction Word (VLIW) and graphics processors, memory and cache design, computer peripherals, and computer clusters. Prerequisite: Admitted into an Engineering Professional Program. C or better in CSE 3320.

**CSE 4331. DATABASE IMPLEMENTATION AND THEORY. 3 Hours.**

Review of the relational model and algebra; relational calculus; relational database design theory; advanced data modeling concepts; object-oriented and object-relational databases; database system implementation techniques, including concurrency control, recovery, atomic commitment, and query processing and optimization, database security; introduction to advanced concepts, such as active, deductive, spatial, temporal, multimedia and distributed databases. Prerequisite: Admitted into an Engineering Professional Program. C or better in CSE 3330.

**CSE 4333. CLOUD COMPUTING FUNDAMENTALS AND APPLICATIONS. 3 Hours.**

Cloud Computing has transformed the IT industry by opening the possibility for infinite or at least highly elastic scalability in the delivery of enterprise applications and software as a service (SaaS). Cloud computing is a method of computing where a shared group of resources such as file storage, web servers, data processing services, and applications are accessed via a public internet connection or a private VPN and/or direct network connection. Cloud computing gives mature enterprises and new start-ups the option to deploy their applications to systems of infinite computational power with practically no initial capital investment and with modest operating costs proportional to the actual use. Examples of cloud computing services include Amazon Web Services, Microsoft Azure, Google Cloud Platform, and IBM Softlayer. This course introduces students to the fundamental and design concepts of writing software applications for the cloud. This course will discuss tools required by an application programmer in building, deploying, and maintaining cloud applications. A combination of lectures and lab activities will expose students to the programming interface utilized in developing cloud applications. Prerequisite: Admitted into an Engineering Professional Program. C or better in CSE 3330, and C or better in CSE 3320.

**CSE 4334. DATA MINING. 3 Hours.**

Automatic discovery of patterns and knowledge from large data repositories, including databases, data warehouses, Web, document collections, and transactions. Basic topics of data mining including data preprocessing, data warehousing and online analytical processing (OLAP), data cube, frequent pattern and association rule mining, correlation analysis, classification and prediction and clustering, as well as advanced topics covering the techniques and applications of data mining on Web and text documents. Prerequisite: Admitted into an Engineering Professional Program. C or better in each of the following: IE 3301 (or MATH 3313). Co-requisite: CSE 3330.

**CSE 4340. FUNDAMENTALS OF WIRELESS NETWORKS. 3 Hours.**

Fundamentals of wireless networks, radio spectrum, coding and modulation, multiple access techniques, antennas, noise and interference, channels, demodulation and decoding, error rates and capacity, link budgets, medium access control, rate adaption, and wireless LAN/PAN, ad-hoc, and sensor networks. Prerequisite: Admitted into an Engineering Professional Program. C or better in CSE 4344 or CSE 4352 or consent of instructor.

**CSE 4342. EMBEDDED SYSTEMS II. 3 Hours.**

Advanced course in design of microcontroller-based systems. Emphasis is on the application of microcontrollers to real-time problems. Topics include the study of the differences in bare metal and embedded Linux implementations, simple Linux character device drivers, bootloader design, watchdog and supervision concepts, and developing applications such as PID controllers. Course includes significant laboratory content and a project with extensive hardware and software requirements. Prerequisite: Admitted into an Engineering Professional Program. C or better in each of the following: CSE 3323, CSE 3442, and CSE 3313.

**CSE 4344. COMPUTER NETWORK ORGANIZATION. 3 Hours.**

Design and analysis of computer networks. Emphasis on the OSI architecture but discusses other schemes (e.g., ARPAnet). Data link control, local networks, protocols/architectures, network access protocols, transport protocols, internetworking, and ISDN. Prerequisite: Admitted into an Engineering Professional Program. C or better in CSE 3320.



**CSE 4345. COMPUTATIONAL METHODS. 3 Hours.**

Introduction to numerical methods for solving problems in computer science and computer engineering. Topics include computer arithmetic, linear and nonlinear equations, eigenvalue problems, least squares, optimization, interpolation, and simulation. Prerequisite: Admitted into an Engineering Professional Program. C or better in each of the following IE 3301 or MATH 3313, CSE 3318, and either CSE 3380 or MATH 3330.

**CSE 4351. PARALLEL PROCESSING. 3 Hours.**

Theory and practice of parallel processing, including characterization of parallel processors, models for memory, algorithms, and interprocess synchronization. Issues in parallelizing serial computations, efficiency and speedup analysis. Programming exercises using one or more concurrent programming languages, on one of more parallel computers. Prerequisite: Admitted into an Engineering Professional Program. C or better in CSE 3320.

**CSE 4352. IOT AND NETWORKING. 3 Hours.**

Study of protocol stacks and layers, implementation of an Ethernet protocol stack, and design of a basic low-latency, small footprint IoT protocol on bare metal embedded devices and embedded Linux systems. Course includes multiple projects with hardware construction and extensive software and integration requirements. Prerequisite: Admitted into an Engineering Professional Program. C or better in CSE 3442.

**CSE 4354. REAL-TIME OPERATING SYSTEMS. 3 Hours.**

Implementation of a real-time operating system with cooperative and preemption context switching, priority scheduling, semaphores, message queues, and inter-process communications on bare metal microcontrollers. Course includes multiple projects with hardware construction and rigorous software requirements. Prerequisite: Admitted into an Engineering Professional Program. C or better in both CSE 3320 and CSE 3442.

**CSE 4355. ELECTROMECHANICAL SYSTEMS AND SENSORS. 3 Hours.**

Applications of electronics and microcontrollers to the control of electromechanical systems. Topics include driving brushless motors (including stepper motors), brushed permanent magnet motors, and other mechanical actuators; the use of the sensors including IMU, LIDAR, RADAR, GPS, capacitive/inductive sensing, laser distance, thermocouples, strain, pressure, optical encoders, and Hall devices; and control applications. Course includes significant laboratory content and a project with extensive hardware and software requirements. Prerequisite: Admitted into an Engineering Professional Program. C or better in both CSE 3323 and CSE 3442.

**CSE 4356. SYSTEM ON CHIP (SOC) DESIGN. 3 Hours.**

Design of FPGA-based system on chip solutions, including processor subsystems, FPGA fabric, processor to FPGA bridges, and Linux device drivers. Course includes a project with extensive software requirements. Prerequisite: Admitted into an Engineering Professional Program. C or better in CSE 3442.

**CSE 4358. MICROPROCESSOR SYSTEMS. 3 Hours.**

Asynchronous and synchronous memory interfacing and timing, design and implementation of DMA controllers and SDRAM controllers. Course includes a project with significant system design. Prerequisite: Admitted into an Engineering Professional Program. C or better in CSE 3442.

**CSE 4360. AUTONOMOUS ROBOT DESIGN AND PROGRAMMING. 3 Hours.**

An introduction to robotics and the design and programming of autonomous robot systems. Topics include basic kinematics, dynamics, and control, as well as sensors, knowledge representation, and programming techniques. Course work includes individual and group projects involving the building and programming of simulated and real robots. Prerequisite: Admitted into an Engineering Professional Program. C or better in each of the following: CSE 3318, CSE 3320 and CSE 3380 (or MATH 3330).

**CSE 4361. SOFTWARE DESIGN PATTERNS. 3 Hours.**

In-depth study of software design patterns including description of patterns, design principles and techniques used by patterns as well as application of patterns to solving practical design problems. Team project. Prerequisites: Admitted into an Engineering Professional Program. C or better in CSE 3311.

**CSE 4372. RISC PROCESSOR DESIGN. 3 Hours.**

Design of a RISC processor, based on RISC V and custom instruction set architectures with implementation on an FPGA target for test and verification. Course includes a project with extensive software requirements. Prerequisite: Admitted into an Engineering Professional Program. C or better in CSE 3442.

**CSE 4373. GENERAL PURPOSE GPU PROGRAMMING. 3 Hours.**

Study of general purpose computation on a GPU. Topics include GPU architectures, stream processing, and programming languages such as OpenCL and CUDA that realize data-parallel, high-throughput compute kernels on GPU architectures. Prerequisite: Admitted into an Engineering Professional Program. C or better in CSE 3320.

**CSE 4376. DIGITAL COMMUNICATION SYSTEMS. 3 Hours.**

Study of digital communication systems including source and channel coding, digital modulation techniques, inter-symbol interference, and multi-channel combining and multiple-access methods. Prerequisite: Admitted into an Engineering Professional Program. C or better in CSE 3313.

**CSE 4377. WIRELESS COMMUNICATION SYSTEMS. 3 Hours.**

Study of wireless systems including modulation, amplification, linearization techniques, filtering, antennas, propagation, reception, and demodulation. Topics include software defined radio design, link budget, and interference analysis. Course includes significant laboratory content. Prerequisite: Admitted into an Engineering Professional Program. C or better in CSE 3313 and CSE 3442.

**CSE 4378. INTRODUCTION TO UNMANNED VEHICLE SYSTEMS. 3 Hours.**

Introduction to UVS (Unmanned Vehicle Systems) such as UAS (Unmanned Aircraft Systems), UGS (Unmanned Ground System) and UMS (Unmanned Maritime System), their history, missions, capabilities, types, configurations, subsystems, and the disciplines needed for UVS development and operation. UVS missions could include student competitions sponsored by various technical organizations. This course is team-taught by engineering faculty. Prerequisite: Admission to a professional engineering or science program.

**CSE 4379. UNMANNED VEHICLE SYSTEM DEVELOPMENT. 3 Hours.**

Introduction to the technologies needed to create an UVS (Unmanned Vehicle System). Integration of these technologies (embodied as a set of sensors, actuators, computing and mobility platform sub-systems) into a functioning UVS through team work. UVS could be designed to compete in a student competition sponsored by various technical organizations or to support a specific mission or function defined by the instructors. This course is team-taught by engineering faculty. Prerequisite: B or better in CSE 4378 and admission to the UVS certificate program.

**CSE 4380. INFORMATION SECURITY. 3 Hours.**

Hands-on introduction to the basics of security. Includes system security, buffer overflows, a high-level overview of cryptography, firewalls and intrusion detection/prevention, malware, penetration testing, forensics, and system administration. Prerequisite: Admitted into an Engineering Professional Program. C or better in CSE 3320.

**CSE 4381. INFORMATION SECURITY II. 3 Hours.**

Deeper study of the fundamentals of security, including symmetric key cryptography, public key cryptography, cryptographic protocols, malware design, network attacks and defenses, data security, privacy, and wireless security. Prerequisite: Admitted into an Engineering Professional Program. C or better in CSE 3320 and C or better in CSE 4344 (or concurrently).

**CSE 4382. SECURE PROGRAMMING. 3 Hours.**

This course is an introduction to methods of secure software design and development. Students will learn about the major security problems found in software today. Using this knowledge, they will work in teams to find these bugs in software, fix the bugs, and design software so that it has fewer security problems. Static analysis tools will be a core part of the class, but students will also be exposed to black box testing tools. Topics will include input validation, buffer overflow prevention, error handling, web application issues, and XML. Prerequisite: Admitted into an Engineering Professional Program. C or better in CSE 3320.

**CSE 4391. INDIVIDUAL PROJECTS. 3 Hours.**

Special problems in computer science and engineering on an individual basis. Topics may change from semester to semester. May be repeated for credit. Departmental approval must be obtained in advance for degree credit. Prerequisite: consent of instructor and department chairperson.

**CSE 4392. SPECIAL TOPICS. 3 Hours.**

New developments in the field of computer science and engineering. Topic may vary from semester to semester. May be repeated for credit when topic changes. Departmental approval required in advance to use for degree credit. Prerequisite: consent of instructor.

**CSE 5191. INDIVIDUAL STUDY IN COMPUTER SCIENCE. 1 Hour.**

Topics dealing with special problems in Computer Science on an individual instruction basis. May be repeated for credit.

**CSE 5192. INDIVIDUAL STUDY IN COMPUTER SCIENCE. 1 Hour.**

Topics dealing with special problems in Computer Science on an individual instruction basis. May be repeated for credit.

**CSE 5194. ORIENTATION SEMINAR. 1 Hour.**

Presentation of computer science research by CSE faculty, students, and invited speakers. Preparation of program of work.

**CSE 5300. FOUNDATION OF COMPUTING. 3 Hours.**

Basics of programming, data structures, and algorithms. Introduction to databases and operating systems. Basics of discrete structures and computability. Course is used for the Master's in Data Science degree program and certificate programs for non-CSE majors. It cannot be taken for credit towards any CSE degree.

**CSE 5301. DATA ANALYSIS & MODELING TECHNIQUES. 3 Hours.**

Concepts and techniques for performing experiments and analyzing their results. Topics cover fundamental statistics, probability and data-representation concepts, inference through hypothesis testing, information theory, queuing models, and selected topics such as capacity planning and bottleneck analysis, clustering and classification, and hidden Markov models with computer science applications as examples.

**CSE 5305. FOUNDATIONS OF GRADUATE LEVEL STUDIES IN COMPUTER SCIENCE. 3 Hours.**

This course serves as a leveling course for Computer Science and Software Engineering Master's Degree students who need reinforcement of fundamental concepts. Topics include, but are not limited to, computer architecture and organization, analysis of algorithms, data structures, operating systems, discrete structures, automata theory and grammars.

**CSE 5306. DISTRIBUTED SYSTEMS. 3 Hours.**

Issues and challenges in distributed systems, including: communication, distributed processes, naming and name services, synchronization, consistency and replication, transactions, fault tolerance and recovery, security, distributed objects, and distributed file systems.

**CSE 5307. PROGRAMMING LANGUAGE CONCEPTS. 3 Hours.**

Study and evaluation of concepts in programming language for modern computer systems. Programming projects are selected from string-based, symbolic, algorithmic, and object-oriented languages.

**CSE 5311. DESIGN AND ANALYSIS OF ALGORITHMS. 3 Hours.**

Techniques for analyzing upper bounds for algorithms and lower bounds for problems. Problem areas include: sorting, data structures, graphs, dynamic programming, combinatorial algorithms, introduction to parallel models.

**CSE 5314. COMPUTATIONAL COMPLEXITY. 3 Hours.**

Sequential and parallel complexity classes (e.g., NP-complete and P-complete) and representative problems in languages, logic and graphs. Reduction techniques. Approximate solutions. Complexity hierarchies.

**CSE 5315. NUMERICAL METHODS. 3 Hours.**

Selected topics from the theory and practice of using automatic digital computers for approximating arithmetic operations, approximating functions, solving systems of linear and non-linear equations, and solving ordinary and partial differential equations.

**CSE 5316. MODELING, ANALYSIS, AND SIMULATION OF COMPUTER SYSTEMS. 3 Hours.**

Mathematical formalism and techniques used for computer system modeling and analysis. Reviews probability, transform theory, coding theory, and Petri nets. Topics may include knowledge based modeling, validation procedures, various simulation techniques for stochastic process and real-time distributed systems.

**CSE 5317. DESIGN AND CONSTRUCTION OF COMPILERS. 3 Hours.**

Review of programming language structures, translation, and storage allocation. Introduction to context-free grammars and their description. Design and construction of compilers including lexical analysis, parsing and code generation techniques. Error analysis and simple code optimizations will be introduced. Prerequisite: MATH 1426, or equivalent, or permission of advisor.

**CSE 5318. APPLIED GRAPH THEORY AND COMBINATORICS. 3 Hours.**

Connected and disconnected graphs; trees; graph planarity; Hamiltonian circuits and Euler tours; coloring; flow and graph optimization algorithms, fundamentals of combinatorics; generating functions and recurrence relations; inclusion-exclusion principle; applications in telecommunications; mobile computing, parallel processing and multiprocessor architectures.

**CSE 5319. SPECIAL TOPICS IN THEORY & ALGORITHMS. 3 Hours.**

May be repeated for credit when topics vary.

**CSE 5320. SPECIAL TOPICS IN SOFTWARE ENGINEERING. 3 Hours.**

May be repeated for credit when topics vary.

**CSE 5321. SOFTWARE TESTING. 3 Hours.**

Study of software quality assurance, software testing process, methods, techniques and tools. Topics include formal review techniques, black box testing, white box testing, integration testing, acceptance testing, regression testing, performance testing, stress testing, and testing of object-oriented software.

**CSE 5322. SOFTWARE DESIGN PATTERNS. 3 Hours.**

Study and application of object-oriented software design patterns to software development and maintenance in the object-oriented paradigm. Prerequisite: CSE 5324 or concurrent enrollment.

**CSE 5323. SOFTWARE ENGINEERING PROCESSES. 3 Hours.**

Introduces software lifecycle models, process disciplines, project management concepts, and applies them by mastering the Personal Software Process (PSP).

**CSE 5324. SOFTWARE ENGINEERING: ANALYSIS, DESIGN, AND TESTING. 3 Hours.**

Motivations, principles, and goals of software engineering; technical aspects of software projects, including: review of structured analysis and structured design, emphasis on object-oriented methods of requirements analysis and specification, design, and implementation; software testing concepts; team project.

**CSE 5325. SOFTWARE ENGINEERING: MANAGEMENT, MAINTENANCE, AND QUALITY ASSURANCE. 3 Hours.**

Issues and principles for software management; managerial and support aspects of software projects, including: processes, estimation techniques, planning and scheduling, risk analysis, metrics, and quality assurance. Other topics include: configuration management, verification and validation, and maintenance; team project.

**CSE 5326. REAL-TIME SOFTWARE DESIGN. 3 Hours.**

Specification, design, and analysis of real-time systems including real-time logics and decidability of real-time conditions; real-time scheduling approaches, system requirement specification; procedural and object-oriented methods; specialized analysis techniques for distributed and for control applications; team project. Prerequisite: CSE 5324 or concurrent enrollment.

**CSE 5327. TELECOMMUNICATIONS SOFTWARE DEVELOPMENT. 3 Hours.**

General understanding and classification of telecommunications systems and applications. Issues relating to the analysis, design, implementation, and testing of telecommunications software. Prerequisite: CSE 5324 and CSE 5344.

**CSE 5328. SOFTWARE ENGINEERING TEAM PROJECT I. 3 Hours.**

Apply the knowledge and skills gained in other software engineering courses to synthesize a solution to a significant and realistic software development team project. Participate in activities including: proposal writing, problem analysis, software requirements specification, project planning, software design, implementation, software quality assurance, software testing, integration, and demonstration. Required for and open only to Master of Software Engineering degree candidates. Prerequisite: one of CSE 5321, CSE 5322, CSE 5325.

**CSE 5329. SOFTWARE ENGINEERING TEAM PROJECT II. 3 Hours.**

Apply the knowledge and skills gained in other software engineering courses to synthesize a solution to a significant and realistic software development team project. Participate in activities including: proposal writing, problem analysis, software requirements specification, project planning, software design, implementation, software quality assurance, software testing, integration, and demonstration. Required for and open only to Master of Software Engineering degree candidates. Prerequisite: one of CSE 5321, CSE 5322, CSE 5325.

**CSE 5330. DATABASE SYSTEMS. 3 Hours.**

Database system architecture; management and analysis of files, indexing, hashing, and B+-trees; the relational model and algebra; the SQL database language; database programming techniques, database design using Entry-Relationship, extended E-R, and UML modeling; basics of normalization. Introduction to database security, query processing and transaction management.

**CSE 5331. DBMS MODELS AND IMPLEMENTATION TECHNIQUES. 3 Hours.**

DBMS system implementation techniques, including query optimization, transaction processing, concurrency control, buffer management and recovery. Object-oriented, object-relational and XML databases. Introduction to advanced database models, such as active, distributed, temporal, spatial and data warehousing.

**CSE 5332. DATA SCIENCE. 3 Hours.**

This inspirational course follows a data-science-for-all perspective that views data acumen as part of literacy. It aims to instill in students the data acumen, i.e., the basic skills to wrestle with data, to draw insights from data, to make sound decisions responsibly using data, and to effectively communicate about data-driven findings and decisions. Topics include 1) data management: data curation, preparation, model, and querying; 2) data description and visualization: exploratory data analysis, graphics, user interface and user experience design; 3) machine learning and knowledge discovery: supervised learning, unsupervised learning, pattern and knowledge extraction, deep learning, model evaluation and interpretation. Prerequisite: MATH 1301, or MATH 1302, or MATH 1308, or MATH 1426, or equivalent and permission of advisor.

**CSE 5333. CLOUD COMPUTING. 3 Hours.**

A survey of state of the art cloud computing paradigms: design, implementation, and programming distributed, scalable storage and computational systems. IaaS, PaaS, and SaaS (Infrastructure, Platform and Software as a Service), Hadoop, EC2, S3, and Azure are discussed.

**CSE 5334. DATA MINING. 3 Hours.**

Preparing data for mining, using preprocessing, data warehouses and OLAP; data mining primitives, languages and system architecture; data mining techniques including association rule mining, classification/prediction and cluster analysis.

**CSE 5335. WEB DATA MANAGEMENT. 3 Hours.**

This course provides an in depth study of models, languages and techniques for large-scale Web data management in distributed and heterogeneous environments. Topics include: Web programming with an emphasis on Web data management, Web Services, semi-structured data, XML standards, modern Web search engines, web information systems, Web query languages, distributed computing, metadata management with RDF, and Semantic Web.

**CSE 5339. SPECIAL TOPICS IN DATABASE SYSTEMS. 3 Hours.**

May be repeated for credit when topics vary.

**CSE 5342. EMBEDDED SYSTEMS II. 3 Hours.**

Advanced course in design of microcontroller-based systems. Emphasis is on the application of microcontrollers to real-time problems. Topics include the study of the differences in bare metal and embedded Linux implementations, simple Linux character device drivers, bootloader design, watchdog and supervision concepts, and developing applications such as PID controllers. Course includes significant laboratory content and a project with extensive hardware and software requirements. Prerequisite: CSE 3323 and CSE 3442, or CSE 5400, or consent of instructor.

**CSE 5344. COMPUTER NETWORKS. 3 Hours.**

Study of computer network architectures, protocols, and interfaces. The OSI reference model and the Internet architecture will be discussed. Networking techniques such as multiple access, packet/cell switching, and internetworking will be studied. Discussion will also include end-to-end protocols, congestion control, high-speed networking, and network management. Emphasis will be on Internet and ATM. Prerequisite: CSE 3320 or consent of instructor.

**CSE 5345. FUNDAMENTALS OF WIRELESS NETWORKS. 3 Hours.**

Fundamentals of wireless networks, radio spectrum, coding and modulation, multiple access techniques, antennas, noise and interference, channels, demodulation and decoding, error rates and capacity, link budgets, medium access control, rate adaption, and wireless LAN/PAN, ad-hoc, and sensor networks. Prerequisite: At least one of these courses: CSE 4344, CSE 4352, CSE 5352, or CSE 5344 or consent of instructor.

**CSE 5346. NETWORKS II. 3 Hours.**

This course provides an in depth study and comparison of the two primary networking paradigms, Internet/broadcast and switched, using two technologies, IPv6 and ATM, as representative examples. The course is implementation-oriented, focusing on issues such as routing, broadcast, multicast, mobility, network configuration, and quality of service. Prerequisite: CSE 5344.

**CSE 5347. FUNDAMENTALS OF BLOCKCHAIN & CRYPTOCURRENCY TECHNOLOGIES. 3 Hours.**

This course covers the technical concepts underlying blockchains and decentralized cryptocurrency systems, such as Bitcoin and Ethereum, including decentralized ledgers (blockchains), decentralized consensus, smart contracts and zero-knowledge proof systems.

**CSE 5348. MULTIMEDIA SYSTEMS. 3 Hours.**

Representations and techniques for processing, communicating, and compression of text, audio, graphics, and video in real time. Project integrating these topics. Prerequisite: CSE 3320.

**CSE 5349. SPECIAL TOPICS IN NETWORKING. 3 Hours.**

May be repeated for credit when topics vary.

**CSE 5350. COMPUTER ARCHITECTURE II. 3 Hours.**

A study of advanced uniprocessor and basic multiprocessor systems. Topics may include memory management systems, pipelined processors, array and vector processors, and introduction to architecture of multiprocessor systems. Prerequisite: CSE 3322 or consent of instructor.

**CSE 5351. PARALLEL PROCESSING. 3 Hours.**

Covers the theory and practice of parallel processing. Theoretical topics include: abstract models and algorithms for shared memory computation (PRAM); algorithms for various topologies such as meshes and hypercubes; efficiency and speedup analysis. Problem areas include data structures, numerical methods, graphs, combinatorics. Practical topics include synchronization, routing, scheduling, parallelizing serial computations, programming languages. Includes programming exercises using one or more concurrent programming languages, on one or more parallel computers. Prerequisite: CSE 3320 or consent of instructor.

**CSE 5352. IoT AND NETWORKING. 3 Hours.**

Study of protocol stacks and layers, implementation of an Ethernet protocol stack, and design of a basic low-latency, small footprint IoT protocol on bare metal embedded devices and embedded Linux systems. Course includes multiple projects with hardware construction and extensive software and integration requirements. Prerequisite: CSE 3442, CSE 5400, or consent of instructor.

**CSE 5353. DISTRIBUTED COMPUTING. 3 Hours.**

Programming languages, support components, coordination models, and fundamental algorithms for distributed and clustered systems. Prerequisite: CSE 5306.

**CSE 5354. REAL-TIME OPERATING SYSTEMS. 3 Hours.**

Implementation of a real-time operating system with cooperative and preemption context switching, priority scheduling, semaphores, message queues, and inter-process communications on bare metal microcontrollers. Course includes multiple projects with hardware construction and rigorous software requirements. Prerequisite: CSE 3442, CSE 5400, or consent of instructor.

**CSE 5355. ELECTROMECHANICAL SYSTEMS AND SENSORS. 3 Hours.**

Applications of electronics and microcontrollers to the control of electromechanical systems. Topics include driving brushless motors (including stepper motors), brushed permanent magnet motors, and other mechanical actuators; the use of the sensors including IMU, LIDAR, RADAR, GPS, capacitive/inductive sensing, laser distance, thermocouples, strain, pressure, optical encoders, and Hall devices; and control applications. Course includes significant laboratory content and a project with extensive hardware and software requirements. Prerequisite: CSE 3323 and one of the following: CSE 3442 or CSE 5400, or consent of instructor.

**CSE 5356. SYSTEM ON CHIP (SoC) DESIGN. 3 Hours.**

Programming and implementation of FPGA-based system on chip solutions, including processor subsystems, FPGA fabric, processor to FPGA bridges, and device drivers. Prerequisite: CSE 3442, CSE 5400, or consent of instructor.

**CSE 5357. ADVANCED DIGITAL LOGIC DESIGN. 3 Hours.**

Hierarchical organization, design, simulation, implementation, and testing of digital systems. Industrial standard computer-aided design tools including hardware description languages (HDLs), field-programmable gate arrays (FPGAs), and other prototyping hardware and software will be employed. Design of arithmetic and other algorithmic processes will be covered. A term project will be required. Prerequisite: CSE 3442, CSE 5400, or consent of instructor.

**CSE 5358. MICROPROCESSOR SYSTEMS. 3 Hours.**

Study of different microprocessor system architectures, design of asynchronous and synchronous memory interfaces, study of advanced bus architectures, analysis of bus timing, implementation of DMA controllers and SDRAM controllers, and study of cache organization and write policies. Prerequisite: CSE 3442 or CSE 5400, or consent of instructor.

**CSE 5359. SPECIAL TOPICS IN COMPUTER ENGINEERING. 3 Hours.**

May be repeated for credit when topics vary.

**CSE 5360. ARTIFICIAL INTELLIGENCE I. 3 Hours.**

Introduction to the methods, concepts and applications of artificial intelligence, including knowledge representation, search, theorem proving, planning, natural language processing, and study of AI programming languages. Prerequisite: CSE 3318 and CSE 3315, or consent of instructor.

**CSE 5361. ARTIFICIAL INTELLIGENCE II. 3 Hours.**

Continuation of artificial intelligence methods and techniques, including uncertainty reasoning, machine learning, perception, and advanced topics in knowledge representation, search and planning. Emphasis on design and implementation of AI solutions. Prerequisite: CSE 5360 or consent of instructor.

**CSE 5362. SOCIAL NETWORKS AND SEARCH ENGINES. 3 Hours.**

Social networks, Search Engines, Recommendation systems, Question & Answering systems are web-enabled Information Technology main stream. This course covers the foundations of these technology including text/query processing, web content analysis, basic graph theory, random walk, PageRank, power law distribution, random graphs, small world, growth models, and network diffusion. Prerequisite: CSE 5311.

**CSE 5364. ROBOTICS. 3 Hours.**

An introduction to robotics and the design and programming of autonomous robot systems. Topics include basic kinematics, dynamics, and control, as well as sensors, knowledge representation, and programming techniques. Coursework includes individual and group projects involving the building and programming of simulated and real robots. Prerequisite: CSE 3318 and CSE 3442.



**CSE 5365. COMPUTER GRAPHICS. 3 Hours.**

Input/output devices and programming techniques suitable for the visual representation of data and images.

**CSE 5366. DIGITAL SIGNAL PROCESSING. 3 Hours.**

Introduction to principles and applications of digital signal processing. Topics include: analysis of signals and systems, Fourier and Z transforms, digital filter design techniques (FIR and IIR), autoregressive (AR) and autoregressive moving average (ARMA) modeling. Applications to science and engineering include: financial predictions and processing of digital music. Laboratory work includes some programming and use of high quality library routines and packages such as Mathematica, Matlab.

**CSE 5367. PATTERN RECOGNITION. 3 Hours.**

Principles and various approaches of pattern recognition processes, including Bayesian classification, parametric/non-parametric classifier design, feature extraction for signal representation, and techniques for classification and clustering. Current issues in pattern recognition research will also be examine. Prerequisite: CSE 3318, MATH 3313.

**CSE 5368. NEURAL NETWORKS. 3 Hours.**

Theoretical principles of neurocomputing. Learning algorithms, information capacity, and mapping properties of feedforward and recurrent networks. Different neural network models will be implemented and their practical applications discussed. Prerequisite: CSE 5301 or consent of instructor.

**CSE 5369. SPECIAL TOPICS IN INTELLIGENT SYSTEMS. 3 Hours.**

May be repeated for credit when topics vary.

**CSE 5370. BIOINFORMATICS. 3 Hours.**

Basic biology of genome and common laboratory techniques Overview of discrete probability theory, random variables and processes. Issues in genome mapping, sequencing and analysis: sequence alignments and alignment algorithms; genomic databases and information access; structure and features of DNA sequences. Techniques in contemporary biotechnology, including proteomics and gene expression analysis using microarray chips. Prerequisite: CSE 5311 or consent of instructor.

**CSE 5372. RISC PROCESSOR DESIGN. 3 Hours.**

Design of a RISC processor, based on RISC V and custom instruction set architectures with implementation on an FPGA target for test and verification. Prerequisite: CSE 3442, CSE 5400, or consent of instructor.

**CSE 5373. GENERAL PURPOSE GPU ARCHITECTURE. 3 Hours.**

Study of general purpose computation on a GPU. Topics include GPU architectures, stream processing, and programming languages such as OpenCL and CUDA that realize data-parallel, high-throughput compute kernels on GPU architectures. Prerequisite: CSE 3320 or consent of instructor.

**CSE 5376. DIGITAL COMMUNICATION SYSTEMS. 3 Hours.**

Study of digital communication systems including source and channel coding, digital modulation techniques, inter-symbol interference, and multi-channel combining and multiple-access methods. Prerequisite: CSE 3313, CSE 5366, or consent of instructor.

**CSE 5377. WIRELESS COMMUNICATION SYSTEMS. 3 Hours.**

Study of wireless systems including modulation, amplification, linearization techniques, filtering, antennas, propagation, reception, and demodulation. Topics include software-defined radio design, link budget, and interference analysis. Course includes significant laboratory content. Prerequisite: CSE 3313, CSE 5366, or consent of instructor.

**CSE 5379. SPECIAL TOPICS IN BIOINFORMATICS. 3 Hours.**

May be repeated for credit when topics vary.

**CSE 5380. INFORMATION SECURITY 1. 3 Hours.**

Hands-on introduction to the basics of security. Includes system security, buffer overflows, a high-level overview of cryptography, firewalls and IDS/IPS, malware, penetration testing, forensics, and system administration. Prerequisite: CSE 3320 or consent of instructor.

**CSE 5381. INFORMATION SECURITY 2. 3 Hours.**

Deeper study of the fundamentals of security, including symmetric key cryptography, public key cryptography, cryptographic protocols, malware design, network attacks and defenses, data security, privacy, and wireless security. Prerequisite: CSE 5380 and CSE 4344 or consent of instructor.

**CSE 5382. SECURE PROGRAMMING. 3 Hours.**

This course is an introduction to methods of secure software design and development for upper-level undergraduate students and graduate students. Students will learn about the major security problems found in software today. Using this knowledge, they will work in teams to find these bugs in software, fix the bugs, and design software so that it has fewer security problems. Static analysis tools will be a core part of the class, but students will also be exposed to black box testing tools. Topics will include input validation, buffer overflow prevention, error handling, web application issues, and XML.

**CSE 5383. INTRODUCTION TO UNMANNED VEHICLE SYSTEMS. 3 Hours.**

Introduction to UVS (Unmanned Vehicle Systems) such as UAS (Unmanned Aircraft Systems), UGS (Unmanned Ground System) and UMS (Unmanned Maritime System), their history, missions, capabilities, types, configurations, subsystems, and the disciplines needed for UVS development and operation. UVS missions could include student competitions sponsored by various technical organizations. This course is team-taught by engineering faculty.

**CSE 5384. UNMANNED VEHICLE SYSTEM DEVELOPMENT. 3 Hours.**

Introduction to the technologies needed to create an UVS (Unmanned Vehicle System). Integration of these technologies (embodied as a set of sensors, actuators, computing and mobility platform sub-systems) into a functioning UVS through team work. UVS could be designed to compete in a student competition sponsored by various technical organizations or to support a specific mission or function defined by the instructors. This course is team-taught by engineering faculty. Prerequisite: B or better in CSE 4378 or CSE 5383 and admission to the UVS certificate program (admission to UVS certificate can be waived by consent of instructor).

**CSE 5388. SPECIAL TOPICS IN INFORMATION SECURITY. 3 Hours.**

May be repeated for credit when topics vary.

**CSE 5389. SPECIAL TOPICS IN MULTIMEDIA, GRAPHICS, & IMAGE PROCESSING. 3 Hours.**

May be repeated for credit when topics vary.

**CSE 5391. INDIVIDUAL STUDY IN COMPUTER SCIENCE. 3 Hours.**

Topics dealing with special problems in Computer Science on an individual instruction basis. May be repeated for credit.

**CSE 5392. TOPICS IN COMPUTER SCIENCE. 3 Hours.**

May be repeated for credit when the topics vary.

**CSE 5393. DIRECTED STUDY IN COMPUTER SCIENCE. 3 Hours.**

DIRECTED STUDY IN COMPUTER SCIENCE.

**CSE 5394. MASTER'S PROJECT I. 3 Hours.****CSE 5395. MASTER'S PROJECT II. 3 Hours.****CSE 5398. MASTER'S THESIS I. 3 Hours.**

Preliminary research effort for the master's thesis, including problem definition and literature search, along with identification of resources, milestones, examining committee members, and external publication venue. Graded F, R.

**CSE 5400. FUNDAMENTALS OF EMBEDDED SYSTEMS. 4 Hours.**

Review of fundamental topics in embedded system design and programming to prepare students for Computer Engineering courses. Topics include programming in resource-constrained environments, design of embedded controller systems, asynchronous and synchronous serial interfaces, timer-based peripherals, pulse-width modulation, analog to digital (A/D) converters, and typical applications. Course includes significant laboratory content.

**CSE 5401. FUNDAMENTALS OF DIGITAL SYSTEMS. 4 Hours.**

Review of fundamental topics in digital logic design and computer architecture to prepare students for Computer Engineering graduate courses. Topics include Boolean algebra; number systems and computer codes; combinational and sequential logic circuit design and analysis; simulation and synthesis of logic circuits using hardware description languages; design realization using gates, flip-flops, and programmable logic devices such as field-programmable gate arrays (FPGAs); component and system architectures; and typical applications. Course includes significant laboratory content.

**CSE 5698. MASTER'S THESIS II. 6 Hours.**

Completion of tasks in support of the thesis defined in Master's Thesis I, including oral defense of the written documents. Prerequisite: CSE 5398. Graded F, R, P.

**CSE 6197. RESEARCH IN COMPUTER SCIENCE. 1 Hour.**

Individually supervised research projects.

**CSE 6297. RESEARCH IN COMPUTER SCIENCE. 2 Hours.**

Individually supervised research projects.

**CSE 6306. ADVANCED TOPICS IN OPERATING SYSTEMS. 3 Hours.**

May be repeated for credit when topics change. Prerequisite: CSE 5306 or consent of instructor.

**CSE 6311. ADVANCED COMPUTATIONAL MODELS AND ALGORITHMS. 3 Hours.**

This course aims at exploring advanced computation models, theory and advanced algorithm design and analysis techniques that have broad applicability in solving real-life problems in cross-disciplinary areas such as the Internet computing, Web search engines, data mining, bioinformatics, wireless mobile and sensor networks, dynamic resource management, distributed computing, and social networking. Topics include: Theory of NP-completeness; Equivalence of Machine Models; Lower Complexity Bounds; Randomized and Probabilistic Algorithms; Game-theoretic and Information-theoretic Models; Approximation and Optimization Techniques. Prerequisite: CSE 5311 or consent of instructor.

**CSE 6314. ADVANCED TOPICS IN THEORETICAL COMPUTER SCIENCE. 3 Hours.**

May be repeated for credit when topics change. Prerequisite: CSE 5314 or consent of instructor.

**CSE 6319. SPECIAL TOPICS IN ADVANCED THEORY AND ALGORITHMS. 3 Hours.**

May be repeated when topics vary.

**CSE 6321. ADVANCED AUTOMATION TESTING. 3 Hours.**

A detailed investigation of full automation testing of front and back end automation testing techniques and tools. Advanced issues in automation test are studied and applied. Knowledge and skills gained in other software engineering courses are applied to synthesize a full automation testing solution to a significant and realistic software development team project. Prerequisite: CSE 5321 or consent of instructor.

**CSE 6323. AGILE SOFTWARE DEVELOPMENT. 3 Hours.**

Study of foundations, techniques and tools for agile methodologies in software engineering including agile manifesto and principles such as pair programming, test-first and refactoring. Latest papers in agile methodologies are reviewed and practiced. Prerequisite: CSE 5324 or consent of instructor.

**CSE 6324. ADVANCED TOPICS IN SOFTWARE ENGINEERING. 3 Hours.**

May be repeated for credit when topics change.

**CSE 6329. SPECIAL TOPICS IN ADVANCED SOFTWARE ENGINEERING. 3 Hours.**

May be repeated for credit when topics vary. Prerequisite: CSE Graduate Standing.

**CSE 6331. ADVANCED TOPICS IN DATABASE SYSTEMS. 3 Hours.**

May be repeated for credit when topics change.

**CSE 6332. CLOUD COMPUTING & BIG DATA. 3 Hours.**

The focus of this course is on data management techniques and tools for storing and analyzing very large volumes of data. Topics include: cloud computing; virtualization; distributed file systems; large data processing using Map-Reduce; data modeling, storage, indexing, and query processing for big data; key-value storage systems, columnar databases, NoSQL systems; big data technologies and tools; large-scale stream processing systems; data analytics frameworks; big data applications, including graph processing, recommendation systems, and machine learning.

**CSE 6339. SPECIAL TOPICS IN ADVANCED DATABASE SYSTEMS. 3 Hours.**

May be repeated for credit when topics vary.

**CSE 6344. ADVANCED TOPICS IN COMMUNICATION NETWORKS. 3 Hours.**

May be repeated for credit when topics change. Prerequisite: CSE 5346 or consent of instructor.

**CSE 6345. PERVASIVE COMPUTING & COMMUNICATIONS. 3 Hours.**

Issues and challenges in pervasive computing environments: interoperability and heterogeneity; location-awareness and mobility; transparency and proactivity; trust, authentication and security, information acquisition and dissemination in mobile and pervasive systems. Context-aware computing. Ad-hoc, sensor and mobile P2P systems in pervasive computing. Case studies. Prerequisite: Introductory courses in Networks, Algorithms and Operating Systems: e.g., CSE 5344, CSE 5311, and CSE 5306, or consent of instructor.

**CSE 6347. ADVANCED WIRELESS NETWORKS & MOBILE COMPUTING. 3 Hours.**

Wireless architectures and protocols (e.g., GSM, CDMA); channel assignment and resource allocation; mobility and location management; mobile data management; wireless data networking and multimedia; call admission control and QoS provisioning; cross layer optimization, performance modeling. Prerequisite: CSE 5345 and CSE 5330.

**CSE 6348. EMBEDDED SYSTEM NETWORKING. 3 Hours.**

Covers application and architecture of wireless sensor networks. Topics include platforms, routing, coverage, MAC, transport layer, data storage, query, and in-network processing. Prerequisite: CSE 5345 or equivalent course.

**CSE 6349. SPECIAL TOPICS IN ADVANCED NETWORKING. 3 Hours.**

May be repeated for credit when topics vary.

**CSE 6350. ADVANCED TOPICS IN COMPUTER ARCHITECTURE. 3 Hours.**

May be repeated for credit when topics change. Prerequisite: CSE 5350 and consent of instructor.

**CSE 6351. ADVANCED TOPICS IN COMPUTER ENGINEERING. 3 Hours.**

May be repeated for credit when topics change. Prerequisite: CSE 4342 or CSE 5342, or consent of instructor.

**CSE 6352. FAULT TOLERANT SYSTEMS. 3 Hours.**

Topics in reliable and fault-tolerant computing. May be repeated for credit when topics change. Prerequisite: CSE 5350 and consent of instructor.

**CSE 6353. COMPUTER ENGINEERING SYSTEM DESIGN. 3 Hours.**

Advanced course in design of computer engineering systems in a team environment working to produce a larger system. Emphasis is on building a complete system, including requirements analysis, building and integrating components (hardware and software), and testing. Prerequisite: at least three of the following courses: CSE 5342, CSE 5352, CSE 5354, CSE 5355, CSE 5356, or CSE 5357 or consent of instructor.

**CSE 6359. ADVANCED TOPICS IN SYSTEMS & ARCHITECTURE. 3 Hours.**

May be repeated for credit when topics vary.

**CSE 6362. ADVANCED TOPICS IN ARTIFICIAL INTELLIGENCE. 3 Hours.**

May be repeated for credit when the topic changes. Prerequisite: CSE 5361 and consent of instructor.

**CSE 6363. MACHINE LEARNING. 3 Hours.**

A detailed investigation of current machine learning methods, including statistical, connectionist, and symbolic learning. Presents theoretical results for comparing methods and determining what is learnable. Current issues in machine learning research will also be examined. Prerequisite: CSE 5301 or consent of instructor.

**CSE 6364. MACHINE LEARNING. 3 Hours.**

A detailed investigation of current machine learning methods, including statistical, connectionist, and symbolic learning. Presents theoretical results for comparing methods and determining what is learnable. Current issues in machine learning research will also be examined. This course is for PhD students only. Prerequisite: CSE 5301 or consent of instructor.

**CSE 6366. DIGITAL IMAGE PROCESSING. 3 Hours.**

Digitization and coding of images, characterization and representation of digital images in spatial and frequency domains, picture restoration and enhancement, filtering of two-dimensional signals, image reconstruction. Prerequisite: CSE 5366 or consent of instructor.

**CSE 6367. COMPUTER VISION. 3 Hours.**

Advanced techniques for interpretation, analysis, and classification of digital images. Topics include methods for segmentation, feature extraction, recognition, stereo vision, 3-D modeling, and analysis of time-varying imagery. Also taught as EE 6358. Prerequisite: CSE 5301 or CSE 5360 or EE 5356 or EE 5357, and consent of instructor.

**CSE 6368. COMPUTER VISION. 3 Hours.**

Advanced techniques for interpretation, analysis, and classification of digital images. Topics include methods for segmentation, feature extraction, recognition, stereo vision, 3-D modeling, and analysis of time-varying imagery. Also taught as EE 6358. This course is for PhD students only. Prerequisite: CSE 5301 or CSE 5360 or EE 5356 or EE 5357, and consent of instructor.

**CSE 6369. SPECIAL TOPICS ADVANCED INTELLIGENT SYSTEMS. 3 Hours.**

May be repeated for credit when topics vary.

**CSE 6379. SPECIAL TOPICS IN ADVANCED BIOINFORMATICS. 3 Hours.**

May be repeated for credit when topics vary.

**CSE 6388. SPECIAL TOPICS IN ADVANCED INFORMATION SECURITY. 3 Hours.**

May be repeated for credit when topics vary.

**CSE 6389. SPECIAL TOPICS IN ADVANCED MULTIMEDIA, GRAPHICS, & IMAGE PROCESSING. 3 Hours.**

May be repeated for credit when topics vary.

**CSE 6392. SPECIAL TOPICS IN ADVANCED COMPUTER SCIENCE. 3 Hours.**

May be repeated for credit when the topics vary.

**CSE 6397. RESEARCH IN COMPUTER SCIENCE. 3 Hours.**

Individually supervised research projects.

**CSE 6399. DISSERTATION. 3 Hours.**

Preparation of dissertation in computer science or computer science and engineering. Graded F, R.

**CSE 6697. RESEARCH IN COMPUTER SCIENCE. 6 Hours.**

Individually supervised research projects.

**CSE 6699. DISSERTATION. 6 Hours.**

Preparation of dissertation in computer science or computer science and engineering. Graded F, R,P,W.

**CSE 6997. RESEARCH IN COMPUTER SCIENCE. 9 Hours.**

Individually supervised research projects.

**CSE 6999. DISSERTATION. 9 Hours.**

Preparation of dissertation in computer science or computer science and engineering. Graded P, F, R.

**CSE 7399. DOCTORAL DEGREE COMPLETION. 3 Hours.**

This course may be taken during the semester in which a student expects to complete all requirements for the doctoral degree and graduate. Enrolling in this course meets minimum enrollment requirements for graduation, for holding fellowships awarded by The Office of Graduate Studies and for full-time GTA or GRA positions. Students should verify that enrollment in this course meets other applicable enrollment requirements. To remain eligible in their final semester of study for grants, loans or other forms of financial aid administered by the Financial Aid Office must enroll in a minimum of 5 hours as required by the Office of Financial Aid. Other funding sources may also require more than 3-hours of enrollment. Additional hours may also be required to meet to requirements set by immigration law or by the policies of the student's degree program. Students should contact the Financial Aid Office, other sources of funding, Office of International Education and/or their graduate advisor to verify enrollment requirements before registering for this course. This course may only be taken twice. Students who do not complete all graduation requirements while enrolled in this course must enroll in a minimum of 6 dissertation hours (6699 or 6999) in their graduation term. Graded P/F/R.

## COURSES

**CTEC 2350. WEB COMMUNICATION DESIGN AND DEVELOPMENT 1. 3 Hours.**

Overview of theoretical principles of communication, organization, human-computer interaction, and user experience research for effective communication over the Internet. This course provides an introduction to essential elements of Web design and development, including using markup and style sheet languages, developing information architecture, and assessing usability.

**CTEC 3320. MULTIMODAL COMMUNICATION AND DESIGN. 3 Hours.**

Recognizing the important role content plays in shaping user experience (UX), this course focuses on how different communication modalities influence content strategies. Students will learn principles, techniques, and workflows for creating content aligned with these strategies. Through hands-on multimedia projects, students will develop skills in scriptwriting, storyboarding, audio and visual recording, multimedia editing, motion design and animation, and post-production techniques. Prerequisite: COMM 3303.

**CTEC 3323. USER EXPERIENCE DESIGN PROCESS. 3 Hours.**

Explores user experience (UX) design emphasizing inclusivity, ethics, and social impacts. Students will apply industry best practices in workflow management, project collaboration, and AI tools to craft digital experiences based on interaction design principles and emerging UX trends. Deliverables, including component-based design systems, wireframes, and interactive prototypes, prepare students for professional practice with a focus on designing for positive change. Prerequisite: A grade of C or better (2.0/4.0) in CTEC 2350.

**CTEC 3350. WEB COMMUNICATION DESIGN AND DEVELOPMENT 2. 3 Hours.**

A continuation of CTEC 2350. This course focuses on creating intuitive, accessible web experiences that enable users to effectively consume and interact with content via HTML, CSS, and JavaScript. Key topics include translating design briefs and visual mockups into functional code, adapting content for different devices, and incorporating interactivity and multimedia elements to enhance user engagement. Prerequisite: CTEC 2350 with a grade of C (2.0/4.0 scale) or better, and 3 hours of Math.

**CTEC 4309. INTERNET MARKETING COMMUNICATION. 3 Hours.**

Course examines best practices in marketing communication; considers electronic commerce conducted via current communication and information technology. Discussion of theories, research strategies, usage trends, and current development. Prerequisite: COMM 3300, COMM 3315, a grade of C (2.0/4.0) or better in COMM 2311 and one of the following: ADVT 3305, CTEC 3350, PREL 3340, or BCMN 3340.

**CTEC 4321. DIGITAL COMMUNICATION MANAGEMENT. 3 Hours.**

Study of corporate and organizational communication theories through a user-centered approach. Students will design, analyze, and evaluate the organization and structure of digital communication via the development of Web-based, database-supported interactive applications. Prerequisite: COMM 3315, a grade of C or better (2.0/4.0) in the following: COMM 2311, CTEC 2350, and CTEC 3350.

**CTEC 4323. USER EXPERIENCE RESEARCH AND INTERACTION DESIGN PRINCIPLES. 3 Hours.**

Study of user experience (UX) research based on the Humanity-Centered Design approach. Students will conduct original research, including interviews, surveys, probes, contextual observations, usability testing, and data analysis. Hands-on projects integrate design principles with research insights, equipping students to conduct comprehensive UX research that guides the creation of user-centric interfaces, preparing them for roles in UX design and research. Prerequisites: COMM 3315 and a grade of C or better (2.0/4.0) in the following: COMM 2311, CTEC 2350, CTEC 3323, CTEC 3350, or, for non-CTEC majors, permission of the department.

**CTEC 4350. WEB COMMUNICATION DESIGN AND DEVELOPMENT 3. 3 Hours.**

This capstone course of the CTEC sequence reviews and applies theoretical principles of communication, human-computer interaction, user experience research, and information architecture for effective communication over the Internet. The course includes web design, implementation, development and project management. Prerequisites: A grade of C (2.0/4.0) or better in the following courses: CTEC 2350, CTEC 3320, CTEC 3350, CTEC 4309, and either CTEC 4321 or CTEC 4323.

**CTEC 4391. CONFERENCE COURSE. 3 Hours.**

Topic assigned on an individual basis, covering individual research or study in the designated areas. May be repeated when topic changes. Prerequisite: 60 or more hours earned and permission of the department.

**CTEC 4393. SPECIAL TOPICS. 3 Hours.**

Special studies in communication technology. Topic varies from semester to semester. May be repeated when topic changes, for a maximum of six credit hours. Prerequisite: 60 or more hours earned and permission.

**CTEC 4395. PROFESSIONAL INTERNSHIP. 3 Hours.**

Individual research while working with business and industry. Individual conference to be arranged. Prerequisite: 60 or more hours earned and permission.

## COURSES

**DASC 5191. ADVANCED STUDY IN DATA SCIENCE. 1 Hour.**

Individual research projects in Data Science. Prior approval of the DASC Graduate Advisor is required for enrollment. A written report is required. Graded F, I, P.

**DASC 5300. FOUNDATION OF COMPUTING. 3 Hours.**

Basics of programming, data structures, and algorithms. Introduction operating systems. Basics of discrete structures and computability. Course is used for the Master's in Data Science degree program and certificate programs for non-CSE majors. It cannot be taken for credit towards any CSE degree. Prerequisite: DASC Major.

**DASC 5301. DATA SCIENCE. 3 Hours.**

This inspirational course follows a data-science-for-all perspective that views data acumen as part of literacy. It aims to instill in students the data acumen, i.e., the basic skills to wrestle with data, to draw insights from data, to make sound decisions responsibly using data, and to effectively communicate about data-driven findings and decisions. Topics include 1) data management: data curation, preparation, model, and querying; 2) data description and visualization: exploratory data analysis; graphics; 3) machine learning and knowledge discovery: supervised learning, unsupervised learning, pattern and knowledge extraction, model evaluation and interpretation. Prerequisite: DASC Major, DASC 5300 (or concurrent enrollment) and DASC 5302 (or concurrent enrollment).

**DASC 5302. INTRODUCTION TO PROBABILITY AND STATISTICS. 3 Hours.**

Topics include descriptive statistics, set theory, combinatorics, mathematical expectation, probability distributions, confidence interval estimation, analysis of variance, random processes, and design of experiments. Prerequisite: DASC Major.



**DASC 5303. DATA SCIENCE PROJECT MANAGEMENT. 3 Hours.**

Management and control of multifaceted science and engineering projects. Coordination and interactions between client and various service organizations. Project manager selection. Typical problems associated with various phases of project life cycle. Case studies illustrate theories and concepts. Students will be expected to demonstrate an understanding of communication and collaboration, including workflow, reproducibility, codebase management, collaboration tools, oral and written communication, presentation and storytelling, and team management, as well as ethics, such as understanding bias, fairness, credibility and misinformation, security, privacy, and codes of conduct. Prerequisite: DASC Major, DASC 5300, DASC 5301, DASC 5302.

**DASC 5304. MACHINE LEARNING. 3 Hours.**

Introduction to methods, concepts, analysis, and applications of modern Machine Learning. Topics include Unsupervised as well as Supervised learning with a central focus on practical and application aspects in the area of Data Science. Prerequisite: DASC MAJOR: DASC 5300, DASC 5301, DASC 5302.

**DASC 5305. DATA VISUALIZATION. 3 Hours.**

Issues, methods, and tools for data visualization for the effective presentation and analysis of data. Covers techniques for the creation and delivery of compelling visual representations and data-driven stories to enhance the delivery of analysis results, as well as visualization methods to extract meaningful information from data and to select appropriate data science methods. Prerequisite: DASC Major, DASC 5304 (or concurrent enrollment).

**DASC 5306. BIG DATA MANAGEMENT. 3 Hours.**

Introduction to data management and processing techniques in relational and other databases as well as computing systems. Topics include the relational model, query languages and methods, data management approaches, technologies and software tools with a focus on practical data science applications. Prerequisite: DASC Major, DASC 5300, DASC 5301, DASC 5302.

**DASC 5309. DATA SCIENCE CAPSTONE PROJECT. 3 Hours.**

Students will design, develop and present a substantial data science project by applying the knowledge and skills acquired from relevant courses. The projects will be drawn from real-world applications and data and might involve collaboration with community partners. Prerequisite: DASC 5300, DASC 5301, DASC 5302, DASC 5304, DASC 5305, DASC 5306.

**DASC 5391. DATA SCIENCE APPLICATIONS. 3 Hours.**

Individually approved research or industry internship in data science. Prerequisite: DASC 5300, DASC 5301, DASC 5302, DASC 5304, DASC 5305, DASC 5306 and Graduate Advisor approval.

**DASC 5392. TOPICS IN DATA SCIENCE. 3 Hours.**

May be repeated for credit when the topics vary. Prerequisite: DASC Major, DASC 5300, DASC 5301, DASC 5302 and consent of instructor.

**COURSES****DATA 1301. INTRODUCTION TO DATA SCIENCE. 3 Hours.**

This course provides an introduction to the field of data science with a high level overview of basic concepts, data types, and techniques while introducing data-informed decision making.

**DATA 2301. DATA VISUALIZATION & DATA STORYTELLING. 3 Hours.**

In this course, students will learn about the principles and techniques of effective data visualization and communicate data using various tools and techniques. The course will cover a variety of tools and techniques commonly used in data visualization, including data visualization software, data preparation and cleaning, and techniques for creating static and interactive visualizations. Through a combination of lectures, hands-on exercises, and individual and group projects, students will explore the principles of data visualization and gain practical skills in designing and communicating data through visual representations. Topics covered will include data exploration, charting and graphing, dashboard design, data storytelling, and best practices for visualizing data. At the end of this course, students can design and implement effective visualizations for various fields, including STEM, psychology, scientific research, and so many others.

**DATA 3311. MATHEMATICS FOR DATA SCIENCE. 3 Hours.**

This course covers techniques from linear algebra and probability with an emphasis on how they are used in data science. Working with real data sets will be emphasized, along with basics of Matlab or R programming. Prerequisite: MATH 1426.

**DATA 3401. PYTHON FOR DATA SCIENCE 1. 4 Hours.**

This is the first of a two course sequence offering the foundations of Python programming in the context of data science. It introduces the full syntax of the Python language as it overviews structured, functional, and object oriented programming methodologies. It also provides a basic conceptual understanding of computing and introduces Unix command-line tools, software employed in data science such as git and Jupyter, and Python libraries such as numpy, matplotlib, and Pandas. Prerequisite: MATH 1426 or concurrent enrollment in MATH 1426.

**DATA 3402. PYTHON FOR DATA SCIENCE 2. 4 Hours.**

This is the second of a two course sequence offering the foundations of Python programming in the context of data science. It reinforces concepts presented in DATA 3401 with greater depth with a focus on application to various problems in data science, while exploring the python library ecosystem. Prerequisite: DATA 3401, or consent of instructor.

**DATA 3421. DATA MINING, MANAGEMENT, AND CURATION. 4 Hours.**

This lecture and lab course will provide training in working with databases, including data mining techniques and principles and best practices in data management, storage, and curation. Prerequisite: DATA 3402 or concurrent enrollment in DATA 3402, or consent of instructor.

**DATA 3441. STATISTICAL METHODS FOR DATA SCIENCE 1. 4 Hours.**

This lecture and lab course will provide an introduction to the fundamental building blocks of advanced data analysis, with emphasis on advanced linear algebra, optimization, statistical inference, and Monte Carlo methods. Working with real data sets will be emphasized, along with basics of R programming. Prerequisite: DATA 3401 or consent of instructor.

**DATA 3442. STATISTICAL METHODS FOR DATA SCIENCE 2. 4 Hours.**

This lecture and lab course will provide an introduction to the principles and general methods for the analysis of categorical data. This type of data occurs extensively in both observational and experimental studies, as well as industrial applications. While some theoretical statistical detail is given, the primary focus will be on methods of data analysis. Topics include generalized regression models, logistic regression models, Poisson regression models, and multinomial regression models. Problems will be motivated from a scientific perspective. Prerequisite: DATA 3441.

**DATA 3461. MACHINE LEARNING. 4 Hours.**

This course introduces and surveys Machine Learning techniques and their application to various problems in data science. Prerequisite: DATA 3401, DATA 3402 or consent of instructor.

**DATA 4090. UNDERGRADUATE RESEARCH. 0 Hours.**

Undergraduate research experiences under supervision of faculty. Students are expected to disseminate research findings by poster or oral presentations in meetings or conferences. Students are also expected to participate in other activities as directed by the grant-funded Research Program Director.

**DATA 4380. DATA PROBLEMS. 3 Hours.**

This course equips Data Science students with the skills to identify, define, and explore various data science challenges. Students will engage with practical projects and expert guidance throughout the course, preparing them for the capstone project. This course includes advanced data handling, machine learning algorithms, model evaluation, and ethical considerations in data science, culminating in real-world project presentations. Prerequisite: DATA 3402, DATA 3421. DATA 3461 or current enrollment in DATA 3461, or permission of the instructor.

**DATA 4381. DATA CAPSTONE PROJECT 1. 3 Hours.**

This is the first of a two-semester sequence that will involve deep engagement in a team or individual project in Data Science. Presentation of written and oral reports will be required. Corequisite: DATA 4380.

**DATA 4382. DATA CAPSTONE PROJECT 2. 3 Hours.**

This is the second of a two-semester sequence that will involve deep engagement in a team or individual project in Data Science. Presentation of written and oral reports will be required. Prerequisite: DATA 4381.

**DATA 4390. DATA SCIENCE RESEARCH. 3 Hours.**

Formulation and definition of research problems, the formulation and execution of strategies of solution, and the presentation of results. Prerequisite: consent of instructor. Recommendation by other faculty encouraged.

**DATA 4391. SPECIAL TOPICS IN DATA SCIENCE. 3 Hours.**

Special topics in Data Science are assigned to individuals or small groups. Faculty members closely supervise the projects and assign library reference material. Small groups will hold seminars at suitable intervals. May be repeated for credit. Prerequisite: senior standing and written permission of the instructor & department chair.

**DATA 4392. ADVANCED TOPICS IN DATA SCIENCE. 3 Hours.**

Varies from semester to semester. New developments in Data Science, in-depth study of a topic not covered in other courses, or a special faculty expertise made available to undergraduates. May be repeated for credit as topic varies. Prerequisite: permission of instructor.

**DATA 4393. HONORS THESIS/SENIOR PROJECT. 3 Hours.**

Required of all students in the University Honors College. During the senior year the student must complete a thesis or a project under the direction of a faculty member in Data Science. Prerequisite: Enrollment in the University Honors College and written permission of the instructor and chair.

**DATA 4394. UNDERGRADUATE RESEARCH EXPERIENCES. 3 Hours.**

Research under faculty supervision and mentorship involving collaboration within a small group. The topic varies from semester to semester, is determined by the faculty teaching the course, and is announced in advance. The course promotes active learning based on inquiry, development of higher-order thinking skills, and meaningful scientific research. Prerequisite: consent of instructor.

## COURSES

**DIVR 2315. INTRODUCTION TO LGBTQ+ STUDIES. 3 Hours.**

Provides an introduction to Gay and Lesbian Studies, including the study of transsexual, transgender, and queer identities. May address topics such as LGBTQ history; sexuality and civil rights; the representation of LGBTQ in art, literature, and popular culture; and/or feminist analysis of sex, gender, and sexuality. Explains the methods and theories employed in gay and lesbian studies, emphasizing the intersection of gender, sexuality, race, ethnicity, class, and ability/disability. Satisfies the University of Texas at Arlington core curriculum requirement in Language, Philosophy, and Culture. This course is offered as GWSS 2315 and DIVR 2315. Credit will be granted in only one department.

**DIVR 2350. SPECIAL ISSUES IN DIVERSITY STUDIES. 3 Hours.**

Special topics of interest in the disciplines of Diversity Studies. May be repeated for credit when the topic changes.

**DIVR 3301. INTRODUCTION TO LATINA/HISPANIC FEMINISM. 3 Hours.**

This interdisciplinary course explores Latina/Hispanic feminism through the intersection of race, class, gender, and sexuality. This course is organized around the following issues: colonization, immigration, globalization, sexism, health, and violence. Through an analysis of cultural production, politics, socio-economics, literary texts, and feminist methodology, the goal of this course is to develop a robust understanding of how Latina/Hispanic feminist methodologies can be used as tools for social change and social justice. Offered as GWSS 3301, MAS 3301, and DIVR 3301. Credit will only be granted in one department.

**DIVR 3305. WOMEN'S HEALTH ISSUES. 3 Hours.**

Will address specific issues of importance to women and their health, including growth and development, nutrition, reproductive health, pregnancy, chronic diseases, and relationship/family issues. Offered as DIVR 3305, HEED 3305 and GWSS 3305. Credit will be granted only once.

**DIVR 3328. MARITAL AND SEXUAL LIFESTYLES. 3 Hours.**

Contemporary American lifestyles selected from: singles, traditional marriage, homosexuals, single-parent families, open marriage, non-marital sexuality, cohabitation, dual-career marriage, childless couples, egalitarian marriage, families in later life. Offered as DIVR 3328, SOCI 3328 and GWSS 3328; credit will be granted only once.

**DIVR 3356. WOMEN, WORK AND SOCIAL CHANGE. 3 Hours.**

Women's work experiences, how these experiences are changing, and relationship between paid employment and non-wage household labor. Paid and unpaid work experiences are empirically examined in terms of a variety of theoretical perspectives. Offered as DIVR 3356, SOCI 3356 and GWSS 3356; credit will be granted only once.

**DIVR 3385. WOMEN AND CRIME. 3 Hours.**

This course examines criminology and criminal justice issues as they relate specifically to women. The three major areas of coverage include (1) women and girls as victims of crime, (2) women and girls as criminal offenders; and (3) women working in the criminal justice system. Offered as DIVR 3385, CRCJ 3385 and GWSS 3385; credit will be granted only once.

**DIVR 4350. SPECIAL TOPICS IN DIVERSITY STUDIES. 3 Hours.**

Special topics of interest in the disciplines of Diversity Studies. May be repeated for credit when the topic changes.

## COURSES

**DNCE 1131. BALLROOM DANCE. 1 Hour. (TCCN = DANC 1128)**

Introduction to various styles of ballroom dance with emphasis on fundamental patterning, rhythms, and partnering work.

**DNCE 1132. MODERN DANCE I. 1 Hour.**

Introduction to Modern dance technique and terminology with emphasis on fundamental movement patterns and dynamic alignment.

**DNCE 1133. AFRICAN DIASPORA DANCE: FOUNDATIONS AND EXPLORATIONS. 1 Hour.**

This course introduces students to the foundational movements, rhythms, and cultural expressions of African diaspora dance forms, emphasizing beginner-level techniques. Through movement practice, cultural context, and historical exploration, students will gain a deeper understanding of the ways African heritage influences dance in the diaspora, and how these forms have evolved in shaping global dance today.

**DNCE 1134. TAP DANCE. 1 Hour. (TCCN = DANC 1110)**

Introduction to Tap dance technique and terminology with emphasis on styles and rhythmic patterns.

**DNCE 1135. BALLET I. 1 Hour.**

Introduction to Ballet dance technique and terminology with emphasis on fundamental patterns and dynamic alignment.

**DNCE 1136. JAZZ DANCE I. 1 Hour.**

Introduction to Jazz dance technique and terminology with emphasis on fundamental movement patterns and dynamic alignment.

**DNCE 1137. HIP-HOP DANCE. 1 Hour.**

Introduction to Hip-Hop dance technique with an emphasis on various styles as related to social and cultural contexts.

**DNCE 1138. DANCE IMPROVISATION AND PARTNERING. 1 Hour.**

Development of solo and ensemble spontaneity, vocabulary, and composition. Dance partnering skills developed through an understanding of physical principles and structural support. Course is designed for all skill levels.

**DNCE 1139. DANCE PERFORMANCE I. 1 Hour. (TCCN = DANC 1151)**

Introductory concepts and practice in dance performance and production processes. Students are required to participate in roles of performer, dramaturg, and/or production crew. Students participate in dance auditions and are eligible to be cast in faculty, guest, and/or student choreography. May be repeated for credit. Open to all university students.

**DNCE 1142. DANCE CONDITIONING. 1 Hour.**

Introductory movement practices to develop strength, flexibility, and range of motion as related to dance technique.

**DNCE 1300. DANCE APPRECIATION. 3 Hours. (TCCN = DANC 2303)**

Designed to develop an awareness and appreciation of dance in its artistic, social, and cultural contexts through an overview of the aesthetic and critical dimensions of viewing and creating various dance idioms. Offers a variety of dance experiences, including the viewing of dance in live and video formats, reading and writing about dance, and experiencing selected dance movements from various dance genres. Explores the relationship of dance to other art forms. This course satisfies the University of Texas at Arlington core curriculum requirement in Creative Arts.

**DNCE 2139. DANCE PERFORMANCE II. 1 Hour.**

Intermediate level concepts and practice in dance performance for the concert stage. Students are required to participate in faculty-supervised dance performances throughout the semester. Prerequisite: An audition is required to enroll and permission of instructor.

**DNCE 2238. DANCE COMPOSITION. 2 Hours.**

Exploration of choreographic elements with emphasis on composing space, time, and energy. Students will develop movement through solo and group practice.

**DNCE 3232. MODERN DANCE II. 2 Hours.**

Intermediate-level Modern dance technique with emphasis on artistry, musicality, and composition. Prerequisite: DNCE 1132 or permission of instructor.

**DNCE 3233. DANCE FOR MUSICAL THEATRE. 2 Hours.**

Instruction in and application of specific musical theatre styles. May be repeated once for credit. Prerequisite: Permission of advisor.

**DNCE 3234. TAP DANCE II. 2 Hours.**

A continued exploration of tap dance technique and terminology, with a more advanced study of the various styles, steps, and rhythms that are essential to the tap dance form. Prerequisite: DNCE 1134, or permission of Advisor.

**DNCE 3235. BALLET II. 2 Hours.**

Intermediate-level Ballet dance technique with emphasis on artistry, musicality, and composition. Prerequisite: DNCE 1135 or permission of instructor.

**DNCE 3236. JAZZ DANCE II. 2 Hours.**

Intermediate-level Jazz dance technique with emphasis on artistry, musicality, and composition. Prerequisite: DNCE 1136.

**DNCE 3238. STAGE CHOREOGRAPHY. 2 Hours.**

Theory and practice of choreographing and producing a dance work for the concert stage. Students have opportunities to lead auditions, facilitate rehearsals, and direct with faculty supervision. Emphasis on developing and articulating creative perspectives and acquiring practical concert production experience. Prerequisite: DNCE 2139 and DNCE 2238, or permission of advisor.

**DNCE 3301. DANCE HISTORY. 3 Hours.**

Study of historical dance forms and analysis of their origins and evolution through time. Students will examine significant dance artists and pieces of choreography through diverse perspectives and processes of viewing, reading, and writing. Students may be required to attend and review dance productions.

**DNCE 3307. DANCE FOR CAMERA AND ALTERNATIVE SPACES. 3 Hours.**

Theory and practice of creating, performing, and directing dance specifically for camera and spaces beyond the studio and concert stage. Analysis of post-modern and contemporary practices as related to dance research, education, and production. Course is designed for all skill levels.

**DNCE 3308. 21st CENTURY DANCE. 3 Hours.**

Survey and critical analysis of trends in contemporary dance through the process of viewing, analyzing, and writing about dance. Focus on written analysis of creative methods, production techniques, and dance as a reflection of contemporary society. Students are required to attend and review dance productions.

**DNCE 3309. DANCE IN WORLD CULTURES. 3 Hours.**

Theory and practice of dance in world cultures. Analysis of historical and contemporary contexts of world dance forms through viewing, reading, writing, and practicing select dances from regions around the globe. The course is designed for all skill levels.

**DNCE 3340. DESIGN AND TECHNOLOGY FOR DANCE. 3 Hours.**

Theory and practice of producing dance for the concert stage. Focus on theatrical lighting, costuming, makeup, stage management, and theatre safety as applied to dance performance.

**DNCE 3341. DANCE PORTFOLIO. 3 Hours.**

Theory and practice of producing professional dance materials in the 21st century, including resumés, biographies, and web-based portfolios. Additional emphasis on the creation of image-based materials including dance portraits and promotional video reels.

**DNCE 3342. EXPERIENTIAL ANATOMY FOR DANCE. 3 Hours.**

Theory and practice of conditioning, bodywork, movement fundamentals, and injury prevention to develop strength, flexibility, coordination, and range of motion as applied to anatomical function in a dance context. Course is designed for all skill levels.

**DNCE 4191. CONFERENCE COURSE. 1 Hour.**

Topics assigned on an individual basis covering individual research or study in a designated area. May be repeated as the topic changes. Prerequisite: Permission of advisor.

**DNCE 4232. MODERN DANCE III. 2 Hours.**

Advanced-level Modern dance technique with emphasis on artistry and complex movement patterns. Prerequisite: Grade of B or better in DNCE 3232 or permission of instructor.

**DNCE 4235. BALLET III. 2 Hours.**

Advanced-level Ballet dance technique with emphasis on artistry and complex movement patterns. Prerequisite: Grade of B or better in DNCE 3235 or permission of instructor.

**DNCE 4291. CONFERENCE COURSE. 2 Hours.**

Topics assigned on an individual basis covering individual research or study in a designated area. May be repeated as the topic changes. Prerequisite: Permission of advisor.

**DNCE 4391. CONFERENCE COURSE. 3 Hours.**

Topics assigned on an individual basis covering individual research or study in a designated area. May be repeated as the topic changes. Prerequisite: Permission of instructor.

## COURSES

**DS 2301. TOPICS IN DISABILITY STUDIES. 3 Hours.**

Special topics of interest in the field of Disability Studies. May be repeated for credit when the topic changes.

**DS 3307. U.S. DISABILITY HISTORY. 3 Hours.**

Examines the history of ideas about disability, the historical lives of people with disabilities, and the history of disability policy. The growth of asylums, the rise of the eugenics movement, a historical look at freak shows, the impact of industrialization on experiences of disability, the evolution of special education, the role of ideas about disability in colonialism, the historical treatment of disabled veterans, and the development of the disability rights movement. Offered as HIST 3307 and DS 3307; credit will only be granted once. Prerequisite: One of HIST 1301 or HIST 1331 and one of HIST 1302 or HIST 1332.

**DS 3312. DISABILITY & SOCIAL WORK. 3 Hours.**

Examines major themes in disability and social work. Topics include basic understandings of disability, lived experiences of people with disabilities, legal and policy perspectives, working with adults and children with a variety of disabilities, history of disability policy and disability rights, disability advocacy, and resources in the community, among others. Offered as DS 3312 and SOCW 3312; credit will only be granted in one department.

**DS 3321. TOPICS IN DISABILITY STUDIES. 3 Hours.**

Special topics of interest in the field of disability studies. May be repeated for credit when the topic changes.

**DS 3322. DISABILITY ETHICS. 3 Hours.**

Explores the philosophical literature pertaining to disability and disabled experiences. Topics include defining disability, healthcare allocation, de-institutionalization, assisted dying and euthanasia, and the ethics of genetic and reproductive technologies. Offered as PHIL 3322 and DS 3322; credit will only be granted once.

**DS 3327. CYBORGS AND PROSTHETICS. 3 Hours.**

Explores the history, theories, and evolving representations of prosthetics, bionics, cyborgism, and the post-human. Investigates the origins and development of the prosthetics industry, historical experiences of prosthetics users, and cultural depictions and debates about human-technology interactions. Offered as DS 3327 and HIST 4327 and previously as DS 3321 and HIST 4388; credit will only be granted once.

**DS 3331. RESEARCH IN DISABILITY STUDIES. 3 Hours.**

Introduction to the theories and methods that disability studies scholars use to conduct research and present their findings in written and oral form. Recommended: HIST 3307 or DS 3321.

**DS 3346. DISABILITY IN MASS MEDIA. 3 Hours.**

Explores how mass media frames disability and neurodiversity for the general public. Focuses on issues related to disability and mass media representation, including journalism, TV, film, advertising, photography, documentary, video games, and the Internet. Topics may include media models of representation, inspiration porn, disability blogs, accessible media, and disabled mimicry in TV and film, among others. Offered as DS 3346 and COMM 3346; credit will be granted in only one department.

**DS 3355. UNIVERSAL DESIGN & ACCESSIBILITY IN THE PERFORMING ARTS. 3 Hours.**

Explores the principles of Universal Design using the performing arts as a case study: creating environments, events, buildings, and products to accommodate the broadest spectrum of human ability, size, age, and other characteristics. Investigates how to put into practice the accessibility guidelines of the Americans with Disabilities Act of 1990. Performing is not required. Offered as THEA 3355 and DS 3355; credit will only be granted in one department.

**DS 3399. DISABILITY AND ART. 3 Hours.**

Explores the many connections between disability and art, including both art created by people with disabilities and the wide variety of artistic representations about disability. Examines the purposes of art-making by people with disabilities: for therapeutic reasons, as a means of self-expression, to achieve professional goals, or as an act of activism. Investigates historical depictions of disability in art as well as art's role as a visual voice for the disability rights movement. Offered as DS 3399 and ART 3399; credit will only be granted once. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor or Disability Studies.

**DS 4100. WHEELCHAIR BASKETBALL. 1 Hour.**

Only open to adapted sports student athletes. May be repeated 10 times. Prerequisite: permission from the director of the Minor in Disability Studies.

**DS 4191. CONFERENCE COURSE. 1 Hour.**

Directed independent study for the advanced undergraduate. A close examination of a chosen topic through research and/or reading; format designed by instructor and student. Course may be repeated for credit once with a change in faculty. Prerequisite: Prior approval of the instructor and the director of the Disability Studies minor.



**DS 4291. CONFERENCE COURSE. 2 Hours.**

Directed independent study for the advanced undergraduate. A close examination of a chosen topic through research and/or reading; format designed by instructor and student. Course may be repeated for credit once with a change in faculty. Prerequisite: Prior approval of the instructor and the director of the Disability Studies minor.

**DS 4326. TOPICS IN DISABILITY HISTORY. 3 Hours.**

Special topics of interest in disability history, such as disability history in global perspective; hard-of-hearing histories, deaf histories, and Deaf History; or disability in the global South. May be repeated for credit when the topic changes. Offered as DS 4326 and HIST 4326; credit will be granted in only one department. Prerequisite: HIST 1301, HIST 1302.

**DS 4329. DISABILITY & WORK. 3 Hours.**

Explores the complex relationship between disability and work within the United States from a current and historical perspective. Topics include study of the Americans with Disabilities Act; research on the diversity, population, and changes in proportions of people with disabilities; employment rates and experiences of people with disabilities; attitudes and perspectives surrounding and affecting the employment opportunities and experiences of people with disabilities; and ways to provide inclusive, non-discriminatory workplaces. Offered as MANA 4329 and DS 4329; credit will only be granted once. Prerequisite: 60 hours or MANA 4326 or Disability Studies permission.

**DS 4391. CONFERENCE COURSE. 3 Hours.**

Directed independent study for the advanced undergraduate. A close examination of a chosen topic through research and/or reading; format designed by instructor and student. Course may be repeated for credit once with a change in faculty. Prerequisite: permission from the director of the Minor in Disability Studies.

**DS 4395. DISABILITY STUDIES INTERNSHIP. 3 Hours.**

Supervised internship in which students apply the academic skills they have acquired in Disability Studies courses by working in a related non-profit or business environment. Prerequisite: HIST 3307 or 3 hours of core disability studies courses; permission of the instructor.

**DS 4491. CONFERENCE COURSE. 4 Hours.**

Directed independent study for the advanced undergraduate. A close examination of a chosen topic through research and/or reading; format designed by instructor and student. Course may be repeated for credit once with a change in faculty. Prerequisite: Permission from the director of the Minor in Disability Studies.

## COURSES

**ECON 2110. SELECTED TOPICS IN ECONOMICS. 1 Hour.**

Topics of current interest in economics. The subject title is to be listed in the class schedule. May be repeated for credit when the topic changes. Prerequisite: ECON 2305 or ECON 2306.

**ECON 2305. PRINCIPLES OF MACROECONOMICS. 3 Hours. (TCCN = ECON 2301)**

(ECON 2301). Elementary models of the macroeconomy. Measures of aggregate economic activity and unemployment and inflation, money and banking, monetary and fiscal policy, international trade and payments, and applications of theory to society's problems.

**ECON 2306. PRINCIPLES OF MICROECONOMICS. 3 Hours. (TCCN = ECON 2302)**

(ECON 2302) The science of choice; develops demand, supply, and the market mechanism for allocating society's scarce resources; analyzes the impact of different industry structures in the market; applies the tools of microeconomic analysis to various topics such as price controls and international trade.

**ECON 2337. ECONOMICS OF SOCIAL ISSUES. 3 Hours.**

Economic analysis and application of basic economic principles to a variety of social issues and topics. Students will become familiar with the U.S. economy, its structure, and how economics applies to an assortment of public policy topics such as crime, energy, immigration, drug use, prostitution, minimum wage, our aging population, healthcare, gender driven wages, recycling, and the macro economy, to name a few. In addition, current economic issues and events may be incorporated into the course via lecture and/or class discussions. This is a non-technical course which satisfies the core requirement for social and behavioral studies. Will not serve to meet degree requirements for College of Business Administration majors. Offered as ECON 2337 and AAST 2337; credit will be granted in only one department.

**ECON 3301. THE ECONOMICS OF HEALTH. 3 Hours.**

Applies economic analysis to the health sector; examines issues involving health insurance and how these issues have been addressed by the market and by the government; role of market structure in health care markets such as the hospital and pharmaceutical industries; compares the U.S. health care system to health care systems in other countries. Prerequisite: ECON 2306.

**ECON 3302. THE ECONOMICS OF CRIME. 3 Hours.**

Economic analysis of criminal activity and its impact on the allocation of scarce resources; economic models of criminal behavior, optimum allocation of criminal justice resources, public and private sector approaches to deterrence, and current issues such as gun control and drug abuse prevention. Prerequisite: ECON 2306.

**ECON 3303. MONEY AND BANKING. 3 Hours.**

Monetary and banking systems of the United States, including the roles that money and interest rates play in the economy, the functions and organization of financial markets, financial institutions, central banks, operations of monetary policy, recent developments in the financial industry and the response of monetary authority. Prerequisite: ECON 2305.

**ECON 3304. PUBLIC SECTOR ECONOMICS. 3 Hours.**

Examines various economic reasons that may justify government involvement in the economy with particular focus on the problems inherent in government intervention. It considers topics such as the efficiency and fairness of alternative taxing systems, the growth and effects of government debt, and public choice (how spending and taxing decisions are made). It analyzes various government programs such as Social Security, health care, expenditure programs for the poor, etc. Prerequisite: ECON 2306.

**ECON 3305. LAWS AND ECONOMICS. 3 Hours.**

A review of the economic effects of laws and legal institutions, including property rights, the common law of contracts and torts, regulations, and crime and punishment. Prerequisite: ECON 2306.

**ECON 3306. SPORTS ECONOMICS AND BUSINESS. 3 Hours.**

Economic principles applied to the analysis of professional and amateur sports. Topics include fan demand, team output decisions, league/conference organization, the societal costs and benefits of government financing of sports facilities, player value, and collective bargaining. The course is designed for both business and economics majors. Prerequisite: ECON 2306.

**ECON 3310. MICROECONOMICS. 3 Hours.**

Develops the theory of consumer and firm behavior using tools of marginal analysis. Students learn motivations behind consumer behavior (utility maximization) and firm behavior (profit maximization). This includes the features of competitive equilibrium, price discrimination, and imperfect competition models. Prerequisite: ECON 2306 and 60 credit hours.

**ECON 3312. MACROECONOMICS. 3 Hours.**

Aggregate economic performance, including economic growth and business cycles. Models and real data will be used. Interactions among private sector behavior, government policies, central bank actions and international events, and their effects on GDP, employment, growth, and prices will be studied. Prerequisite: ECON 2305, ECON 3303, and 60 credit hours.

**ECON 3313. INDUSTRIAL ORGANIZATION AND PUBLIC POLICY. 3 Hours.**

Explains market structure and its relation to strategic behavior, advertising, pricing and product differentiation decisions. Further topics include the organization of the firm, takeovers, mergers and acquisitions, research and development, and the various regulatory controls placed on firms and industries. Prerequisite: ECON 2306.

**ECON 3317. ECONOMIC DATA LITERACY & VISUALIZATION. 3 Hours.**

Students learn how to answer questions with real-world data by exploring the connections between variables visually. Data visualization software is used to perform analysis and present results in a clear and concise manner. Emphasis is placed on best practices in data visualization, applications, and hands-on data analysis. Prerequisite: BSTAT 2305.

**ECON 3318. ECONOMIC DATA ANALYSIS. 3 Hours.**

Students learn how to answer questions with real-world data by exploring the connections between variables. Programs are used to perform analysis and present results in a clear and concise manner. Emphasis is placed on applications and hands-on data analysis. Prerequisite: BSTAT 3321 or permission of instructor.

**ECON 3322. BITCOIN AND ECONOMICS OF CRYPTOCURRENCIES. 3 Hours.**

Bitcoin (BTC) is a digital asset with unique characteristics that spawned an industry of similar assets called cryptocurrencies. The course examines the evolution of digital money in the historical context of the U.S. financial system. Students will examine cryptocurrencies, with a focus on BTC, as a vehicle for wealth storage and as a transactions asset (money). The course will cover valuation of cryptocurrencies compared to other assets in the context of asset pricing theory at an introductory level. Prerequisite: ECON 2306.

**ECON 3328. PRINCIPLES OF TRANSPORTATION. 3 Hours.**

The application of microeconomic and statistical tools in the analysis of the various modes of transportation. Topics for discussion include transportation as a derived demand, regulation of transportation, mass transit, and international issues in transportation. Prerequisite: ECON 2306.

**ECON 3335. ECONOMICS OF PUBLIC POLICIES. 3 Hours.**

Applies the principles of microeconomics to a wide range of public policy topics, including education, energy, health care, immigration, drugs, crime, recycling, risk and safety, Social Security, sports stadiums, tax policy, and topics on the economics of the family. Prerequisite: ECON 2306.

**ECON 3388. EUROPEAN ECONOMIC HISTORY, 1750 TO PRESENT. 3 Hours.**

An economic analysis of historical events leading up to and following the Industrial Revolution, large-scale industry, early banking, commerce, Utopian movements, war, postwar economic integration and the continuing debate over economic globalization. Prerequisite: ECON 2305.

**ECON 4191. STUDIES IN ECONOMICS. 1 Hour.**

Advanced studies, on an individual basis, in the various fields of economics. Prerequisite: ECON 2306 and 90 credit hours and departmental permission.

**ECON 4291. STUDIES IN ECONOMICS. 2 Hours.**

Advanced studies, on an individual basis, in the various fields of economics. Prerequisite: ECON 2306 and 90 credit hours and departmental permission.

**ECON 4300. ADVANCED COMMUNICATION FOR BUSINESS AND ECONOMIC PROFESSIONALS. 3 Hours.**

The course includes the creation of documents that can include financial formulas and economic forecasting, industry-specific reports, and presentations incorporating the results of a financial or economic theory and corresponding research. The course will use a variety of learning methods including lecture, class discussion, case analysis and presentation, guest speakers, and written exercises. This course is required to be eligible to sit for the Certified Business Economic (CBE) Exam. Students who receive credit for this course in the undergraduate program may not repeat the course at the Master's level. Prerequisite: BCOM 3360.

**ECON 4302. ENVIRONMENTAL ECONOMICS. 3 Hours.**

Economic forces that influence the quality of the environment; economic theory and environmental management; regulatory requirements for economic impact analysis; international issues including trade and implications for Third World economies. Prerequisite: ECON 2306.

**ECON 4305. THE ECONOMICS OF DISCRIMINATION. 3 Hours.**

Course reviews the economic theory of discrimination that arises from personal preference and social forces, that is revealed in numerous market situations. Empirical evidence of the impact on employment, careers, purchasing, business practice, and economic outcomes are studied. Students will prepare presentations on the topic. Students who receive credit for this course in the undergraduate program may not repeat the course at the Master's level. Prerequisite: ECON 2306.

**ECON 4306. COMPARATIVE ECONOMIC SYSTEMS. 3 Hours.**

Studies how differing economies are organized with respect to market, command, and traditional institutions. Several empirical economies are evaluated and compared with respect to performance and efficiency. Each economy is placed within its unique historical and social context to explore why certain institutions work in one situation but may fail in others. Prerequisite: ECON 2306.

**ECON 4311. MANAGERIAL ECONOMICS. 3 Hours.**

Applies Economic Optimization as the fundamental methodology to guide decisions at the firm level. Microeconomic Theory provides the foundation for decision making and strategy. Topics include investment decisions, pricing, price discrimination, strategy, bargaining, uncertainty, moral hazard and adverse selection, and incentive structures for employees and for units of the firm. The class is real-world-oriented exploring actual decisions of firms. Prerequisite: ECON 2306 and 60 credit hours.

**ECON 4316. DIGITIZATION, ECONOMICS AND STRATEGY. 3 Hours.**

Economics and strategy applied to emerging online markets: the gig economy (e.g., Airbnb, Uber, Slashdot), digital entertainment (e.g., Spotify, Netflix, Hulu), and video gaming (e.g., World of Warcraft, Play Store, Twitch). Economic concepts covered will include platforms, pricing, product positioning, product bundling, social networks, and collaboration. Explores how various IT innovations have disrupted business models and the strategic implications of future innovations. Prerequisite: ECON 2306 or Consent of the instructor.

**ECON 4318. ECONOMIC REGRESSION ANALYSIS CAPSTONE. 3 Hours.**

The course builds on data analysis techniques learned in ECON 3318. Students explore the difference between correlation and causation and learn how to use advanced techniques to analyze causal relationships between variables. Students display their mastery of analysis through a capstone project and present their findings in a professional manner. Prerequisite: ECON 3318 or consent of instructor.

**ECON 4319. ECONOMIC GROWTH AND DEVELOPMENT. 3 Hours.**

The issues underlying vast differences in development among the nations of the world. Course covers the elements of theories of growth, the role of international trade, and issues of institutional structures related to economic progress in a nation. Prerequisite: ECON 2306.

**ECON 4320. GAMES AND DECISION MAKING. 3 Hours.**

Game theory studies the strategic interactions between two or more parties. These interactions are common in business, law, politics, and sports. Examples include analysis of "games" in the real world such as competition among firms, complex business decisions, and political campaigns. This course starts with the basics of game theory (such as Nash equilibrium and dominant strategies) and moves to more complicated games such as repeated and stochastic games, and auctions. The course includes in-class demonstrations, hands-on experiments, and real-world examples. Students will think analytically and frame strategic interactions by accessing the incentives of those involved through the tools discussed. Prerequisite: ECON 2306.

**ECON 4321. INTERNATIONAL TRADE. 3 Hours.**

The course provides an understanding of international trade (international movement of goods and services), migration (international movement of labor), and investment (cross-border movement of assets) theories. It is designed to better understand the implications of such theories as they relate to international business management. It helps managers deal with the opportunities and challenges created by the global environment. Prerequisite: ECON 2306.

**ECON 4322. INTERNATIONAL FINANCE. 3 Hours.**

The nature and instruments of international payments. International financial institutions and arrangements. Exchange rate, balance of payment, and income determination theories. Prerequisite: ECON 2305.

**ECON 4323. MATHEMATICAL ECONOMICS. 3 Hours.**

This course focuses on applying mathematical concepts to solve economic and business problems. Course will upgrade mathematical skills for graduate work in economics and business. The emphasis is on calculus and linear algebra and their economic applications. Students who receive credit for this course in the undergraduate program may not repeat the course at the Master's level. Prerequisite: MATH 1315 or MATH 1316 and ECON 3310 and ECON 3312.

**ECON 4324. MONETARY AND FISCAL POLICY. 3 Hours.**

The effects of money on production and national income; quantity and commodity theories of money; various theories of interest rates; instruments and policies of Federal Reserve monetary action; proposals for monetary reform. Central bank systems. Prerequisite: ECON 2306 and ECON 3303 and 60 credit hours.

**ECON 4325. ECONOMIC FORECASTING. 3 Hours.**

The class presents methods that allow users to capture movement in data related to seasonality, trend and cycles to produce forecasts for economic date. Students are exposed to practical coding applications in software including R. Prerequisites: ECON 3318 or equivalent.

**ECON 4330. HUMAN RESOURCE ECONOMICS. 3 Hours.**

Application of economic principles to labor topics such as the demand for marriage, the demand for children, the economics of beauty, the economics of highly paid sports and entertainment stars, the effects of immigration on U.S. wages and employment, workplace discrimination, the effects of affirmative action policies, and the effects of minimum wage legislation. Prerequisite: ECON 2306.

**ECON 4331. SEMINAR IN ECONOMICS. 3 Hours.**

Readings and discussions of special topics in economics. Prerequisite: 60 or 90 credit hours and consent of instructor. May be repeated for credit with consent of department chair.

**ECON 4391. STUDIES IN ECONOMICS. 3 Hours.**

Advanced studies, on an individual basis, in the various fields of economics. Prerequisite: ECON 2306 and 90 credit hours and departmental permission.

**ECON 4393. ECONOMICS INTERNSHIP. 3 Hours.**

Practical training in economics. Analysis of theory applied to real life situations. May be used as an advanced business elective only; graded on a pass/fail basis. No credit will be given for previous experience or activities. May not be repeated for credit. Prerequisite: Junior standing and consent of department internship advisor.

**ECON 5182. INDEPENDENT STUDIES IN ECONOMICS. 1 Hour.**

Extensive analysis of an economic topic. Prerequisite: Departmental Permission Required.

**ECON 5199. GRADUATE ECONOMICS INTERNSHIP. 1 Hour.**

Practical training in economics. Analysis of theory applied to real life situations. Course counts as an elective and has a pass/fail grade. No credit will be given for previous experience or activities. Prerequisite: Minimum nine graduate semester hours completed.

**ECON 5282. INDEPENDENT STUDIES IN ECONOMICS. 2 Hours.**

Extensive analysis of an economic topic. Prerequisite: Departmental Permission Required.

**ECON 5299. GRADUATE ECONOMICS INTERNSHIP. 2 Hours.**

Practical training in economics. Analysis of theory applied to real life situations. Course counts as an elective and has a pass/fail grade. No credit will be given for previous experience or activities. Prerequisite: Minimum nine graduate semester hours completed.

**ECON 5300. ADVANCED COMMUNICATION FOR BUSINESS AND ECONOMIC PROFESSIONALS. 3 Hours.**

This course focuses on developing industry-specific acumen necessary to work in the fields of economics, finance, marketing, management, and information systems. The course includes the creation of documents that can include financial formulas and economic forecasting, industry-specific reports, and presentations incorporating the results of a financial or economic theory and corresponding research. The course will use a variety of learning methods including lecture, class discussion, case analysis and presentation, guest speakers, and written exercises. This course is required to be eligible to sit for the Certified Business Economic (CBE) Exam.

**ECON 5301. MATHEMATICAL ECONOMICS. 3 Hours.**

Course is designed to upgrade mathematical skills for graduate work in economics and business. The emphasis is on calculus and linear algebra and their applications in economic analysis. Mathematical tools covered include optimization, comparative-statics analysis, and simple dynamic analysis. Prerequisite: MATH 1316 or other calculus course.

**ECON 5305. THE ECONOMICS OF DISCRIMINATION. 3 Hours.**

Course reviews the economic theory of discrimination that arises from personal preference and social forces, that is revealed in numerous market situations. Empirical evidence of the impact on employment, careers, purchasing, business practice, and economic outcomes is studied. Students will prepare presentations on the topic. Students who receive credit for this course in the undergraduate program may not repeat the course at the Master's level. Prerequisite: Graduate student standing regardless of major.

**ECON 5306. ENVIRONMENTAL ECONOMICS. 3 Hours.**

An examination of the development of laws and policies that concern the environment followed by an application of economic analysis for environmental issues such as water use, air pollution, land controls, public lands, and global environmentalism. Other topics include: property rights, theories of regulation, and enviropreneurship. Participants will produce and present a case study on an environmental economic subject of interest.

**ECON 5310. MICROECONOMIC THEORY. 3 Hours.**

Development of marginal analysis and game theory tools in economics; focus on the analysis of consumer choice and decision making by firms; development of competitive model and various deviations from competition including the exercise of market power, externalities, and information asymmetries. Prerequisite: ECON 3310.

**ECON 5311. ECONOMIC ANALYSIS. 3 Hours.**

Provides an overview of microeconomic foundations of economic analysis with a focus on business applications. Topics include supply and demand, marginal analysis, pricing issues, and theory of the firm. An overview of macroeconomics is also provided, covering monetary and fiscal policy, inflation, growth, and international trade. Non-credit for MS in Economics.

**ECON 5312. MACROECONOMIC THEORY. 3 Hours.**

Study of contemporary macroeconomic theory and applications, including stylized facts of macroeconomics, the general framework for macroeconomic analysis, the analysis of modern macroeconomic models, and the long-run economic growth. Prerequisite: ECON 3312.

**ECON 5313. DECISIONS AND STRATEGY. 3 Hours.**

Decision analysis applied to pricing, hiring, investing, and partnering. Analyze conditions needed to create competitive advantage. Applications to decisions regarding: entering markets, launching products, developing informational advantages, establishing contractual and non-contractual relationships, and managing incentives within the organization.

**ECON 5314. ECONOMIC ANALYSIS FOR BUSINESS DECISIONS. 3 Hours.**

This course demonstrates how microeconomic theory can be used in business decision-making. Analytical tools are developed to study competitive analysis, strategic position and dynamics, internal organization of the firm, and the firm's strategic position in the supply chain. Through the use of real business information, the class provides an understanding of how to link economic theory with practice. Students will engage in empirical analysis.

Prerequisite: ECON 5336 or BSAD 6317 concurrent.

**ECON 5315. COMPETITION, INNOVATION, AND STRATEGY. 3 Hours.**

Based on economic analysis, students develop the skills to assess the competitive landscape and identify appropriate strategic responses. Applications include: Strategic Pricing, Product Positioning, Project Selection, Entry/Exit, R&D Investments, Organizational Structure, and Supply Chain Incentives.

Prerequisite: ECON 3310 or equivalent.

**ECON 5316. DIGITAL BUSINESS TRANSFORMATION. 3 Hours.**

Economics and strategy applied to emerging online markets: the gig economy (e.g., Airbnb, Uber, Slashdot), digital entertainment (e.g., Spotify, Netflix, Hulu), and video gaming (e.g., World of Warcraft, Play Store, Twitch). Economic concepts covered will include platforms, pricing, product positioning, social media, collaboration. Explores how various aspects of IT has transformed previous business models and how future developments could transform it further. Prerequisite: ECON 5313 or ECON 5314 or ECON 3310 or Consent of the instructor.

**ECON 5317. DATA VISUALIZATION. 3 Hours.**

Students learn how to answer questions with real-world data by exploring the connections between variables visually. Data visualization software is used to perform analysis and present results in a clear and concise manner. Emphasis is placed on best practices in data visualization, applications, and hands-on data analysis. Prerequisite: Graduate student standing.

**ECON 5318. ECONOMICS OF SPORTS. 3 Hours.**

Economic principles applied to the analysis of professional and amateur sports. Topics include fan demand, team output decisions, league/conference organization, the societal costs and benefits of government financing of sports facilities, player value, and collective bargaining. The course is designed for both business and economics majors. Prerequisite: ECON 5311 or equivalent.

**ECON 5319. INTERNATIONAL TRADE AND INVESTMENT. 3 Hours.**

The course provides an understanding of international trade, direct investment, and migration theories and policies pertaining to the movement of goods, services, assets, and labor across borders. It focuses on the implications of such theories and policies related to household welfare and international business management. It aims to provide a working knowledge of tools to help managers better navigate the opportunities and challenges in the global business environment. Prerequisite: ECON 5313 or ECON 5314 or ECON 3310 or consent of the instructor.

**ECON 5321. GLOBAL BUSINESS ANALYTICS. 3 Hours.**

This course provides a working knowledge of tools that influence the decisions multinational firms make in the global environment. It is designed to understand the implications of international trade, investment, and institutional theories as they relate to international business management. It focuses on how to test the implications of theories using global data sets. Participants will complete an empirical research project and present their findings.

Prerequisite: ECON 5336 or BSAD 6317, or consent of the instructor.

**ECON 5325. TRANSFER PRICING. 3 Hours.**

Course concerns the theory, practice, strategy and taxation of intra-firm trade among affiliated entities of a multinational enterprise (MNE). Transfer pricing is important for maximizing profits, monitoring performance of segments of an MNE, establishing control over cash and income flows, advancing strategic objectives, and reducing overall corporate tax burden. Issues arise in accounting, economics, taxation, and law.

**ECON 5327. MONETARY POLICY AND FINANCIAL SYSTEM ANALYSIS. 3 Hours.**

This course reviews the link between financial systems, monetary policy, and the macro economy, with an emphasis on the role that financial markets and institutions play in the domestic and global business environment. Contemporary policy issues are considered and we study how monetary policy actions affect financial markets and institutions. Students will engage in empirical applications using actual data and simulation exercises. Prerequisite: ECON 5336 or BSAD 6317 concurrent.

**ECON 5329. RESEARCH METHODS IN APPLIED ECONOMICS. 3 Hours.**

Each student presents a replication of a published article that uses methods from Econometrics I/II, Forecasting, Forecasting and/or Time Series. The instructor will present replications of several published papers and assist students in choosing studies that they will attempt to replicate. Class meetings will focus on answering specific questions that arise as students carry out their replication exercises. The course concludes with student presentations, along with submission of a written report summarizing the replication effort and detailing the extent to which published results were replicable. The goal is to develop the skills to write quality papers using a variety of statistical techniques. Prerequisite: ECON 5336 or BSAD 6317.

**ECON 5330. HUMAN RESOURCE ECONOMICS. 3 Hours.**

This course studies labor supply decisions made by households, labor demand decisions made by firms, and the equilibrium wage differences that result from these decisions. Other topics include unemployment, human capital investments, efficiency wages and other incentive schemes, inequality, labor mobility and migration, and discrimination. Prerequisites: ECON 5311 or equivalent.



**ECON 5331. PROJECT EVALUATION AND FEASIBILITY ANALYSIS. 3 Hours.**

This course introduces feasibility analysis including demand/market evaluation, cost estimation, and benefit-cost analysis. Students gain the ability to apply economic analysis methods (present worth, annual cost, rate of return, benefit-cost ratios, and breakeven) to basic economic problems. Other issues include depreciation; risk and uncertainty; sensitivity analysis; and global economic factors that impact the economy and project funding. Students will perform an empirical evaluation of project feasibility using cost-benefit tools. Prerequisite: ECON 5314 or consent of instructor.

**ECON 5332. GOVERNMENT, TAXES, AND BUSINESS STRATEGY. 3 Hours.**

The interaction between government and business is broad. Effective business leadership requires the ability to analyze and respond to public policy. Economics provides a framework for understanding the incentives of consumers, businesses, bureaucrats, and civil servants in different policy environments and predicting their behavior in response to policy changes. This course focuses primarily on tax policy at the federal, state and local levels, including issues in corporate taxation, personal income tax, treatment of capital gains and losses, tax incidence, work-leisure choices, fiscal competition among state and local governments, capital flight, and fiscal federalism. Prerequisite: Graduate Standing.

**ECON 5333. ECONOMICS OF HEALTH. 3 Hours.**

Economic analysis applied to current health policy issues, including health expenditures, public and private insurance, incentives, provider education and labor markets, hospitals, prescription drugs, malpractice, long-term care, the Internet. and various proposals for reform.

**ECON 5336. APPLIED BUSINESS AND ECONOMICS DATA ANALYSIS I. 3 Hours.**

Develops an understanding of statistical and econometric techniques. Participants exploit real data and computational power to uncover patterns/trends and examine relationships. Focus on conceptual frameworks and the application of techniques to data sets in various fields. Participants learn to use statistical packages such as R and SAS to apply the tools to real data and will complete an empirical analysis paper. Prerequisite: Graduate standing.

**ECON 5337. BUSINESS & ECONOMIC FORECASTING. 3 Hours.**

The course analyzes univariate and multivariate methods that allow users to capture patterns in data related to seasonality, trend and other random components to produce forecasts that are useful in virtually any business environment. Participants gain practical experience coding in relevant software. By the end of the course, students will be able to use statistical tools to critically assess the usefulness of alternative methods, which range from simple exponential smoothing to those that use machine learning. Prerequisite: ECON 5336 or BSAD 6317 or BSTAT 5325 or consent of instructor.

**ECON 5338. APPLIED TIME SERIES. 3 Hours.**

Covers topics of time series data analysis popularly used in many fields, including economics and business. Begins with univariate analysis of time series data with the focus on ARIMA, GARCH model, and unit-root tests, and extends to multivariate analysis of distributed lag model, VAR, and cointegration tests. The last part of the course is devoted to discussion of popular nonlinear dynamic models, such as TAR and structural breaks, before moving on to dynamic panel data models. Since emphasis is put on empirical applications, students will spend time in the computer lab to apply the techniques they learn to a variety of time series data. Students will undertake empirical analysis using statistical software. Prerequisite: ECON 5336 or BSAD 6317.

**ECON 5339. APPLIED BUSINESS AND ECONOMICS DATA ANALYSIS II. 3 Hours.**

The course covers cross-section, panel data, and limited dependent variables methods. Topics may include analysis of natural experiments/differences-in-differences, panel data methods, instrumental variable estimation, simultaneous equation models, sample selection corrections, and limited dependent variable and hierarchical models. Participants learn how to use statistical packages such as R, SAS, and STATA to apply these methods to data to examine causal relationships. They build an understanding of appropriate methods for different research design. Participants will complete an empirical research paper. Prerequisite: BSTAT 5325 or ECON 5336 or BSAD 6317 or the consent of the instructor.

**ECON 5341. ADVANCED BUSINESS AND ECONOMIC DATA ANALYTICS. 3 Hours.**

Students use advanced modeling and estimation techniques applied to large data sets collected by both business and government. The course includes assignments designed to give practical experience at applying the advanced statistical methods, culminating in a final project that includes a written report and class presentation. Projects will exploit data from various sources, such as sales transactions, individual health records, Internet search results, Twitter feeds, and environmental data. The advanced techniques covered may include data mining, statistical visualization, computational statistics, and other computer-intensive statistical methods. Prerequisite: ECON 5336 and ECON 5339; or BSAD 6317 and BSAD 6318.

**ECON 5343. CAUSAL INFERENCE FOR BUSINESS DECISIONS. 3 Hours.**

Students learn methods to identify and measure the outcomes of business decisions. In particular, students will learn various issues pertaining to the miss-attribution of causal effects. The course surveys multiple methods to overcome the misidentification problem. Students will engage in empirical analysis. Prerequisites: ECON 5336 or BSAD 6317 and ECON 5339 or BSAD 6318.

**ECON 5382. INDEPENDENT STUDIES IN ECONOMICS. 3 Hours.**

Extensive analysis of an economic topic. Prerequisite: Departmental Permission Required.

**ECON 5391. SPECIAL TOPICS IN ECONOMICS. 3 Hours.**

In-depth study of selected topics in economics. May be repeated when topics vary. Prerequisite: Departmental Permission Required.

**ECON 5398. THESIS. 3 Hours.**

Graded R/F only. Prerequisite: Permission of Graduate Advisor in Economics.

**ECON 5399. GRADUATE ECONOMICS INTERNSHIP. 3 Hours.**

Practical training in economics. Analysis of theory applied to real life situations. Course counts as an elective and has a pass/fail grade. No credit will be given for previous experience or activities. Prerequisite: Minimum nine graduate semester hours completed.

**ECON 5698. THESIS. 6 Hours.**

Graded P/F/R. Prerequisite: Permission of Graduate Advisor in Economics.

**ECON 5998. THESIS. 9 Hours.**

Graded P/F/R. Prerequisite: Permission of Graduate Advisor in Economics.

**ECON 6310. ADVANCED MICROECONOMIC THEORY. 3 Hours.**

Investigates the advanced neoclassical theory of microeconomics. The course develops formal models of consumer behavior, market structure, general equilibrium, and welfare. The objective of the course is to acquaint students with the analytical tools necessary to evaluate the formal literature in economics and to conduct scientific, hypothesis-driven statistical studies. Prerequisites: ECON 5301 and ECON 5310.

**ECON 6312. ADVANCED MACROECONOMIC THEORY. 3 Hours.**

Topics include dynamic general equilibrium analysis of model economies, monetary theory in overlapping generations models, advanced growth theory, and new open-economy macroeconomics. Prerequisites: ECON 5301 and ECON 5312.

## COURSES

**EDAD 1130. FOUNDATIONS OF LEADERSHIP. 1 Hour.**

Student leadership trainers, under the supervision of the staff in the Department of Student Activities, facilitate class discussion and assist students in identifying the necessary skills for effective leadership in university organizations and in both personal and professional settings. Topics include: leadership vs. management communication, leadership styles and personality traits, emotionally intelligent leadership, ethical leadership, leadership and change, and diversity and cultural awareness. Opportunities are provided for group problem solving, and team interaction and collaboration. Elective only and does not count as part of the professional certification requirements. Pass-Fail grades will be awarded.

**EDAD 1330. INTRODUCTION TO LEADERSHIP & DIVERSITY, EQUITY, AND INCLUSION. 3 Hours.**

Study the dimensions of leadership and its application to diversity, equity, and inclusion. Students will explore social identities development and power dynamics that result in inequalities within various systems. Students will also unpack cultural identities, life experiences, and world views on leadership relationships.

**EDAD 2330. THEORIES IN LEADERSHIP. 3 Hours.**

Review leadership theories and practices from critical perspectives. Students will deconstruct common concepts and theories of leadership and reconstruct how leadership can be used for social change. Students will have an opportunity to develop skills necessary to employ socially just leadership processes and practice.

**EDAD 4330. CAPSTONE IN LEADERSHIP STUDIES. 3 Hours.**

The primary purpose of this course is to revisit the themes introduced throughout the minor coursework. The course is intended to generate critical thought, reflection, and application of leadership development for social change. This class serves as the capstone that will draw upon students' leadership approaches, DEI, career aspirations, and community engagement to help students consider change in daily tasks and relationships. Students will have opportunities to engage with research to reimagine leadership for social change. Prerequisite: EDAD 2330, EDAD 1330.

**EDAD 4390. SELECTED TOPICS IN LEADERSHIP. 3 Hours.**

An examination of different topics related to leadership. This seminar may be repeated for credit as the topic changes.

**EDAD 4391. INDEPENDENT RESEARCH. 3 Hours.**

An examination of selected topics related to leadership. Can be repeated for credit with permission.

**EDAD 5190. SELECTED TOPICS IN EDUCATION. 1 Hour.**

An examination of different topics related to education. This seminar may be repeated for credit as the topic changes.

**EDAD 5191. INDEPENDENT RESEARCH. 1 Hour.**

Research for thesis substitute or equivalent over topic agreed upon between student and instructor. Can be repeated for credit with permission.

**EDAD 5199. PROBATIONARY CERTIFICATION INTERNSHIP. 1 Hour.**

This course provides mentoring and supervision to UTA Educational Leadership and Policy Studies students employed as assistant principals or principals while on a Probationary Certificate and not enrolled in either EDAD 5389 or EDAD 5399. Individuals must reenroll in EDAD 5199 while on probation, which is initially issued for one calendar year.

**EDAD 5290. SELECTED TOPICS IN EDUCATION. 2 Hours.**

An examination of different topics related to education. This seminar may be repeated for credit as the topic changes.

**EDAD 5291. INDEPENDENT RESEARCH. 2 Hours.**

Research for thesis substitute or equivalent over topic agreed upon between student and instructor. Can be repeated for credit with permission.

**EDAD 5302. EDUCATIONAL TECHNOLOGY PLANNING. 3 Hours.**

This course is designed to help prepare future educational administrators in assessing, revising, or developing a technology plan for their school, district, or campus. Students will explore the overall concepts of technology, new applications of technology, and how they apply to educational standards, such as the National Educational Technology Standards for Teachers (NETS-T) and the Technology Standards for School Administrators (TSSA).

**EDAD 5303. TEACHER LEADERSHIP FOR SCHOOL IMPROVEMENT. 3 Hours.**

Examine formal/informal leadership in schools emphasizing the roles and contributions of teachers as leaders of instructional improvement at the classroom and school levels. Study organizational dynamics and school culture from theoretical and practical perspectives for improving teaching and learning. Develop leadership strategies for shaping professional learning communities.

**EDAD 5304. DATA-DRIVEN ASSESSMENT. 3 Hours.**

Examine the impact of national and state-level education standards on curriculum, instruction, out-of-class experiences, and in-class and out-of-class assessment practices. Examine the structure and uses of both standardized, formative, summative, culturally-responsive, and multimodal assessments. Examine methods for using assessment data to design differentiated instruction and out-of-class experiences that meet varying student needs. Some of the topics will be examined in relation to assessment and institutional servingness for racially and ethnically minoritized students, such as Hispanic college students.

**EDAD 5305. CURRICULUM DESIGN, IMPLEMENTATION, AND EVALUATION. 3 Hours.**

The emphasis of this course is an examination of theory and research in curriculum development, implementation, and evaluation. The areas of focus include challenges principals face regarding curriculum leadership, implementing and maintaining rigorous curriculum and instruction, understanding a teacher's perspective about curriculum and instruction, the impact of ensuring an aligned curriculum, distributed leadership in curriculum design, implementation, and evaluation, improvement through planning, monitoring, and feedback, the importance of coaching teachers, and understanding the impact of the instructional leader.

**EDAD 5306. COACHING AND CONSULTATION SKILLS. 3 Hours.**

Examine various methods of coaching at the individual teacher, grade-level or subject-area team, and whole-school levels. Includes in-class instructional demonstrations, teacher observations and providing feedback, coaching through team meetings, and providing whole-school professional development. Also effective ways of including school administrators in instructional improvement.

**EDAD 5307. TEACHER LEADERSHIP POLICY TRENDS AND ISSUES. 3 Hours.**

Examines current national and state-level trends and policies in teacher leadership. Reviews research on the effects of various models of teacher leadership on instructional improvement.

**EDAD 5309. ADVANCED INSTRUCTIONAL STRATEGIES. 3 Hours.**

A study of advanced models of teaching, including concept attainment, inductive thinking, inquiry, cognitive growth, non-directive group investigation, laboratory training, simulation and the training model. Research in teacher effectiveness and demonstration of various models will be required.

**EDAD 5312. ORGANIZATIONAL THEORY AND LEADERSHIP IN HIGHER EDUCATION. 3 Hours.**

This is an introductory course on the theory and research of behavior in informal and formal organizational settings within the context of PK-20 education. Topics include basic conceptions of behavior, motivation, attitudes and group functioning. Emphasis is on understanding the processes of organizing and organization behavior at the individual, group, and institutional levels of analysis.

**EDAD 5315. RESEARCH PRACTICUM. 3 Hours.**

Examination of basic concepts and procedures necessary for empirical research investigations within classroom contexts, experimental design, data collection and interpretation, and statistical analysis.

**EDAD 5321. EDUCATIONAL RES. 3 Hours.****EDAD 5322. EDUCATIONAL RESEARCH AND EVALUATION. 3 Hours.**

An overview of basic concepts and procedures necessary for analyzing, designing, and conducting quantitative and qualitative educational studies. Topics include familiarization with educational journals, associations, funding agencies, accreditation procedures, program evaluation, sampling procedures, data collection, and statistical analyses.

**EDAD 5330. LEADERSHIP IN THE INSTRUCTIONAL SETTING PRACTICUM. 3 Hours.**

Examination of current research on effective instructional organizations and classroom instruction in today's schools, on characteristics of school leadership, and on the role and function of the teacher as instructional leader. Topics include the essential components of instruction, developing instructional-management systems, evaluating student and teacher performance, assisting colleagues to monitor and improve instructional skills, school climate and leadership styles as they impact on school improvement. This is the second course of the practicum experience. Prerequisite: EDAD 5389.

**EDAD 5340. THE GLOBAL COLLEGE STUDENT. 3 Hours.**

The purpose of the course is to explore and understand the nature, culture, and development of the College Student in an international context. The course focuses on examining a range of development theories that offer insight into the processes of student learning, growth, and development during the college years with focus on international students. The course will discuss student development models worldwide to better understand how to integrate the international students on American campuses.

**EDAD 5341. INTERNATIONAL HIGHER EDUCATION ADMINISTRATION AND STUDENT AFFAIRS. 3 Hours.**

The course is designed to introduce students to the organization, management, and philosophy of higher education administration and student affairs at post-secondary institutions. It explores the range of services and organizations associated with the wide range of positions that exist in student and academic affairs and helps students gain a better understanding of the potential career opportunities that await them after graduation. The course explores issues related to the integration of international students on American campuses as well as new initiatives designed for this student population.

**EDAD 5344. INTERNATIONAL PERSPECTIVES ON COMMUNITY COLLEGE EDUCATION. 3 Hours.**

This course will provide students with the philosophical and historical foundations of the American community college system and equivalent institutions worldwide. The course will examine current issues including, but not limited to, the evolution of the community college baccalaureate, principles of accreditation, institutional effectiveness, workforce development, and federal oversight of community colleges. Students will also explore how international students are integrated on community college campuses.

**EDAD 5347. TRENDS AND ISSUES IN GLOBAL HIGHER EDUCATION. 3 Hours.**

The course is designed to introduce students to key issues affecting higher education today. Through diverse and critical readings, the students explore issues such as access and equity, affirmative action, academic freedom, college costs, and strategic change. The course content is designed from an international and comparative perspective.

**EDAD 5350. AMERICAN COLLEGE STUDENT. 3 Hours.**

The purpose of the course is to explore and understand the nature, culture, and development of the American College Student. The course focuses on examining a range of development theories that offer insight into the processes of student learning, growth, and development during the college years.

**EDAD 5351. HIGHER EDUCATION ADMINISTRATION AND STUDENT AFFAIRS. 3 Hours.**

The course is designed to introduce students to the organization, management, and philosophy of higher education administration and student affairs at post-secondary institutions. It explores the range of services and organizations associated with the wide-range of positions that exist in student and academic affairs and helps students gain a better understanding of the potential career opportunities that await them after graduation.

**EDAD 5352. HIGHER EDUCATION LAW. 3 Hours.**

The purpose of this course is to provide students with the fundamental cases of higher education law for administrators. Topics of this course may include the legal structure of higher education, separation of church and state, religion, academic freedom, employment and tenure, due process, computer-related legal issues, copyright, students' rights of speech and expression, search and seizure, desegregation, tort liability, contracts and collective bargaining.

**EDAD 5353. HIGHER EDUCATION FINANCE. 3 Hours.**

This course will provide knowledge of the theoretical basis for use of tax funds for education, student fees and tuition, state methods for financing, planning, cost benefit, budgeting, federal role, capital outlay, and the relationships between educational objectives and resource allocations.

**EDAD 5354. THE AMERICAN COMMUNITY COLLEGE. 3 Hours.**

This course will provide students with the philosophical and historical foundations of the American community college system. Students will explore current issues including, but not limited to, the evolution of the community college baccalaureate, principles of accreditation, institutional effectiveness, workforce development/career readiness, and federal oversight of community colleges. In addition, barriers and strategies to improve throughputs in PK-20 will be discussed, highlighting the role of the community college in that pipeline process and how additional designations such as Hispanic Serving Institution (HSI) can further enhance their ability to transform the education system. This course benefits learners interested in higher education and those who aspire to be professors, researchers, policy analysts, and/or administrators at institutions of higher education.

**EDAD 5355. HIGHER EDUCATION CURRICULUM. 3 Hours.**

An examination of theory and research in curriculum development, implementation, and evaluation in higher education settings. Emphasis will be on current trends in the content areas.

**EDAD 5356. HISTORY, PRINCIPLES, AND PHILOSOPHY OF HIGHER EDUCATION ADMINISTRATION. 3 Hours.**

This course is for current and prospective faculty, administrators, and staff seeking to learn about the American higher education system. The topics addressed include the history, recent developments, and strategies for future management and administration, finance, organization, governance, and the mission and role of higher education in American society.

**EDAD 5357. HIGHER EDUCATION TRENDS AND ISSUES. 3 Hours.**

The course is designed to introduce students to key issues affecting higher education today. Through diverse and critical readings, the students explore issues such as access and equity, affirmative action, faculty, academic freedom, college costs, and strategic change.

**EDAD 5360. LEADERSHIP THEORY. 3 Hours.**

Focus is on leadership, organization, and administration of schools. The importance of campus culture, climate, vision and ethics will be stressed throughout standards-based instruction, case studies, developmental activities, readings, reflections and field experiences. The importance of appropriate principal induction will be stressed along with the concepts of the principal as scholar-practitioner and proactive leader. An emphasis will be placed on continuous school improvement and a commitment to professional development.

**EDAD 5363. ADVANCED EDUCATIONAL RESEARCH. 3 Hours.**

An in-depth coverage of selected topics in the design of research and the collection and analysis of data. Topics include multivariate analyses, experimental and quasi-experimental designs, development and selection of data collection instruments, focus group interviewing, observational research, the delphi method, and interpretive analysis.

**EDAD 5365. LEADING LEARNING ORGANIZATIONS. 3 Hours.**

The change process in educational settings serves to focus this course. Moving along the continuum of change theories, the planning, adoption, implementation and institutionalization of change are explored across public school and post-secondary learning organizations.

**EDAD 5376. EDUCATIONAL GOVERNANCE. 3 Hours.**

Focus on the appointed and elected entities and bureaucracies that determine and implement policy in public education.

**EDAD 5377. CONTEMPORARY ISSUES IN EDUCATION. 3 Hours.**

An exploration of selected controversial issues in contemporary education will include research that discusses the relevance of context and culture in designing and measuring student success. Such topics will also include contemporary analysis of policy and perspectives on educational leaders' ability to promote student success in various PK-20 environments, such as the Hispanic-Serving Institution (HSI), etc. Symposium/seminar/lecture format.

**EDAD 5379. SUPERINTENDENCY INTERNSHIP. 3 Hours.**

Provides experiences in the various roles and responsibilities of a superintendent of schools under the direction of a school district mentor and a university supervisor. An internship project will be developed in consultation with public school and university personnel.

**EDAD 5380. DIVERSITY AND EQUITY IN EDUCATION. 3 Hours.**

Effective leadership, instruction, and management strategies for work in diverse educational settings. Designed to provide increased self-awareness and insight into issues of diversity and equity such as culture, ethnicity, exceptionality, gender, language, and socioeconomic status. Demographic issues along with urban and suburban educational settings will also be addressed.

**EDAD 5381. GOVERNANCE, POLITICAL AND LEGAL ASPECTS OF EDUCATION. 3 Hours.**

Focus on the legal foundation of public education, political theory, and application of political skills in working with school personnel, students, parents, and community organizations. The role of the law, court rulings, and the politics of school governance at the federal, state, and local levels will be addressed.

**EDAD 5382. FOUNDATIONS OF EDUCATIONAL ADMINISTRATION. 3 Hours.**

Will address the various aspects of instructional leadership roles and responsibilities of central office as well as building level administrators and supervisors. Topics included will be history of educational administration, educational philosophy, the global understanding of administrative roles in urban and rural settings, and professional organizations, as well as an overview of educational reforms, site-based management, governance, instructional management, evaluation, exchanging ideas, making changes, coaching beginning teachers, mentoring of teachers and peers, and a diverse community.

**EDAD 5383. THE PRINCIPALSHIP. 3 Hours.**

The Principalship will address the role of the campus leader in the leadership, organization and administration of schools. The importance of campus culture, climate, vision and ethics will be stressed throughout standards-based instruction, case studies, developmental activities, readings, reflections and field experiences. The importance of appropriate principal induction will be stressed along with the concepts of the principal as scholar-practitioner and proactive leader. An emphasis will be placed on continuous school improvement and a commitment to professional development.

**EDAD 5384. RESOURCE MANAGEMENT IN EDUCATION. 3 Hours.**

School finance, educator compliance training, as well as auxiliary areas of resource management, will be addressed. The emphasis will be on the use of technology, alternative models of financing and budgeting, and sources of revenue from the federal, state, and local levels as well as from private sources. The course is designed to assist administrators in developing an understanding of the functions, operation, and evaluation of auxiliary services which support the educational program.

**EDAD 5388. EDUCATIONAL POLICY ISSUES IN THE PUBLIC SCHOOLS. 3 Hours.**

Examination of positions on policy issues of importance in education.

**EDAD 5389. ADMINISTRATIVE PRACTICUM. 3 Hours.**

Designed to provide prospective educational administrators job-related experiences under supervision in an appropriate educational setting. An approved professional study is designed in relationship to the intern's interest and past experiences. Can be repeated for credit with approval of advisor.

**EDAD 5390. SELECTED TOPICS IN EDUCATION. 3 Hours.**

An examination of different topics related to education. Such topics will be grounded in research that supports PK-20 student success in and out-of-the classroom as well as educational leaders' success in various types of institutions, such as the Hispanic-Serving Institution (HSI), etc. This seminar may be repeated for credit as the topic changes.

**EDAD 5391. INDEPENDENT RESEARCH. 3 Hours.**

Research for thesis substitute or equivalent over topic agreed upon between student and instructor. Can be repeated for credit with permission.

**EDAD 5395. FUTURISTIC LEADERSHIP ROLES IN SCHOOL ADMINISTRATION. 3 Hours.**

Concepts and skills to prepare educational leaders for learner-centered schools and to anticipate and foster the professional development of all staff and parents in the learning community.

**EDAD 5399. CAPSTONE PRACTICUM IN EDUCATIONAL LEADERSHIP AND POLICY STUDIES. 3 Hours.**

The course focus will be on collaborative inquiry and action research in the individual classroom, team, school, and/or professional learning community. Each student will identify, research, design and initiate addressing a real problem at their work site. Students will leave this course and graduate from the program with a research presentation as part of their informal professional portfolio. Successful completion of the Capstone Internship will fulfill the comprehensive examination requirements for the graduate degree and/or certification. Requirements of EDAD 5399 will include, but not be limited to, those collaboratively established by University faculty and school administrative personnel. EDAD 5389 and EDAD 5330 are prerequisites for EDAD 5399 for students in Master of Education in Educational Leadership and Policy Studies with Principal Certificate Courses and Principal Certification Preparation Only programs. Prerequisite: EDAD 5389, EDAD 5330.

**EDAD 6179. SUPERINTENDENCY PRACTICUM. 1 Hour.**

Provides experiences in the various roles and responsibilities of a superintendent of schools under the direction of a school district mentor and a university supervisor. An internship project will be developed in consultation with public school and university personnel.

**EDAD 6279. SUPERINTENDENCY PRACTICUM. 2 Hours.**

Provides experiences in the various roles and responsibilities of a superintendent of schools under the direction of a school district mentor and a university supervisor. An internship project will be developed in consultation with public school and university personnel. Prerequisite: permission of advisor.



**EDAD 6301. INTRODUCTION TO DOCTORAL STUDIES. 3 Hours.**

This course provides an introduction to doctoral and PK-20 education studies. It also includes a discussion of the dissertation process and doctoral student journey and practices for successful doctoral study. Students will explore the purpose and function of scholarly writing, practice fundamental writing and editing skills, and utilize APA style requirements. It should be noted that discussion is a critical component of learning, so this pedagogic approach will be central to the course as well. Prerequisite: ELPS doctoral program admittance required.

**EDAD 6304. INTRODUCTION TO EDUCATIONAL RESEARCH. 3 Hours.**

The purpose of this course is to introduce doctoral students to different approaches to educational research and to alternative frames and paradigms of interpretation (e.g., constructivism, feminism, poststructuralism, critical theory, etc.). This course will also explore ethical issues throughout the research process. Students will be introduced to research questions relevant to various qualitative, quantitative, and mixed methods research designs.

**EDAD 6308. INTRODUCTION TO QUALITATIVE RESEARCH. 3 Hours.**

In this introductory course, students will learn about various epistemologies, philosophies, theories, logics, designs, and practices of qualitative research by studying more than and beyond the popularized methodologies in education research. Engaging with qualitative scholarly literature, we will learn about the strategies and tools of designing qualitative research including frameworks, data collection methods, relational responsibilities, positionality, ethics, and the tensions surrounding them.

**EDAD 6310. INTRODUCTION TO STATISTICS. 3 Hours.**

This course examines introductory statistical methods and their implications for educational research and evaluation. Students will be introduced to descriptive statistics, confidence intervals, hypothesis testing, Type I and Type II errors, and ethical issues. Through statistical software applications (e.g., SAS, SPSS, R, Stata, etc.), students will also gain hands-on experience such as running and interpreting t-tests, ANOVA, correlation, and Chi-square.

**EDAD 6315. ADVANCED STATISTICS. 3 Hours.**

This course examines advanced statistical methods through a basic introduction to measurement analysis in educational research focusing on procedures, including factorial and repeated ANOVA, MANOVA, ANCOVA, multiple regression, logistic regression, multivariate analysis, reliability, exploratory, and confirmatory factor analysis. Students will learn to develop an advanced understanding of these methods and conduct data analysis using relevant statistical applications (e.g., JMP, R, SAS, SPSS, Stata, etc.).

**EDAD 6318. ADVANCED QUALITATIVE RESEARCH. 3 Hours.**

This course is designed to provide students with both theoretical and practical opportunities to explore qualitative research in various educational contexts. The course focuses on advancing qualitative data collection and analysis through both analog and digital strategies and tools. Students will help support each other in developing and implementing independent, small-scale research projects relevant to PK-20 education and write a research paper on their qualitative studies. Prerequisite: EDAD 6308.

**EDAD 6320. K-16 PHILOSOPHY & HISTORY POLICY RESEARCH. 3 Hours.**

Analysis of the roles of history, philosophy, culture, and values in shaping educational policy. Topics include the Greek Academies, the Medieval Universities, Progressivism, Neo-Conservatism, and Postmodern perspectives, as necessary antecedents to the K-16 movement. Detailed analysis of the roles, history, philosophy, culture, and values for public school and policy making within institutions of higher education.

**EDAD 6325. EDUCATIONAL POLICY ANALYSIS. 3 Hours.**

This advanced policy course enables students to identify relevant educational principles, practices, and processes of policy analysis. Students engage in policy analysis of historic and contemporary PK-20 education policies and will develop and apply policy analysis in their area of interest using current research on specific education policy (their own or from other studies) as a shared context for learning.

**EDAD 6327. K-16 POLICY & LAW ANALYSIS RESEARCH. 3 Hours.**

A study of principles and practices involved in policy analysis research in educational settings and critical analysis of the legal underpinnings of public K-16 education with particular emphasis on the United States Constitution.

**EDAD 6330. INTRODUCTION TO EDUCATION POLICY. 3 Hours.**

This course provides a comprehensive introduction to micro and macro-level policy-related issues and topics, theories, methodologies, and analysis within the diverse contexts of PK-20 education.

**EDAD 6331. LEADERSHIP IN THE K-12 INSTRUCTIONAL SETTING. 3 Hours.**

Examination of current research on effective instructional organizations and classroom instruction in today's schools, on characteristics of school leadership, and on the role and function of the teacher as instructional leader. Topics include the essential components of instruction, developing instructional-management systems, evaluating student and teacher performance, assisting colleagues to monitor and improve instructional skills, school climate and leadership styles as they impact on school improvement. For doctoral students only.

**EDAD 6335. K-16 ACCOUNTABILITY POLICY RESEARCH. 3 Hours.**

A comprehensive course covering the research about and role of outcomes assessment in institutional accountability and accreditation. Addresses the relationship between outcomes assessment and strategic planning. Exploration of outcomes assessment in public schools and institutions of higher education.

**EDAD 6340. ORGANIZATIONAL THEORIES IN EDUCATION. 3 Hours.**

This is an introductory course on the theory and research of behavior in informal and formal organizational settings within the context of PK-20 education. Topics include basic conceptions of behavior, motivation, attitudes and group functioning. Emphasis is on understanding the processes of organizing and organization behavior at the individual, group, and institutional levels of analysis.

**EDAD 6342. K-16 ORGANIZATIONAL & LEADERSHIP THEORY RESEARCH. 3 Hours.**

In depth study of theories of organizing, the ways in which they are evidenced in educational organizations and the ways in which they influence leaders and learning. Analysis of both classical and contemporary theories, and their application in K-16 settings.

**EDAD 6343. CONTEXTS OF EDUCATION. 3 Hours.**

This course offers students an interdisciplinary introduction to in/formal PK-20 education and schooling, while critically studying past, present, and future opportunities and possibilities of education around the globe. Through the study and application of various educational concepts and theories, issues and trends, and intersectionalities, this course interrogates and reimagines diverse educational contexts across various historical, economic, philosophical, social, and cultural, political, economic dimensions. Prerequisite: ELPS doctoral program admittance required.

**EDAD 6345. K-16 HUMAN RESOURCES LEADERSHIP RESEARCH. 3 Hours.**

Human resource needs in educational settings, including faculty and staff recruitment, selection, evaluation, retention, promotion, tenure, grievances, and leadership and personnel development.

**EDAD 6350. K-16 CURRICULUM LEADERSHIP RESEARCH. 3 Hours.**

Foundations, principles, and issues of curriculum, including vertical alignment and the middle college concept. Exploration of curriculum development in both public schools and institutions of higher education. Analysis of the role of articulation agreements.

**EDAD 6351. HIGHER EDUCATION AND STUDENT AFFAIRS ADMINISTRATION. 3 Hours.**

The course is designed to introduce students to the organization, management, and philosophy of higher education administration and student affairs at post-secondary institutions. It explores the range of services and organizations associated with the wide-range of positions that exist in student and academic affairs and helps students gain a better understanding of the potential career opportunities that await them after graduation. For doctoral students only.

**EDAD 6352. HIGHER EDUCATION LAW. 3 Hours.**

The purpose of this course is to provide students with the fundamental cases of higher education law for administrators. Topics of this course may include the legal structure of higher education, separation of church and state, religion, academic freedom, employment and tenure, due process, computer-related legal issues, copyright, students' rights of speech and expression, search and seizure, desegregation, tort liability, contracts and collective bargaining. For doctoral students only.

**EDAD 6353. HIGHER EDUCATION FINANCE. 3 Hours.**

This course will provide knowledge of the theoretical basis for use of tax funds for education, student fees and tuition, state methods for financing, planning, cost benefit, budgeting, federal role, capital outlay, and the relationships between educational objectives and resource allocations. For doctoral students only.

**EDAD 6354. American Community College. 3 Hours.**

This course will provide students with the philosophical and historical foundations of the American community college system. Students will explore current issues including, but not limited to, the evolution of the community college baccalaureate, principles of accreditation, institutional effectiveness, workforce development, and federal oversight of community colleges. For doctoral students only.

**EDAD 6355. K-16 STUDENT SERVICES LEADERSHIP RESEARCH. 3 Hours.**

Analysis of the student services, co-curricular, extracurricular, and auxiliary enterprise functions of both public schools and institutions of higher education. Particular emphasis on the relationship with the institutions' stated curricula, purposes, and institutional missions.

**EDAD 6356. HISTORY, PRINCIPLES, AND PHILOSOPHY OF HIGHER EDUCATION ADMINISTRATION. 3 Hours.**

This course is for current and prospective faculty, administrators, and staff seeking to learn about the American higher education system. The topics addressed include the history, recent developments, and strategies for future management and administration, finance, organization, governance, and the mission and role of higher education in American society. For doctoral students only.

**EDAD 6357. HIGHER EDUCATION TRENDS AND ISSUES. 3 Hours.**

The course is designed to introduce students to key issues affecting higher education today. Through diverse and critical readings, the students explore issues such as access and equity, affirmative action, faculty, academic freedom, college costs, and strategic change. For doctoral students only.

**EDAD 6358. AMERICAN COLLEGE STUDENT. 3 Hours.**

The purpose of the course is to explore and understand the nature, culture, and development of the American College Student. The course focuses on examining a range of development theories that offer insight into the processes of student learning, growth, and development during the college years. For doctoral students only.

**EDAD 6359. HIGHER EDUCATION CURRICULUM. 3 Hours.**

An examination of theory and research in curriculum development, implementation, and evaluation in higher education settings. Emphasis will be on current trends in the content areas. For doctoral students only.

**EDAD 6360. EDUCATIONAL LEADERSHIP THEORY. 3 Hours.**

This course focuses on major theoretical perspectives on PK-20 educational leadership, how these perspectives are studied and advanced through empirical research. Students will examine theory and empirical research on topics such as leadership effects on student learning; challenges in leading educational organizations; and the relationships among leaders' knowledge, skills, and dispositions and their leadership preparation and effectiveness.

**EDAD 6365. K-16 LEADING LEARNING ORGANIZATIONS RESEARCH. 3 Hours.**

Building on organizational and leadership theories and their use in educational organizations, this course focuses on the study of change theory and its uses in leading learning organizations in times of change.

**EDAD 6370. RESEARCH LITERATURE REVIEW AND METHODS. 3 Hours.**

This course provides an overview of the concepts necessary for creating an extensive, integrative, systematic literature review. Course content will include step-by-step instructions on crafting a literature review by selecting and defining a topic; creating thematic boundaries; developing literature search strategies; analyzing strategies; identifying literature gaps and limitations; applying citation and reference styles; and writing the review.

**EDAD 6371. PERSONNEL & SCHOOL LAW. 3 Hours.**

Focuses on understanding the relationship between motivation and the management of human resources; articulate the basics of team management and group facilitation; identify proper procedures for recruiting, assignment, and inducting personnel; and recognize the legal requirement for suspension, transfer, reduction in force and dismissal of professional personnel. Prerequisite: permission of advisor.

**EDAD 6373. THE SUPERINTENDENCY. 3 Hours.**

This course introduces candidates to the many facets of the superintendency with a focus on the challenges facing the superintendent today. Topics include: exercising collaborative leadership, developing a strong organizational culture, dealing with the politics of education, building strong superintendent-board relations, managing the problems of school reform, and planning. Instruction is problem-oriented and included field-based experiences.

**EDAD 6374. ADVANCED SCHOOL BUSINESS ADMINISTRATION. 3 Hours.**

Survey principles of public school finance at the local, state, and federal levels. Examines the school budgeting process, methods of school funds accounting and techniques of school business management. Prerequisite: permission of advisor.

**EDAD 6376. Educational Governance. 3 Hours.**

Focus on the appointed and elected entities and bureaucracies that determine and implement policy in public education. For doctoral students only.

**EDAD 6378. ADVANCED CURRICULUM AND PROGRAM ASSESSMENT. 3 Hours.**

Focuses on the processes of implementing district-wide curriculum, programs, and other innovations in school systems. Topics include: recent research on the implementation of change in curriculum and instruction, trends in education, strategic and contextual planning, program and student assessment and accountability, and national curriculum projects. Prerequisite: permission of advisor.

**EDAD 6380. K-16 RESEARCH PRACTICUM I. 3 Hours.**

An In depth research experience that provides an opportunity for participants to work with an experienced faculty researcher on cutting edge K-16-related research. The practicum experience will be personalized to best meet the individual student's needs, aptitudes, and aspirations in the context of the K-16 research arena.

**EDAD 6381. POLITICAL AND LEGAL ASPECTS OF K-12 EDUCATION. 3 Hours.**

Focus on the legal foundation of public education, political theory, and application of political skills in working with school personnel, students, parents, and community organizations. The role of the law, Ct rulings, and the politics of school governance at the federal, state, and local levels will be addressed. For doctoral students only.

**EDAD 6383. The Principalship. 3 Hours.**

Examination of current research on effective instructional organizations and classroom instruction in today's schools, on characteristics of school leadership, and on the role and function of the teacher as instructional leader. Topics include the essential components of instruction, developing instructional-management systems, evaluating student and teacher performance, assisting colleagues to monitor and improve instructional skills, school climate and leadership styles as they impact on school improvement. For doctoral students only.

**EDAD 6384. RESOURCE MANAGEMENT IN K-12 EDUCATION. 3 Hours.**

School finance, as well as auxiliary areas of resource management, will be addressed. The emphasis will be on the use of technology, alternative models of financing and budgeting, and sources of revenue from the federal, state, and local levels as well as from private sources. The course is designed to assist administrators in developing an understanding of the functions, operation, and evaluation of auxiliary services which support the educational program. For doctoral students only.

**EDAD 6385. K-16 RESEARCH PRACTICUM II. 3 Hours.**

A research experience in K-16 research that provides an opportunity for participants to experience the process research with an experienced university professional. The experience will be individualized to best meet the student's needs, aptitudes, and aspirations in the context of K-16 research.

**EDAD 6390. DOCTORAL RESEARCH SEMINAR. 3 Hours.**

This seminar course offers doctoral students advanced, individualized writing support to help them complete their comprehensive examinations and prepare for research writing and doctoral dissertation work. Students will analyze, synthesize, integrate, apply, generalize, and expand upon research knowledge and skills gained during their program of study.

**EDAD 6391. INDEPENDENT RESEARCH. 3 Hours.**

Research for independent study over topic agreed upon between student and instructor. Can be repeated for credit with permission. For doctoral students only.

**EDAD 6392. SELECTED TOPICS IN EDUCATIONAL LEADERSHIP AND POLICY STUDIES. 3 Hours.**

Topics within PK-20 education may vary by semester and per instructor, and may afford students the opportunity for choice within the cohort design. Selected topics courses will provide opportunities for faculty to teach courses in their areas of expertise that meet students' needs, aptitudes, and aspirations. Examples of selected topics that may be offered in leadership research include: K-16 governance, IDEA & ADA, and higher education finance. May be repeated for credit with permission of instructor.

**EDAD 6399. DISSERTATION. 3 Hours.**

Prerequisite: admission to candidacy for the Doctor of Philosophy degree, and permission of major professor. Graded P/F.

**EDAD 6699. DISSERTATION. 6 Hours.**

Prerequisite: admission to candidacy for the Doctor of Philosophy degree, and permission of major professor. Graded R/F/P/W.

**EDAD 6999. DISSERTATION. 9 Hours.**

Prerequisite: admission to candidacy for the Doctor of Philosophy degree, and permission of major professor. Graded P/R/F.

**EDAD 7399. DOCTORAL DEGREE COMPLETION. 3 Hours.**

This course may be taken during the semester in which a student expects to complete all requirements for the doctoral degree and graduate. Enrolling in this course meets minimum enrollment requirements for graduation, for holding fellowships awarded by The Office of Graduate Studies and for full-time GTA or GRA positions. Students should verify that enrollment in this course meets other applicable enrollment requirements. To remain eligible in their final semester of study for grants, loans or other forms of financial aid administered by the Financial Aid Office must enroll in a minimum of 5 hours as required by the Office of Financial Aid. Other funding sources may also require more than 3-hours of enrollment. Additional hours may also be required to meet requirements set by immigration law or by the policies of the student's degree program. Students should contact the Financial Aid Office, other sources of funding, Office of International Education and/or their graduate advisor to verify enrollment requirements before registering for this course. This course may only be taken twice. Students who do not complete all graduation requirements while enrolled in this course must enroll in a minimum of 6 dissertation hours (6699 or 6999) in their graduation term. Graded P/F/R.

## COURSES

**EDADIR 5391. INDEPENDENT RESEARCH. 3 Hours.**

Research for thesis substitute or equivalent over topic agreed upon between student and instructor. Can be repeated for credit with permission.

**EDADIR 6391. INDEPENDENT RESEARCH. 3 Hours.**

Research for independent study over topic agreed upon between student and instructor. Can be repeated for credit with permission. For doctoral students only.

## COURSES

**EDCO 5241. A STUDY OF THE ETHICAL, LEGAL, AND PROFESSIONAL ISSUES IN SCHOOL COUNSELING. 2 Hours.**

A study of the ethical, legal, and professional issues involved in the provision of guidance and counseling services in an educational setting. Content includes issues of confidentiality and privileged communication, record keeping, malpractice, client rights, counselor responsibilities, codes of ethics, and relevant laws.

**EDCO 5242. TESTING AND ASSESSMENT IN SCHOOL COUNSELING. 2 Hours.**

A study of the nature, characteristics, and ethical uses of psychological tests and assessment instruments in an educational setting. Included are measurements of intelligence, aptitude, achievement, interest, and personality.

**EDCO 5243. THE SCHOOL GUIDANCE PROGRAM. 2 Hours.**

Guidance counselors provide a variety of services in addition to counseling. Career and mental health informational services, mediation and crisis intervention services are included as well as working with parents, community resources, and the instructional staff.

**EDCO 5300. Counseling Students in Schools, Part 1. 3 Hours.**

During this capstone course and practicum, candidates will attend a three-hour evening course, and must complete a minimum of 80 of their 160 practicum hours in an approved public school. This will include individual counseling, small group counseling, consulting activities, guidance activities delivered to classrooms, planning, testing and test interpretation, and other activities as directed by the site-based mentor counselor and by a UTA supervisor. Additionally, there will be required every-other-Friday two-hour-after-school seminars at UTA.

**EDCO 5301. Counseling Students in Schools, part 2. 3 Hours.**

This course is a follow up to EDCO 5300 and will also include required every-other-Friday afternoon two-hour-after-school seminars. Candidates will complete their practicum activities this semester by finishing their total of 160 (minimum) supervised hours in their approved public school along with all other course requirements. A university supervisor and a site-based mentor counselor will provide practicum supervision.

**EDCO 5340. ADVANCED HUMAN GROWTH AND DIVERSITY. 3 Hours.**

This advanced course includes the theories of psychosocial, cognitive, and biological development as well as the characteristics and needs of special populations including gifted and talented and special education. Also included is research on gender, culture, ethnicity, socioeconomic status, intellect, lifestyle, and other issues of relevance for educators and students in today's schools.

## COURSES

**EDML 4300. PRE-ADOLESCENT/ADOLESCENT GROWTH AND DEVELOPMENT. 3 Hours.**

Prerequisite to subsequent courses in teacher education. Physical, social, emotional, and cognitive growth patterns from emphasizing familial, cultural, societal, and genetic determinants of behavior. Topics include the following: developmental characteristics of pre-adolescents/ adolescents including exceptional learners and students with special needs, a variety of disabilities (Learning Disabled, Emotionally Disabled, Behavior Disorders, Attention Deficit Hyperactivity Disorder, etc.), the creation and purpose of Individual Education Plans, concepts, and forms, as well as the IDEA law, its application and ethical considerations. The course also includes a field component.

**EDML 4350. NATURE & CURRICULUM NEEDS OF THE YOUNG ADOLESCENT LEARNER. 3 Hours.**

Examines the curriculum, instruction, and organization of middle grades schools. Provides a substantial knowledge base in the nature and needs of early adolescents, as well as in middle school curriculum, instruction, and behavior management. A variety of instructional approaches will be discussed including the purpose and need for appropriate language, behavior, and disability modifications, inclusion, resource, content mastery, and others. Theory and practice in the teaching of students with special needs will be addressed. The course also includes a field component. Prerequisite: Admitted to the Middle Level Program.

**EDML 4360. TEACHING STUDENTS WITH SPECIAL NEEDS - A SURVEY. 3 Hours.**

Theory and practice in the teaching of students with special needs, including a survey of the variety of disabilities (LD, ED, physical handicapped, conduct, ADD, ADHD, etc.), the creation and purpose of Individual Education Plans, concepts and forms. The IDEA law and its application, and ethical considerations. A variety of instructional approaches will be discussed including the purpose and need for appropriate modifications, inclusion, resource, consult, content mastery and others. Special emphasis will be the State basic skills assessment and the State developed alternative assessment.

**EDML 4370. SOCIAL STUDIES & DIVERSITY IN THE MIDDLE LEVEL GRADES. 3 Hours.**

Examination of materials, methods, content, and assessment learning experiences associated with middle level social studies. Content areas include history, geography, economics, government, citizenship, culture, science, technology, and society. Prerequisites: EDML 4300 & EDML 4350; BEEP 4384; LIST 4343.

**EDML 4371. SCIENCE IN THE MIDDLE LEVEL GRADES. 3 Hours.**

Instructional approaches, management, materials, and effective teaching practices pertinent to teaching science in the middle level grades; the organization of science content and the selection and implementation of lesson designs which utilize a hands-on approach promoting discovery and inquiry. This Inquiry course involves a two-hour lecture and two-hour application of lecture /theory. The two-hour application of lecture/theory will require students to spend time in a 4-8 classroom during normal school hours. Prerequisites: EDML 4300, EDTC 4301, and EDML 4350.

**EDML 4372. MATHEMATICS IN THE MIDDLE LEVEL GRADES. 3 Hours.**

Curriculum standards, methods, and effective teaching practices as proposed by the National Council of Teachers of Mathematics for the middle level; the organization of mathematics content with an emphasis on using manipulatives and technology to teach math. This inquiry course involves a two-hour lecture and two-hour application of lecture/theory. The two-hour application of lecture/theory will require students to spend time in a 4-8 classroom during normal school hours. Prerequisite: EDML 4350.

**EDML 4676. MIDDLE LEVEL FIELD-BASED EXPERIENCE. 6 Hours.**

Supervised and directed field-based experience, Monday through Thursdays. Candidates will be placed in two settings: an early grade (4,5,6) and late grade (6,7,8) experience as well as in two content areas. Prerequisite: EDML 4300, EDML 4350, LIST 4343, and BEEP 4384. This course must be taken just prior to student teaching (EDML 4677).

**EDML 4677. MIDDLE LEVEL CLINICAL TEACHING. 6 Hours.**

Supervised and directed clinical teaching experience in an approved field setting, Monday through Friday. Candidates will be assigned for the Independent School District (ISD) calendar. Candidates will be placed in two settings: an early grade (4,5,6) and late grade (6,7,8) experience as well as in two content areas. Required seminars will provide candidates with theory to integrate and apply during clinical teaching. Prerequisites: LIST 4378.

**EDML 5302. SCIENCE IN THE MIDDLE GRADES. 3 Hours.**

The examination of instructional strategies, materials, current research, and technology pertinent to teaching science in the middle grades; the scope and sequence of science content and implementation of instructional approaches to accommodate diverse student populations.

**EDML 5303. MATHEMATICS IN THE MIDDLE GRADES. 3 Hours.**

The examination of instructional strategies, materials, current research, and technology pertinent to teaching mathematics in the middle grades; the scope and sequence of math content and the selection and implementation of instructional approaches to accommodate diverse student populations.

**EDML 5304. SOCIAL STUDIES IN THE MIDDLE GRADES. 3 Hours.**

An examination of content, methods, current research, and learning theory appropriate for social studies education in the middle grades. Special attention to methods that promote analytical and evaluative abilities necessary for participatory democracy in a culturally diverse society.

**EDML 5308. MIDDLE GRADES ORGANIZATION, INSTRUCTION, AND MANAGEMENT. 3 Hours.**

The examination of principles, theories, and research related to developmentally responsive middle level programs, effective instruction and effective strategies of classroom management. Attention is given to the employment of a variety of approaches for developing an appropriate climate to meet the varying needs of the middle level student.

**EDML 5315. CLINICAL TEACHING. 3 Hours.**

Clinical teaching in candidate's certification area(s). This longitudinal experience will help candidates apply theory and research to practice.

**EDML 5328. PREADOLESCENT/ADOLESCENT GROWTH, DEVELOPMENT, AND LEARNING THEORY. 3 Hours.**

Course will focus on physical, social, emotional, and cognitive growth patterns of 10- to 15-year-old children, emphasizing familial, cultural, societal, and genetic determinants of behavior. Attention is given to current research regarding the developmental characteristics of adolescents, including exceptional learners and students with special needs.

**EDML 5391. INDEPENDENT RESEARCH. 3 Hours.**

Research for thesis substitute or equivalent over a topic agreed upon between the student and instructor. May be repeated for credit with permission.



## COURSES

### **EDTC 4201. TECHNOLOGY APPLICATIONS. 2 Hours.**

This course is for K-12 educators who are interested in integrating technology into teaching and learning. Its focus is on the technology applications Texas Essential Knowledge and Skills (TEKS). Participants should gain a greater understanding of the technology applications TEKS and how to introduce them into curriculum. Study and application of technology use in educational environments. Topics include: instructional learning and computer software.

### **EDTC 4301. TECHNOLOGY APPLICATIONS. 3 Hours.**

This course is for K-12 educators who are interested in integrating technology into teaching and learning. Focus is on the technology applications Texas Essential Knowledge and Skills (TEKS). Participants should gain a greater understanding of the technology applications TEKS and how to introduce them into curriculum. Study and application of technology use in educational environments. Topics include: instructional learning and computer software.

### **EDTC 5190. SELECTED TOPICS IN EDUCATION. 1 Hour.**

An examination of different topics related to education. This seminar may be repeated for credit as the topic changes.

### **EDTC 5191. INDEPENDENT RESEARCH. 1 Hour.**

Research for thesis substitute or equivalent over topic agreed upon between student and instructor. May be repeated for credit with permission.

### **EDTC 5290. SELECTED TOPICS IN EDUCATION. 2 Hours.**

An examination of different topics related to education. This seminar may be repeated for credit as the topic changes.

### **EDTC 5291. INDEPENDENT RESEARCH. 2 Hours.**

Research for thesis substitute or equivalent over topic agreed upon between student and instructor. Can be repeated for credit with permission.

### **EDTC 5300. INTRODUCTION TO FOUNDATION OF EDUCATION INSTRUCTIONAL DESIGN AND TECHNOLOGY. 3 Hours.**

Analysis of integrating TEKS, computers and related technologies in education. Topics include issues and concerns prior to integration, use of software in teaching and learning, identifying resources and strategies for use of the World Wide Web, and creating instructional activities into and across curriculum.

### **EDTC 5301. CURRENT APPLICATIONS OF TECHNOLOGY IN EDUCATION. 3 Hours.**

Study of technology use in educational environments. Topics include: instructional, learning, assessment, and management applications; a review of current research on selection, evaluation, and integration of appropriate media; and computer hardware, software, and multimedia.

### **EDTC 5302. INTERNET IN EDUCATION. 3 Hours.**

Course is designed to aid educators and training professionals in developing robust techniques for locating, utilizing, and creating Internet resources for professional productivity and research.

### **EDTC 5310. COMPUTER APPLICATIONS IN CURRICULUM AND INSTRUCTION. 3 Hours.**

Designed for both elementary and secondary teachers; skills and methods necessary to implement computer applications within the curriculum. Methods for managing the computer in the classroom, courseware telecommunications within the curriculum.

### **EDTC 5320. WEB AUTHORING. 3 Hours.**

Study of Web site planning, development and HTML tagging. Topics include: storyboards, content creation, Web site tagging with browser independent tags, use of color and fonts to communicate concepts, interactivity by design, ethical use of and respect for intellectual property, understand copyright, fair use, patent, and trademarks, the Master Technology Teacher Standards (EC-12) and the Standards for Basic Endorsement in Educational Computing and Technology Literacy.

### **EDTC 5330. DESKTOP PUBLISHING. 3 Hours.**

Study of desktop publishing planning, development, and production. Topics include: desktop publishing terminology, basic design theory, principles of form and design, guidelines for desktop publishing, ethical use of and respect for intellectual property, understand copyright, fair use, patent, and trademarks, the Master Technology Teacher Standards (EC-12) and the Standards for Basic Endorsement in Educational Computing and Technology Literacy.

### **EDTC 5340. MULTIMEDIA. 3 Hours.**

Study of multimedia planning, development, and implementation that maximize the use of technology, student learning, and teacher effectiveness. Topics include: methodologies for tutorials, hypermedia, drills, simulations, educational games, open-ended learning environments, testing, Web-based learning, interactivity by design, ethical use of and respect for intellectual property, understand copyright, fair use, patent, and trademarks, the Master Technology Teacher Standards (EC-12) and the Standards for Basic Endorsement in Educational Computing and Technology Literacy.

### **EDTC 5390. SELECTED TOPICS IN EDUCATION. 3 Hours.**

An examination of different topics related to education. This seminar may be repeated for credit as the topic changes.

### **EDTC 5391. INDEPENDENT RESEARCH. 3 Hours.**

Research for thesis substitute or equivalent over topic agreed upon between student and instructor. May be repeated for credit with permission.

## COURSES

### **EDUC 2101. EXPLORING TEACHING. 1 Hour.**

An opportunity to experience a mentorship with public school students while exploring the impact Gardner's Multiple Intelligences and personality profiles play in the learning environment. Ten hours of mentorship required. Academic credit awarded. Service Learning course.

**EDUC 2302. THE PROFESSIONAL EDUCATOR. 3 Hours.**

This course introduces students to the teaching profession. Professionalism, ethics, learning theory and historical foundations, advocacy, and current trends and issues in education will be examined. Students will develop a personal philosophy of education. This course fulfills the University requirement for either UNIV 1101 or UNIV 1131.

**EDUC 2330. STUDENT LEADER EFFECTIVENESS TRAINING. 3 Hours.**

Identifies the philosophy and theories of leadership, leadership styles, and contemporary leadership issues for any student who desires to pursue their leadership education. Practical application of leadership skills are developed through interactive class discussions, analyzing case studies, and group problem-solving and role-playing experiences. Elective only and does not count as part of the professional education certification requirements.

**EDUC 3301. TEACHING DIVERSE LEARNERS. 3 Hours.**

A survey course that focuses on effective differentiated instruction, assessment, and management strategies for working with diverse learners to build capacity for constructing a culturally responsive learning environment. Designed to provide increased self-awareness and insight into issues of diversity. Additionally, students will examine education law and models related to diverse learners as well as strategies for working with parents and families of diverse learners. Students will evaluate multicultural context, demographics, and practices at a local school. This course requires students to spend a minimum of 20 hours a semester in a K-12 classroom.

**EDUC 3333. STEM EDUCATION IN THE PK-12 CONTEXT. 3 Hours.**

Methods and materials for integrated STEM teaching and learning in the PK-12 context. Emphasis on developing best practices for an integrated context that combines and makes connections between science, technology, engineering, and mathematics. This includes, but is not limited to, project and problem-based learning, real world problem solving, inquiry-based instruction, computational thinking, and engineering design. Includes field-experience in a PK-12 STEM setting.

**EDUC 3390. SPECIAL TOPICS IN EDUCATION. 3 Hours.**

An examination of different topics related to education. This seminar may be repeated for credit as the topic changes.

**EDUC 4316. FOUNDATIONS OF EDUCATION. 3 Hours.**

The course introduces students to the teaching profession. Historical foundations, professionalism, school law (including special education law), diversity in education, effective communication, family involvement, and current trends and issues in education will be examined. Students will also examine personal reasons for wanting to teach and will create a personal philosophy of education. Field observation required. (2-1).

**EDUC 4318. POSITIVE CLASSROOM MANAGEMENT. 3 Hours.**

A survey of effective strategies of classroom management based on contemporary research. Particular attention will be paid to creating proactive learning environments through positive behavioral interventions and supports. Outcomes students will demonstrate include: instructional management and application of positive behavioral supports, procedures of assessment for planning classroom management; understanding of functional behavior assessment, a continuum of behavioral support, and the role of behavioral strategies in instructional classroom management; and understanding classroom management systems and instructional formats.

**EDUC 4319. CLASSROOM ASSESSMENT. 3 Hours.**

This course will introduce students to classroom assessment strategies that are used to inform teaching. Focus will include ways to interpret standardized test results and also create and use authentic classroom-based assessments to design and deliver differentiated instruction. Data-based instructional decisions will also be introduced. Course will include a field-based component.

**EDUC 4325. WOMEN IN SCIENCE. 3 Hours.**

Explores the role of women in science. Emphasis on gender and science, the history of women in science, gender equity in the classroom, strategies for the retention of women scientists, the current culture/climate for women in science, and contemporary women in science. Offered as EDUC 4325, SCIE 4325, and GWSS 4325. Credit will be granted only once.

**EDUC 4331. KNOWING AND LEARNING IN MATH AND SCIENCE. 3 Hours.**

Restricted to students in the UTeach Arlington program. Psychological foundations of learning; problem solving in mathematics and science education utilizing technology; principles of expertise and novice understanding of subject matter; implications of high-stakes testing; and foundations of formative and summative assessment. Three lecture hours a week for one semester; additional hours may be required. Prerequisite: SCIE 1201 or SCIE 1334 or concurrent enrollment in either.

**EDUC 4332. CLASSROOM INTERACTIONS. 3 Hours.**

Restricted to students in the UTeach Arlington program. Principles of delivering effective instruction in various formats (lecture, lab activity, collaborative settings); examination of gender, class, race, and culture in mathematics and science education; overview of policy related to mathematics and science education. Three lecture hours a week for one semester with additional fieldwork hours to be arranged. Prerequisite: C or better in SCIE 1202 or C or better in SCIE 1334; C or better in EDUC 4331 or concurrent enrollment.

**EDUC 4333. MULTIPLE TEACHING PRACTICES IN MATH AND SCIENCE. 3 Hours.**

Restricted to students in the UTeach Arlington program who have earned a passing score on the preliminary portfolio. Multiple research-based teaching practices including foundations of project-based, case-based, and problem-based learning environments; principles of project-based curriculum development in mathematics and science education; classroom management and organization of inquiry-based, problem-based/project-based learning classrooms. Three lecture hours a week for one semester with additional fieldwork hours to be arranged. Prerequisite: C or better in EDUC 4332; formal admission to program.

**EDUC 4340. HUMAN GROWTH AND DEVELOPMENT. 3 Hours.**

Prerequisite to subsequent courses in teacher education. Physical, social, emotional, and cognitive growth patterns from conception to early adulthood, emphasizing familial, cultural, societal, and genetic determinants of behavior. Topics include developmental characteristics of children and adolescents including exceptional learners and students with special needs.

**EDUC 4341. ORGANIZATION AND MANAGEMENT OF INSTRUCTION IN SECONDARY SCHOOLS. 3 Hours.**

Emphasizes the importance of organizing, developing, and adapting management systems to enhance learning in classroom environments. Managing the teaching-learning process, applying a variety of assessment techniques, motivation, and adapting management styles to meet student needs. This course involves a two-hour lecture and two-hour application of lecture/theory. The two-hour application of lecture/theory will require students to spend time in a K-12 classroom during normal school hours, 8 a.m.-4 p.m., Monday-Friday.

**EDUC 4342. APPLICATIONS OF INSTRUCTION IN MIDDLE/SECONDARY SCHOOL CLASSROOMS. 3 Hours.**

Field-based applications of inquiry-based curriculum planning and instructional theory and methods. Includes writing and implementing unit and instructional goals and objectives, using instructional lesson models to meet teacher appraisal criteria including utilization of classroom technology and audiovisual aids, planning for individual needs, and evaluating student progress. This course involves a lecture and application of lecture/theory. The application of lecture/theory will require students to spend time in a Grades 4-12 classroom during normal school hours, Monday-Friday, for typically one day a week throughout the semester.

**EDUC 4343. TEACHING SOCIAL STUDIES IN THE SECONDARY SCHOOL. 3 Hours.**

Methods and materials for social studies teaching and learning at the secondary school level. Emphasis on establishing a productive classroom environment, curriculum planning, implementation of effective instructional strategies, integration of educational technologies, and assessing student learning. Includes field-experience in a social studies classroom in a local middle or high school. The application of lecture/theory will require students to spend time in a grades 7-12 social studies classroom during normal school hours, Monday-Friday, for typically one day a week throughout the semester.

**EDUC 4344. TEACHING IN MIDDLE/SECONDARY SCHOOL SCIENCE CLASSROOMS. 3 Hours.**

Methods and materials for inquiry-based science teaching and learning at the middle/secondary level. Emphasis on establishing a productive classroom environment, curriculum planning, implementation of effective instructional strategies, integration of educational technologies, and assessing student learning. Includes field experience in a PK-12 classroom setting.

**EDUC 4345. TEACHING IN MIDDLE/SECONDARY SCHOOL MATHEMATICS CLASSROOMS. 3 Hours.**

Methods and materials for inquiry-based mathematics teaching and learning at the middle/secondary level. Emphasis on establishing a productive classroom environment, curriculum planning, implementation of effective instructional strategies, integration of educational technologies, and assessing student learning. Includes field experience in a PK-12 classroom setting.

**EDUC 4346. SECONDARY SCHOOL CULTURE AND THE TEACHING PROFESSION. 3 Hours.**

School cultures, effective schools and teaching practices, stages of professional development, foundations of American schools, legal and ethical aspects, and societal demands on the school.

**EDUC 4347. SECONDARY SCHOOL INTERNSHIP WITH TECHNOLOGY APPLICATIONS. 3 Hours.**

Supervised and directed professional practice in a local secondary school. The student will be assigned to a public school site for five hours per week. Weekly seminars are required. Internship must be taken the semester prior to residency. Theory from technology will be applied during internship assignment.

**EDUC 4352. TEACHING DIVERSE POPULATIONS. 3 Hours.**

Effective instruction, assessment, and management strategies for working in diverse educational settings. Designed to provide increased self-awareness and insight into issues of diversity such as culture, ethnicity, exceptionality, gender, language, religion, and socioeconomic status. This course involves a two-hour lecture and two-hour application of lecture/theory. The two-hour application of lecture/theory will require students to spend time in a K-12 classroom during normal school hours, 8 a.m.-4 p.m., Monday-Friday.

**EDUC 4390. SELECTED TOPICS IN EDUCATION. 3 Hours.**

An examination of different topics related to education. This seminar may be repeated for credit as the topic changes.

**EDUC 4391. CONFERENCE COURSE. 3 Hours.**

Independent study in the preparation of a project or a paper on a research topic; consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: permission of instructor.

**EDUC 4647. CLINICAL TEACHING IN MIDDLE/SECONDARY SCHOOL/ALL-LEVEL CLASSROOMS. 6 Hours.**

Supervised and directed clinical teaching in student's targeted area of certification. The student will be assigned full time for the Independent School District calendar. Required seminars provide students with theories/backgrounds/strategies to integrate and apply during clinical teaching. Students will apply theory and research to practice through daily teaching and interaction with students, major assignments, and data analysis of practice. Prerequisite: Office of Educational Field Experiences approval required.

**EDUC 5190. SELECTED TOPICS IN EDUCATION. 1 Hour.**

An examination of different topics related to education. This seminar may be repeated for credit as the topic changes.

**EDUC 5191. INDEPENDENT RESEARCH. 1 Hour.**

Research for thesis substitute or equivalent over a topic agreed upon between the student and instructor. May be repeated for credit with permission.

**EDUC 5263. READING AND DEVELOPMENT. 2 Hours.**

This course will focus on the acquisition of reading skills in the typically developing child. Sub-skills and precursors of reading such as visual and phonological processing will be examined from a neurological point of view. This foundational knowledge will then be applied to researching reading difficulties as well as the teaching and learning in the classroom for typically developing students and those with reading difficulties.

**EDUC 5290. SELECTED TOPICS IN EDUCATION. 2 Hours.**

An examination of different topics related to education. This seminar may be repeated for credit as the topic changes.

**EDUC 5291. INDEPENDENT RESEARCH. 2 Hours.**

Research for thesis substitute or equivalent over a topic agreed upon between the student and instructor. May be repeated for credit with permission.

**EDUC 5305. EFFECTIVE TEACHING AND LEARNING FOR 21ST CENTURY EC-12 STUDENTS. 3 Hours.**

Students gain understanding of the nature of learning and the purpose of education as the pedagogical foundation to teaching in any discipline. Students develop knowledge of state and national standards and apply these standards vertically and horizontally in preparing high quality teaching and learning experiences. Students gain experience critically analyzing disciplinary content, instructional models, lessons, curricula, and research literature. Students learn to construct and test instructional models using activities that focus attention on diversity, authentic assessments, intellectual, social and emotional development, interdisciplinary connections, and technology.

**EDUC 5309. ADVANCED TEACHING MODELS FOR DIVERSE LEARNERS. 3 Hours.**

Students engage in the advanced study and design of curriculum models with an understanding of cognitive development, pedagogical content knowledge (PCK), and learning progressions. Students learn in-depth analyses of how students learn and how to appropriately differentiate instruction. Students learn culturally responsive teaching practices and gain skill in developing learning experiences that attend to teaching diverse learners.

**EDUC 5310. DIVERSE POPULATIONS IN TODAY'S SCHOOLS. 3 Hours.**

An overview of the diverse populations in today's schools and effective instruction, assessment, and management strategies for working in diverse educational settings. Urban, suburban, and rural school communities and populations will be addressed with special attention to issues of human growth and development, culture, ethnicity, exceptionality, gender, language, religion and socioeconomic status. This course application of lecture/theory which will require students to spend a minimum of 20 hours in a K-12 classroom during normal school hours.

**EDUC 5314. EFFECTIVE CLASSROOM INSTRUCTION. 3 Hours.**

Designed to provide teachers with skills and competencies based on research findings on effective teaching and instruction related to promoting student academic achievement. Includes identifying, developing, and practicing instructional variables that affect teacher performance and student learning tasks. Includes field-experience in a local middle or high school based on teacher candidate's certification program. The application of lecture/theory will require candidates to spend time in a grades 7-12 classroom during normal school hours, Monday-Friday.

**EDUC 5315. CLINICAL TEACHING. 3 Hours.**

Supervised clinical teaching in candidate's area of certification. Candidates will be assigned full-time according to school district calendar. Required seminars provide candidates with theory to integrate and apply during clinical teaching. This experience will help candidates apply theory and research to practice through daily teaching and interaction with students, major assignments, and data analysis.

**EDUC 5321. EDUCATIONAL RESEARCH. 3 Hours.**

Examination of basic concepts and procedures necessary for empirical research investigations within classroom contexts, experimental design, data collection and interpretation, and statistical analysis.

**EDUC 5322. EDUCATIONAL RESEARCH AND EVALUATION. 3 Hours.**

An overview of basic concepts and procedures necessary for analyzing, designing, and conducting quantitative and qualitative educational studies. A focus on educational research, including empirical research, investigations data collection and interpretation, and statistical analysis. Also, a focus on educational evaluation including accreditation, personnel appraisal, and educational programs and materials.

**EDUC 5329. CLASSROOM MANAGEMENT AND DISCIPLINE. 3 Hours.**

Analysis of the variables that affect teacher and student behavior in the classroom. Survey of effective strategies of classroom management and discipline based on contemporary research. Particular attention to individual student differences in settings such as gifted and talented, handicapped, and learning disabled.

**EDUC 5330. LEADERSHIP IN THE INSTRUCTIONAL SETTING. 3 Hours.**

Examination of current research on effective instructional organizations and classroom instruction in today's schools, on characteristics of school leadership, and on the role and function of the teacher as instructional leader. Topics include the essential components of instruction, developing instructional-management systems, evaluating student and teacher performance, assisting colleagues to monitor and improve instructional skills, school climate and leadership styles as they impact on school improvement.

**EDUC 5358. THEMATIC SCIENCE FOR ELEMENTARY AND SECONDARY TEACHERS. 3 Hours.**

Professional development program for elementary and secondary science teachers who will examine a variety of instructional strategies. The course will provide a broad spectrum of content from all areas of science and provide opportunities to participate in investigations, field trips and seminars. The course will facilitate the implementation of a thematic science curriculum in elementary and secondary schools through research-based practices.

**EDUC 5359. ENVIRONMENTAL SCIENCE FOR ELEMENTARY AND SECONDARY TEACHERS. 3 Hours.**

Designed for elementary, middle and high school teachers who will examine a variety of environmental education issues and instructional strategies for classroom and outdoor settings. The course will provide a broad spectrum of content from all areas of science and will provide opportunities to participate in field trips, science investigations and seminar sessions. It will facilitate the implementation of an environmentally based curriculum in schools using best practices.

**EDUC 5360. INTRODUCTION TO MIND, BRAIN, AND EDUCATION. 3 Hours.**

Students will explore central themes and issues in the field of learning sciences, which incorporates cognitive and educational psychology, along with neuroscience, to help educators teach better and students learn better. This course also offers a number of exercises to help students become researchers as well as consumers of research.

**EDUC 5361. INTRODUCTION TO EDUCATIONAL NEUROSCIENCE. 3 Hours.**

This course is designed to provide an introduction to foundational areas of neuroscience such as brain anatomy and brain mapping techniques and its applications to education. Students will study different viewpoints of links between education and neuroscience and develop their own notions of what educational questions might be answered with brain-based techniques.

**EDUC 5362. THE NEUROSCIENCE OF TYPICAL & ATYPICAL LANGUAGE DEVELOPMENT. 3 Hours.**

This course will examine the many levels of language including phonetics, phonology, semantics, syntax and pragmatics from both functional and neuroscientific perspectives. This will be closely tied to language acquisition and early language development. The focus on the pre-reading years will provide a solid basis for further study of literacy-related skills and overall learning. Sub-skills and precursors of reading will be examined from a neurological point of view and applied to researching reading difficulties as well as the teaching and learning in the classroom. Course offered as EDUC 5362 and SPED 5309; co-list credit will be granted only as one.

**EDUC 5363. THE NEUROSCIENCE OF TYPICAL & ATYPICAL DEVELOPMENT OF MATHEMATICAL AND REASONING ABILITY. 3 Hours.**

The course focuses on the development of problem-solving, logical, numeracy, and mathematical skills from a cognitive neurocognitive perspective. Woven throughout the course is attention to cognitive biases in scientific thinking. Two prominent features of the course include neuroplasticity as a result of organic and environmental pressures and brain-based disorders (dyscalculia, ADHD, autism) and adaptive strategies.

**EDUC 5364. EPISTEMOLOGY AND NEUROSCIENCE. 3 Hours.**

Students will explore the basic principles of reasoning and knowledge construction as well as their psychological and neurobiological underpinnings. Students compare and contrast the deductive and inductive methods used in decision-making and belief-forming processes. The course also highlights the role of the frontal cortex and limbic system in how learners address and resolve questions and challenges in varying contexts. The goal of the course is to offer students the theoretical structures and critical strategies necessary for assessing their own work toward the completion of the capstone project as well as for analyzing the outcomes it generates. The skills acquired in this course are widely transferrable and can help the student to become a better consumer and producer of pedagogical and scientific research.

**EDUC 5365. THEORETICAL AND CONCEPTUAL MODELS IN MIND, BRAIN, AND EDUCATION. 3 Hours.**

This course is designed to help students connect cognitive science to instructional practice. Students examine the roles that cognitive models play in learning and in designing lessons and curricula. The cognitive models in this course are used to provide a framework for recognizing possible strategies for improving or re-designing curricula, as well as build lessons or interventions that fit their working context. Students are expected to take part in a prototype curriculum, analyze how it was constructed and to use their insights to build a modest curriculum over the course of the semester.

**EDUC 5366. EVALUATING AND DEBUNKING EDUCATIONAL INTERVENTIONS. 3 Hours.**

This course focuses on making sense of the impact of interactions between educational variables in complex systems like classrooms and schools. Being able to predict outcomes in dynamic environments requires understanding that the variables themselves can change as a result of interacting with each other, which influences how we understand systems from neural networks to school districts. The general sense of the course will be to understand certain behaviors/characteristics of dynamic systems from the examination and analysis of exemplars from multiple domains. We also examine how areas of the brain demonstrate these characteristics and use them to implement certain functionalities, and in turn examine the implications of these functionalities on curriculum and instruction.

**EDUC 5367. RESEARCH METHODS IN MIND, BRAIN, AND EDUCATION. 3 Hours.**

This course presents an overview of the process of scientific inquiry, while fostering an understanding of research paradigms used by researchers in MBE. The primary course goals are to support students in developing a framework for their capstone project in MBE, and help them identify the research tools and methods necessary to carry out the capstone project. To support this work students analyze research from MBE as well as the wider literature to identify relevant tools, techniques and methodologies. As students develop expertise with the tools and techniques that are relevant to their capstone project they are expected to share that knowledge with their peers.

**EDUC 5368. CONDUCTING RESEARCH IN MIND, BRAIN, AND EDUCATION. 3 Hours.**

The goal of this course is to help students in the Mind, Brain and Education program complete their capstone project. Students work collaboratively with fellow students and with faculty oversight to prepare a poster presentation that summarizes their capstone work, as well as choose a local, national or international conference to present their work.

**EDUC 5370. INTRODUCTION TO GIFTED AND TALENTED CHILDREN. 3 Hours.**

Psychological characteristics of gifted and talented children. Introduction to identification techniques, educational programs, instructional approaches, and special problems.

**EDUC 5371. MEASUREMENT AND ASSESSMENT OF GIFTED AND TALENTED CHILDREN. 3 Hours.**

Tests, formal and informal measures, and systems for identification and selection of the gifted and talented student. Basic test construction theory, test interpretation, and test uses.

**EDUC 5372. METHODS, MATERIALS, AND CURRICULUM FOR THE GIFTED AND TALENTED. 3 Hours.**

Curriculum theory and curriculum design for the gifted student. Methodology for implementing practical and theoretical objectives for gifted instruction.

**EDUC 5373. CREATIVITY: THEORIES, MODELS, AND APPLICATION. 3 Hours.**

The concept of and current research on creativity, the nature and assessment of creative thinking, as well as methods of fostering creativity.



**EDUC 5374. PRACTICUM. 3 Hours.**

Participation in a gifted and talented setting supervised by a university and/or school district representative. A wide range of practical experiences will be emphasized. Graded P/F/R.

**EDUC 5380. DIVERSITY IN EDUCATIONAL SETTINGS. 3 Hours.**

Effective leadership, instruction, and management strategies for work in diverse educational settings. Designed to provide increased self-awareness and insight into issues of diversity such as culture, ethnicity, exceptionality, gender, language, religion, and socioeconomic status. Demographic issues along with urban and suburban educational settings will also be addressed.

**EDUC 5390. SELECTED TOPICS IN EDUCATION. 3 Hours.**

An examination of different topics related to education. This seminar may be repeated for credit as the topic changes.

**EDUC 5391. INDEPENDENT RESEARCH. 3 Hours.**

Research for thesis substitute or equivalent over a topic agreed upon between the student and instructor. May be repeated for credit with permission.

**EDUC 5394. UNDERSTANDING AND DESIGNING EDUCATIONAL RESEARCH. 3 Hours.**

In this introductory course, students learn about different types of educational research methods and study designs that can be applied to real-world settings. Furthermore, students learn about how to write measurable research questions, ethically collect data, and be introduced to qualitative, quantitative, and mixed methods study designs. At the conclusion of this course, students should be able to understand the basics of educational research to determine whether it would be appropriate for implementation in a real-world authentic setting.

**EDUC 5395. DESIGNING CLASSROOM RESEARCH. 3 Hours.**

In this course, students will develop their own classroom educational research project. Their designed study will be based in the literature in their educational field and focus on classroom research questions and problems that will inform teaching practices. In this course, students will develop an individual research problem statement, argue the significance of the problem, complete a written literature review and logical chain of reasoning related to the stated problem, write specific research questions to investigate the problem in educational settings, and design a research study (methodology) that will effectively investigate their research questions. Students design a research study that shows promise for improving education, written as the first three chapters of a scholarly classroom action research project. Prerequisite: EDUC 5394. For M.Ed.T. students, this course is to be taken in the final semester of the masters' degree program. For M.Ed. students, this course is to be taken in the semester just prior to the final semester of the masters' degree program, and in the semester immediately preceding EDUC 5397.

**EDUC 5396. EEG Laboratory and Experimental Design. 3 Hours.**

This course is an introduction to EEG technique, covering experimental design, recording, analysis, and interpretation of brainwaves.

**EDUC 5397. IMPLEMENTING AND DISSEMINATING CLASSROOM RESEARCH. 3 Hours.**

In this advanced course, students will build on the knowledge gained in EDUC 5394/EDUC 5367 to specifically focus on how to collect, analyze, and interpret different types of data grounded in a variety of educational research methods. This course is split into three sections focusing on quantitative data analyses/interpretations (e.g., correlations, t-tests, and regressions), qualitative data analyses/interpretations (e.g., thematic analysis, content analysis, and summative analysis), and mixed methods analyses/interpretations. At the conclusion of this course, students should be able to collect, analyze, and interpret different types of data commonly used in educational classrooms to make data driven decisions. Prerequisite: EDUC 5394 or EDUC 5367.

**EDUC 5398. THESIS. 3 Hours.**

Requires an individual research project in the individual's area of concentration. Graded "R" (Research) or "P" (Pass) or "F" (Fail) only. Prerequisite: Permission of Graduate Advisor required.

**EDUC 5600. COUNSELING STUDENTS IN SCHOOLS. 6 Hours.**

The focus of this capstone course will be individual and group counseling theories and techniques for pre k-12 students in an educational setting. Special techniques are included for substance abuse, and for using group play therapy. Knowledge of Diagnostic and Statistical Manual of Mental Disorders, 4th. Edition (DSM IV) will be covered for purposes of diagnosis and for outside referral when necessary. Three hours in a supervised counseling practicum in area schools or with school children will be required.

**EDUC 5698. THESIS. 6 Hours.**

Requires an individual research project in the individual's area of concentration. Graded "R" (Research) or "P" (Pass) or "F" (Fail) only. Prerequisite: Permission of Graduate Advisor required.

**COURSES****EDUCIR 5391. INDEPENDENT RESEARCH. 3 Hours.**

Research for thesis substitute or equivalent over a topic agreed upon between the student and instructor. May be repeated for credit with permission.

**COURSES****EE 1000. FRESHMAN UNDERGRADUATE RESEARCH. 0 Hours.**

Freshman level undergraduate research. Prerequisite: Departmental good standing and permission of instructor. May be taken a maximum of 3 times.

**EE 1101. INTRODUCTION TO ELECTRICAL ENGINEERING. 1 Hour.**

After an introduction to different branches of Engineering, we focus on Electrical Engineering to illustrate concepts, methods, problem solving approach, and tools common to all Engineering, and those unique to Electrical Engineering. Various areas within Electrical Engineering will be introduced, with examples from analog and digital electronic circuits, control and robotics, microwave and optical engineering, telecommunication, energy systems, and biosensors. Students will be introduced to skills they need to succeed in subsequent Engineering courses, and ethical responsibilities. The emphasis is to engage students in active learning through exercises, mini-projects, and team activities. Selected speakers from across the College of Engineering will make presentations and emphasize the interdisciplinary nature of Engineering. Some College of Engineering requirements are satisfied by the content of this course.

**EE 1106. ELECTRICAL ENGINEERING FRESHMAN PRACTICUM. 1 Hour.**

A hands-on lab course focusing on basic methods for manipulating voltages and currents to achieve specific application objectives. Introduction to lab equipment and safety. Basic theory includes circuit elements and abstractions, circuit topology and analysis methods. Students will engage in laboratory experiments and learn how to conduct measurements including voltage, current, impedance, waveform, and frequency/spectrum analysis. Prerequisite: Grade of C or better in EE 1201 (concurrent enrollment with EE1201 is recommended).

**EE 1201. INTRODUCTION TO ELECTRICAL ENGINEERING. 2 Hours.**

An introduction to Electrical Engineering to illustrate concepts, methods, problem solving approaches, and tools unique to Electrical Engineering. Students will be introduced to skills they need to succeed in all subsequent Engineering courses. Students will learn about laws and rules related to academic integrity and professional ethical responsibilities. Five areas within Electrical Engineering will be highlighted with examples from analog and digital electronic circuits, control and robotics, microwave and optical engineering, telecommunication/signal processing, and energy systems. Selected speakers will make presentations to highlight the five areas and emphasize the interdisciplinary nature of Engineering. Ideally this will help the student make decisions about areas of interest to pursue as elective courses later in the curriculum. Computer access is required (laptop preferred) and general computer skills are expected. Prerequisite: Grade C or better in MATH 1426 (or concurrent enrollment). Concurrent enrollment with EE 1106 is recommended.

**EE 1311. COMPUTING SYSTEM AND ALGORITHMIC SOLUTIONS. 3 Hours.**

This course focuses on algorithmic problem solving and implementation of the algorithm using C or Python Programming Language. Fundamental concepts covered in this course include computing system architecture, operating systems, program execution, algorithm and flowchart, data structure, numerical methods, and hardware interfacing. Prerequisite: Grade C or better in MATH 1426 (or concurrent enrollment).

**EE 2000. SOPHOMORE UNDERGRADUATE RESEARCH. 0 Hours.**

Sophomore level undergraduate research course. Prerequisites: Departmental good standing and permission of instructor. May be taken a maximum of 3 times.

**EE 2181. CIRCUIT ANALYSIS LABORATORY. 1 Hour.**

Circuits laboratory for non-electrical engineering majors. This is identical to the laboratory portion of EE 2440. Prerequisite: Grade C or better in MATH 2425. Corequisite: EE 2320 and PHYS 1444.

**EE 2240. SOPHOMORE PROJECT LABORATORY. 2 Hours.**

A project based course encompassing design and implementation that provides an opportunity for students to explore and develop comprehensive applications of electrical engineering concepts and technologies to address real-world needs. Students will work in teams and engage in project planning, management, presentation, reporting, and outcome assessment. Prerequisite: Grade of C or better in each of the following: EE 1311, EE 2315, EE 2303 (or concurrent enrollment), EE 2341 (or concurrent enrollment), and EE 2347 (or concurrent enrollment).

**EE 2301. MODELING AND ANALYSIS METHODS IN ELECTRICAL ENGINEERING. 3 Hours.**

Modeling and analysis with emphasis on solution techniques of dynamic problems arising in electrical engineering applications. Problem formulation and solution of first and second order ordinary differential equations (ODEs). Use of Laplace Transform and numerical solution methods to solve initial and boundary value problems. Systems of ODEs. Vectors and matrices. Linear equations and inverse matrices. Vector spaces, Eigenvalues and Eigenvectors. First and second order partial differential equations (PDEs). Solutions to boundary value problems for Laplace's equation and other PDEs. Prerequisite: MATH 2326 and an academic history that includes a Linear Algebra and Matrix Theory Course or consent of the instructor.

**EE 2302. PRINCIPLES OF ACTIVE AND PASSIVE DEVICES. 3 Hours.**

This course covers electric and magnetic properties of solid materials with applications in the design and fabrication of active and passive devices. Topics include charge carriers, drift and diffusion currents, electrostatics, magnetostatics, dielectric/conductor/semiconductor properties, magnetic domain, Hall effects, passive circuit elements, electronic energy band diagrams, p-n junction, diode, FET, LED, semiconductor lasers, sensor and device applications. Prerequisite: Grade of C or better in both CHEM 1465 and PHYS 1444.

**EE 2303. ELECTRONICS I. 3 Hours.**

Review of semiconductors, drift and diffusion current, and p-n junction. Electrical characteristics of diodes, bipolar junction transistors (BJTs), and field-effect transistors (FETs). Circuit applications: switches, square-law detector, and amplifier. Digital and analog electronic circuits. Logic circuits. Single and multistage electronic circuit analysis and design. Amplifier operating point and frequency response. Low frequency and high frequency analysis and design. Prerequisite: Grade C or better in each of the following EE 2302 (or concurrent enrollment), EE 2315 and MATH 3319.

**EE 2315. CIRCUIT ANALYSIS I. 3 Hours. (TCCN = ENGR 2305)**

This course covers fundamental concepts and applications in manipulating voltage and current using passive and active circuit elements. Circuit models for passive (lumped) elements (resistor, capacitor, and inductor); independent and dependent sources; switches and active elements (diode and transistor). Circuit topology, governing laws (KCL and KVL), and node and mesh analysis methods. Time-varying and time-harmonic analyses of 1st order and 2nd order passive circuits. Steady-state alternating-current (AC) phasor analysis. Frequency domain analysis and Bode plots. Properties and applications of diode and transistor. Rectifier and switches. Higher level abstractions: Thevenin and Norton equivalents, and op-amps. Properties and applications of op-amps. Computer-assisted circuit analysis and design. Prerequisite: Grade C or better in each of the following: EE 1106, MATH 2425, MATH 3319 (or concurrent enrollment) and PHYS 1444 (or concurrent enrollment).

**EE 2320. CIRCUIT ANALYSIS. 3 Hours.**

For non-electrical engineering majors. Basic principles of R, L, and C components. Kirchhoff's laws, network analysis, loop and node equations, basic network theorems. Steady-state Alternating Current (AC) phasor analysis, operational amplifiers, filtering, and digital circuits. Prerequisite: Grade of C or better in each MATH 2425 or HONR-SC 2425 and PHYS 1444.

**EE 2341. DIGITAL CIRCUITS AND SYSTEMS. 3 Hours.**

An introduction to digital system design with hands-on projects. Number systems and codes. Boolean algebra; combinatorial logic and arithmetic. Digital electronics; CMOS logic gates; digital signals and noise margin; logic gates; and combinatorial logic circuits. Timing hazard and delay. Programmable logic devices; VHDL. State machines; sequential logic elements; counters and shift registers; sequential logic circuits. Arithmetic and computer logic circuits. Prerequisite: Grade C or better in each of the following: EE 1311 and EE 2315 (or concurrent enrollment).

**EE 2347. MATHEMATICAL FOUNDATIONS OF ELECTRICAL ENGINEERING. 3 Hours.**

This course focuses on mathematical modeling and algorithmic thinking to solve electrical engineering problems and interpret the results. Concepts covered in this course include mathematical representation of electrical signal and system behavior, complex analysis, Fourier series and Fourier transformations, computational modeling using MATLAB or Python, data processing and analysis. Prerequisite: Grade of C or better in each of EE 1311, MATH 2425, and MATH 3319.

**EE 2403. ELECTRONICS I. 4 Hours.**

Introduction to semiconductors, carrier statistics, drift and diffusion, semiconductor diodes, bipolar junction transistors (BJTs), and field-effect transistors (FETs). Circuit applications of diodes. Direct Current (DC) biasing and stability of circuits containing diodes, BJTs, and FETs. Introduction to mid-band single stage small signal analysis of BJT and FET circuits. Laboratory experiments to complement concepts learned in class. Prerequisite: Grade C or better in both EE 2415 and MATH 2326.

**EE 2415. CIRCUIT ANALYSIS I. 4 Hours.**

Basic circuit concepts of resistor, inductor, and capacitor (RLC) components. Kirchhoff's laws, resistive network analysis, power calculations, loop and node equations, topology, basic network theorems. Dependent sources and operational amplifiers. Computer-assisted solution of circuit problems. Elementary transient time-domain analysis. Introduction to frequency domain analysis and Bode plots. Steady state A-C phasor analysis, including element laws and phasor diagrams. Problems and experimental demonstrations will be covered during recitation and laboratory sessions. Prerequisite: Grade C or better in EE 1106 and MATH 2425. Co-requisite: MATH 3319 and PHYS 1444.

**EE 2440. CIRCUIT ANALYSIS WITH LAB. 4 Hours. (TCCN = ENGT 1401)**

For non-electrical engineering majors. Basic principles of R, L, and C components. Kirchhoff's laws, network analysis, loop and node equations, basic network theorems. Steady-state AC phasor analysis, operational amplifiers, filtering, and digital circuits. Concurrent laboratory experiments complement lecture topics. Prerequisite: Grade C or better in MATH 2425 and PHYS 1444.

**EE 2441. DIGITAL DESIGN AND PROGRAMMABLE MICROCONTROLLERS. 4 Hours.**

Theory and design of digital logic circuits. Number systems and binary arithmetic. Boolean algebra theorems. Optimization by algebraic and mapping methods. Logic gates, arithmetic logic units, decoders, analysis and synthesis of combinatorial logic circuits, sequential circuits. Synchronous and asynchronous state machines, hazards and races conditions with sequential circuits. Introduction of hardware description language (VHDL). Laboratory consists of "proof of concept" experiments using digital components. Prerequisite: Grade C or better in CSE 1311.

**EE 3000. JUNIOR UNDERGRADUATE RESEARCH. 0 Hours.**

Junior level undergraduate research. Prerequisite: Departmental good standing and permission of instructor. May be taken a maximum of 3 times.

**EE 3140. JUNIOR PROJECT LABORATORY. 1 Hour.**

Introduction to electrical engineering design concepts and strategies. Students must complete semester long projects from the areas of sensors, analog, digital, and mixed signal circuits, modules, and systems. Students are expected to use knowledge and skills previously obtained from lecture and laboratory courses (electronics, digital logic and microprocessors, and circuit analysis II) to complete their projects. The project must be well planned with clear performance objectives and constraints. Students are expected to show competency in technical writing and presentation. Prerequisite: Must be in the professional EE program. Grade of C or better in EE 2403, EE 2441. Prerequisite or concurrent enrollment: EE 3446.

**EE 3240. JUNIOR PROJECT LABORATORY. 2 Hours.**

Introduction to electrical engineering design concepts and strategies, engineering ethics, professional responsibility and safety. Students must complete semester long projects from the areas of sensors, analog, digital, and mixed signal circuits, modules, and systems. Students are expected to use knowledge and skills previously obtained from lecture and laboratory courses to complete their projects. The project must be well planned with clear performance objectives, specifications, consideration of constraints, timeline, public health, accessibility and environmental impact. Students are expected to show competency in technical writing and presentation. Prerequisite: Must be in the professional EE program and Grade of C or better in each of the following: EE 2303, EE 2341, and EE 3346 (or concurrent enrollment).

**EE 3301. COMPUTER SOLUTIONS AND CODING FOR ELECTRICAL ENGINEERING. 3 Hours.**

Introduction to computer architecture and operating systems. Python programming. Programming constructs and strategies. Design and analysis of algorithms and data structures. Applications of searching, sorting, numerical, and simulation algorithms. Prerequisite: Must be in the professional EE program and C or better in each of the following: EE 1311, EE 2341, and EE 3330 (or concurrent enrollment).

**EE 3302. FUNDAMENTALS OF POWER SYSTEMS. 3 Hours.**

Introduction to power systems, three-phase circuit analysis, symmetrical components, transformer, polyphase induction motors, synchronous generators, synchronous motors, diode and diode circuits, thyristor and thyristor circuits, DC-DC switching converters, and DC-AC switching converters, Renewable energy sources. Concurrent laboratory experiments complement the course lecture topics. Prerequisite: Must be in the professional EE program and C or better in each of the following: EE 3346 and EE 3407 (or concurrent enrollment).

**EE 3310. ADVANCED MICROCONTROLLERS. 3 Hours.**

Principles of operation for microcontroller, including assembly language programming, internal architecture of microcontroller, timing analysis, and interfacing techniques. Special emphasis will be placed on hardware-software interactions, design of memory systems for microcontroller and utilization of programmable peripheral devices. Prerequisite: Grade of C or better in EE 2441 and EE 2403.

**EE 3314. FUNDAMENTALS OF EMBEDDED CONTROL SYSTEMS. 3 Hours.**

Analyses of open-loop and closed loop systems using frequency domain and state variable techniques. Analog and digital control design methods. System design requirements and specifications. Design and implementation of control system using programmable devices. Principles of operation for microcontroller, internal architecture, programming tools and techniques, timing analysis, interfacing with sensors and actuators. Real-time control applications. Prerequisite: Must be in the professional EE program and C or better in each of the following: EE 2341, EE 3316, and EE 3318 (or concurrent enrollment).

**EE 3316. CONTINUOUS AND DISCRETE SIGNALS AND SYSTEMS. 3 Hours.**

Time-domain and frequency-domain analyses of periodic, aperiodic, continuous, and discrete time signals. Energy and power signals. System abstraction, signal flow and block diagrams. Linear systems, time invariance, causality, stability, and state-space. Laplace transforms. Impulse and frequency responses of LTI systems. LTI system specification and design. Filters and equalizers. Continuous time and discrete time (DT) signal conversion, sampling theorem, aliasing, and quantization error. Discrete-Time Fourier Transform (DTFT). Time and frequency responses of LTI system to DT signals. Interpolation and low-pass filter. Time and frequency domain analyses of DT LTI systems. z-transform. Causality and stability of DT LTI systems. Applications of DT LTI systems, FIR and IIR filters. Prerequisite: Must be in the professional EE program and C or better in each of the following: EE 2347 and EE 2315.

**EE 3317. LINEAR SYSTEMS. 3 Hours.**

For non-electrical engineering majors. Time-domain transient analysis, convolution, Fourier Series and Transforms, Laplace Transforms and applications, transfer functions, signal flow diagrams, Bode plots, stability criteria, and sampling. Prerequisite: Grade C or better in MATH 2326, MATH 3319, and EE 2440 (or equivalent).

**EE 3318. ANALOG AND DIGITAL SIGNAL PROCESSING. 3 Hours.**

Time and frequency domain analyses of continuous-time (CT) and discrete-time (DT) signals and systems. CT and DT Convolution. DTFT, DFT, and z-transforms of signals. Phase shifting, frequency shifting, and group delay. Modeling of stationary random signals utilizing filtered white noise. Power spectral density and SNR. Improving SNR through filtering. Amplitude, phase, and stability of causal and non-causal digital filters. FIR and IIR digital filter design. Applications of discrete time systems. Program assignments in Matlab. Prerequisite: Must be in the professional EE program and C or better in each of the following: EE 3316 and EE 3330 (or concurrent enrollment).

**EE 3330. PROBABILITY AND STATISTICAL METHODS. 3 Hours.**

Probability, random variables, functions of random variables, moments, random signals, noise, stochastic models and power spectral density. Data and statistics. Random sampling. Statistical analysis, hypothesis testing, goodness of fit test, and regression. Response of LTI systems to random signals. Rigorous mathematical concepts will be tied to engineering system issues such as characterizing uncertainty due to measurement error, component and system tolerances, and noise sources such as device noise, quantization noise, communication channel noise, and thermal noise. Prerequisite: Must be in the professional EE program and C or better in each of the following: EE 2347 and EE 3316 (or concurrent enrollment).

**EE 3346. CIRCUIT ANALYSIS II. 3 Hours.**

Time-harmonic single-phase and poly-phase voltages and currents. Instantaneous, time average, and complex powers. Power factor and maximum power transfer. Independent and dependent sources. Time and frequency domain analyses of open-loop and closed-loop circuits. Feedback configurations, poles and zeros, stability analysis. Oscillators and filters. Two-port networks and network parameters. Network theorems and analyses, superposition, reciprocity. Characteristics and applications of operation amplifiers. Amplifiers and active filters. Power distribution networks and transmission lines. Prerequisite: Must be in the professional EE program and C or better in each of the following: EE 2347, EE 2303, and EE 2315.

**EE 3407. ELECTROMAGNETICS. 4 Hours.**

Time varying electric and magnetic fields; electromagnetic (EM) sources. Laws governing EM fields and sources. Circuit and transmission line circuits. Wave propagation on transmission line. Power flow and impedance matching. Applications of EM theory in energy conversion. Antenna concept, EM wave radiation and polarization. Applications of EM theory in energy conversion. Waves in unbounded medium. Wave reflection, transmission, and scattering. Fundamentals and applications of rectangular waveguides. Fundamentals of antenna. Friis' transmission formula. Applications of EM theory in optical transmission, wireless communications, and radar. A designated lab provides experiences using modern RF and EM tools to re-enforce abstract concepts. Prerequisite: Must be in the professional EE program and C or better in each of the following: EE 2347, PHYS 1444, and EE 3346 (or concurrent enrollment).

**EE 3444. ELECTRONICS II. 4 Hours.**

Low and high frequency characteristics and circuit models for diodes, bipolar junction transistors (BJTs), and field effect transistors (FETs). Analysis and design of full spectrum small signal BJT and FET circuits. Analysis and transistor level design of active filters, oscillators, feedback configurations, and multistage differential and operational amplifiers. Concurrent laboratory exercises in support of the topics covered in class. Prerequisite: Must be in the professional EE program and C or better in each of the following: EE 2303 and EE 3346.

**EE 3446. CIRCUIT ANALYSIS II. 4 Hours.**

Analysis and design of filters, oscillators, feedback configurations, and operational amplifiers. Dependent sources, device models, two-port networks, and mutual inductance and transformers. Network response functions, poles and zeros, network theorems, resonance, and the analysis and design of active filters. Application of phasors in steady-state circuit analysis. Introduction to distributed networks and transmission lines. Introduction to single-phase and three-phase balanced and unbalanced power networks, complex power, power factor correction, and maximum power transfer. Concurrent laboratory experiments complement lecture topics. Prerequisite: Must be in the professional EE program. Grade C or better in EE 2347 and EE 2415.

**EE 4000. UNDERGRADUATE RESEARCH. 0 Hours.****EE 4149. ENGINEERING DESIGN PROJECT. 1 Hour.**

A practicum resulting in the design, construction, and evaluation of a device or system, building on electrical or electronic knowledge and skills acquired in earlier course work, and incorporating appropriate engineering standards. The application of project management techniques in order to meet design specifications through the effective allocation of team resources, scheduling, and budgetary planning. The demonstration of the finished product/prototype through both oral presentation and a written project report. Mode of Instruction: Practicum. Prerequisite: Must be in the professional EE program and Grade of C or better in EE 4240. Grade of C or better in all prior 3000 and 4000 level EE coursework.

**EE 4240. CONCEPTS & EXERCISES IN ENGINEERING PRACTICE. 2 Hours.**

Integration of technical knowledge and skills with project planning, project execution, teamwork, and communication skills (written and oral) are utilized to begin the capstone design experience. Student teams are given a project description with requirements and constraints and they design, construct, and evaluate a technical solution to that meets them. It builds on electrical or electronic knowledge and skills acquired in earlier course work while incorporating appropriate engineering standards. Project management techniques are applied in order to meet design specifications through the effective allocation of team resources, scheduling, and budgetary planning. By the end of this course, students are expected to deliver a final project design that is ready to be built and experimentally tested in the second semester 4149 course. Must be taken in the semester prior to EE 4149. An EE Proficiency Test is administered during the class. Prerequisite: Must be in the professional EE program and grade of C or better in each of the following: COMS 2302, EE 3240, EE 3314, EE 3318, EE 3330, and EE 3407. Co-requisite ECON 2305.

**EE 4301. POWER SYSTEMS ANALYSIS AND CONTROL. 3 Hours.**

This course includes an introduction to synchronous machines, power flow analysis, short circuit analysis, power system controls, and the fundamentals of transient stability analysis. Prerequisite: Grade of C or better in EE 3302.

**EE 4302. ENGINEERING ENTREPRENEURSHIP. 3 Hours.**

Topics include special problems of newly formed firms, planning, start-up business considerations, business strategy, management basics, and business plan design. Students will engage in business and entrepreneurship training and discussion, become aware of basic business operations, and learn about inventions, intellectual property, and the patenting process. Other topics include assessment of possible markets, venture feasibility, teambuilding, and leadership. Opportunities in university environments will be discussed including incubation centers and patent licensing. We address legal issues, Small Business Innovation Research (SBIR) proposal design, SBIR funding from the National Science Foundation (NSF), National Institutes of Health (NIH), and others. Additional topics include the proposal review process, grant reporting, local high-tech business accelerators, angel-group funding, venture plans, and venture capital. Classes will feature lectures from engineering and business faculty as well as presentations by successful entrepreneurs. Course taught as EE 4302, ENGR 4302 and ENGR 5302; credit will be granted only once. Prerequisite: Student must be in an engineering professional program.

**EE 4308. POWER SYSTEM MODELING AND ANALYSIS. 3 Hours.**

Fundamental concepts for modeling transmission lines, distribution lines, power system generators, power transformers and power system load. The method of symmetrical components is discussed. Simulation of power systems during normal and abnormal conditions are presented. The philosophy of deregulation regarding separation of power systems into generation, transmission and distribution companies is introduced. Prerequisite: Grade of C or better in EE 3302.

**EE 4310. MICROPROCESSOR SYSTEMS. 3 Hours.**

Hardware/software development techniques for microprocessors with emphasis on asynchronous and synchronous memory interfaces, optimizing data throughput, and modern bus architectures. Topics include DMA controller design, SDRAM controller design, and real-world interfacing. Prerequisite: Grade of C or better in EE 3314.

**EE 4311. EMBEDDED MICROCONTROLLER SYSTEMS. 3 Hours.**

Hardware/software development techniques for microcontroller systems with an emphasis on hardware-software interactions, programming internal peripherals, interfacing with external sensors and devices, and real-time control applications. Prerequisite: Grade of C or better in EE 3314.

**EE 4312. ADVANCED MICROPROCESSOR SYSTEMS. 3 Hours.**

Study of the advanced microprocessor architectures including 32/64-bit RISC and CISC families of microprocessors will be compared based on detailed architectural analysis of the selected devices. This course may also include: address/instruction pipelines, burst cycles, memory caching and cache coherency issues, register renaming, speculative instruction execution and other performance-oriented techniques. Prerequisite: EE 4311.



**EE 4313. CONTROL SYSTEMS FOR NON-EE MAJORS. 3 Hours.**

For non-electrical engineering majors. Analyses of closed loop systems using frequency response, root locus, and state variable techniques. Analog and digital control design methods. System modeling, identification, and control design based on analytic and computer methods. Classes meet at the same time as EE 4314. Prerequisite: Grade of C or better in either EE 3317 or MAE 3319.

**EE 4314. CONTROL SYSTEMS. 3 Hours.**

Analyses of closed loop systems using frequency response, root locus, and state variable techniques. Analog and digital control design methods. System modeling, identification, and control design based on analytic and computer methods. Use of laboratory experiments with mechatronic systems to complement the course lectures. Prerequisite: Grade of C or better in EE 3316. Co-requisite EE 3318.

**EE 4315. INTRODUCTION TO ROBOTICS. 3 Hours.**

Overview of industrial robots. Study of principles of kinematics, dynamics, and control as applied to industrial robotic systems; robotic sensors and actuators; path planning; programming of industrial robot in the laboratory; survey of robotic applications in various modern and traditional fields; and guidelines to robot arm design and selection. Prerequisite: Grade C or better in EE 4314.

**EE 4316. OP AMPS IN ANALOG SIGNAL PATHS. 3 Hours.**

The course covers fundamental concepts involved in the analysis and design of a wide variety of linear and non-linear circuits that use bipolar and CMOS integrated circuit operational amplifiers (op-amps). Applications of these components in practical circuit designs are emphasized. Prerequisite: Grade of C or better in EE 3446.

**EE 4317. ANALOG CMOS IC DESIGN. 3 Hours.**

Analysis and design of CMOS analog integrated circuits; MOS device structure and models; single-state and differential amplifiers; current mirror and Operational Amplifier design; noise analysis and feedback; comparators and voltage references. Prerequisite: Must be in the professional EE program and C or better in each of the following: EE 2303 and EE 3444.

**EE 4318. DIGITAL SIGNAL PROCESSING. 3 Hours.**

Discrete time convolution. Fast convolution using the fast Fourier transform (FFT). Amplitude and phase of digital filters. Stability analyses using the Z-transform. Design of finite impulse response (FIR) digital filters through windowing and optimization approaches. Infinite Impulse Response (IIR) digital filter design approaches using transformation and optimization. Prerequisite: Grade of C or better in EE 3316 and EE 3318.

**EE 4320. DIGITAL VLSI DESIGN. 3 Hours.**

Introduction to Very Large Scale Integration circuit design and fabrication technology. Metal-Oxide Semiconductor (MOS) device models and digital integrated circuit design with Metal-Oxide Semiconductor Field-Effect Transistor (MOSFETs). Computer Aided Drafting (CAD) tools for VLSI design. Processing models and process flow. MOS integrated circuits for logic gates and digital systems. Prerequisite: Grade of C or better in EE 3444.

**EE 4327. THEORY AND DESIGN OF ANTENNAS. 3 Hours.**

Basic theory of antennas with emphasis on design and engineering application. Prerequisite: Grade of C or better in EE 3407.

**EE 4328. CURRENT TOPICS IN ELECTRICAL ENGINEERING. 3 Hours.**

To introduce current topics into the curriculum prior to the creation of permanent course numbers. A notice listing a descriptive course title, a course description, and the name of the instructor will be posted on the departmental webpage each time the course contents are changed. Prerequisite: Consent of instructor.

**EE 4329. SEMICONDUCTOR DEVICES. 3 Hours.**

Introduction to semiconductors in terms of atomic bonding and electron energy bands. Equilibrium statistics of electrons and holes. Carrier dynamics; continuity, drift, and diffusion currents; generation and recombination processes, including important optical processes. Introduction to P-N junctions, metal-semiconductor junctions; bipolar junction transistors, junction and Metal-Oxide Semiconductor Field-Effect Transistors (MOSFETs). Introduction to optoelectronic devices, including LEDs, lasers, detectors, solar cells, modulators, etc. Prerequisite: Grade of C or better in EE 3407.

**EE 4330. FUNDAMENTALS OF TELECOMMUNICATIONS SYSTEMS. 3 Hours.**

Examines analog and digital communication techniques including amplitude modulation, frequency modulation, phase modulation and pulse code modulation. Probabilistic telecom signals introduced. Time domain and frequency domain multiplexing. Analog and digital noise analysis, practical pulse shaping for Digital Telecom transmission. Design of communications systems. Prerequisite: Grade of C or better in EE 3316 and EE 3330. Co-requisite EE 3318.

**EE 4331. DATA COMMUNICATIONS ENGINEERING. 3 Hours.**

Layered approach to data communications and networking will be presented. Network models such as TCP/IP and OSI will be introduced. Protocols and technologies related to each layer will be studied in depth. For physical layer, analog and digital signaling, modulation, bandwidth, multiplexing as well as line and block coding techniques. For data link layer, various MAC layer protocols involving multiple access, error detection (CRC), wired (Ethernet) versus wireless (Wi-Fi) LANs, switching. For network layer, internet protocol (IP) and routing principle. Underlying technologies learned from this course are applicable to wide range of traditional and current data communication protocols. Performance analysis of well-known protocols using probabilistic model will also be studied. Prerequisite: Grade of C or better in each of the following: EE 3316, EE 3330, and EE 3318 (or concurrent enrollment).

**EE 4333. WIRELESS COMMUNICATIONS AND IoT. 3 Hours.**

Fundamental principles of radio system design and propagation. Basics of cellular systems, environment, propagation models, traffic models and spectral capacity. Multiple-access techniques including FDMA (frequency division multiple access), TDMA (time division multiple access), CDMA (code division multiple access). Internet of Things (IoT) system architecture, IoT enabling technologies such as sensors and sensor networks, IoT communication and networking protocols, IoT services and applications. IoT demands, impacts, and implications on sensors technologies, big data management, and future internet design for various IoT use cases, such as smart cities, smart environments, smart homes, etc. Prerequisite: Grade of C or better in EE 3316 and EE 3330. Prerequisite or concurrent enrollment in EE 3318.

**EE 4334. PROGRAMMABLE LOGIC DESIGN. 3 Hours.**

Design of digital systems using programmable logic devices and high-level techniques. The course emphasizes the understanding of state-of-the-art hardware devices as well as design and simulation tools. Hardware description language will be taught and used for digital system design. Various design options and compromises will be explored for typical tasks. Projects will be assigned to develop design proficiency. Prerequisite: Grade of C or better in EE 2341.

**EE 4336. FOUNDATIONS OF MEDICAL IMAGING. 3 Hours.**

This course introduces the engineering, physics, mathematics, and signal processing methods fundamental to medical image acquisition and processing. X-ray projection, X-ray computed tomography, magnetic resonance imaging, and ultrasound imaging. Brief introduction to optical and infrared imaging and nuclear imaging (SPECT/PET) will be included. Open to students in an engineering or science professional program. Prerequisite: EE 3316 or equivalent.

**EE 4339. RADIO FREQUENCY CIRCUIT DESIGN. 3 Hours.**

Analysis of waves on ideal transmission lines, assorted practical transmission line systems, and hollow waveguides. Circuit theory for transmission line systems involving scattering parameters and the Smith chart. Microwave impedance matching techniques. Design of lumped element amplifiers from VHF to microwave frequencies. Real world microwave characterization techniques. Prerequisite: Grade of C or better in EE 3444 and EE 3407.

**EE 4340. CONCEPTS & EXERCISES IN ENGINEERING PRACTICE. 3 Hours.**

Integration of technical knowledge and skills with project planning, teamwork, and communication skills (written and oral). A project-oriented approach is used including the preparation of literature-based research reports, research proposals, product development proposals, and project management plans. Supporting topics: technical information resources, ethics, safety, intellectual property. Students will begin their engineering capstone design experience, including team formation, project selection, background research, and preparation of preliminary project plan. Must be taken in the semester prior to EE 4349 (Engineering Design Project). An EE Proficiency Test will be administered on first day of class. Prerequisite: Grade of C or better in each of COMS 2302, EE 3330, EE 3446, and EE 3407. Corequisite ECON 2305.

**EE 4344. INTRODUCTION TO MEMS AND DEVICES. 3 Hours.**

Develops the basics for microelectromechanical devices and systems including microsensors, and micromotors, principles of operation, different micromachining techniques, and thin-film technologies as they apply to MEMS. Prerequisite: EE 3407.

**EE 4349. ENGINEERING DESIGN PROJECT. 3 Hours.**

A practicum resulting in the design, construction, and evaluation of a device or system, building on electrical or electronic knowledge and skills acquired in earlier course work, and incorporating appropriate engineering standards. The application of project management techniques in order to meet design specifications through the effective allocation of team resources, scheduling, and budgetary planning. The demonstration of the finished product/prototype through both oral presentation and a written project report. Mode of Instruction: Practicum. Prerequisite: Grade of C or better in EE 4340. Grade of C or better in all prior 3000 and 4000 level EE coursework.

**EE 4357. INTRODUCTION TO MACHINE LEARNING. 3 Hours.**

The course presents fundamental principles and techniques on detecting meaningful patterns in data. Supervised learning techniques with applications in regression and classification will be presented, as well as support vector machines in classification. Further, the toolbox of neural networks will be detailed with applications in classification problems. Unsupervised learning will be studied on clustering problems. Feature extraction and dimensionality reduction will also be covered. Boosting methods will also be covered. Prerequisite: Grade of B or better in EE 3330, EE 2347, MATH 2326, and MATH 3319.

**EE 4362. DIGITAL COMMUNICATIONS. 3 Hours.**

Fundamental principles underlying the transmission of digital data over noisy channels. Basics of source coding techniques including entropy coding, Lempel-Ziv. Channel capacity. Spectral analysis of digital modulation techniques. Optimum receiver design and error probability performance of commonly used modulation schemes. Applications to lightwave and wireless systems. Prerequisite: Grade of C or better in EE 3318 and in EE 4330.

**EE 4364. INFORMATION THEORY FOR DATA SCIENCE. 3 Hours.**

Entropy, conditional entropy, relative entropy, mutual information, transfer entropy, entropy rates of stochastic process, data compression, Huffman coding, Shannon coding, compressive sensing, encoding of correlated data, source coding with side information, channel capacity, differential entropy, rate distortion, information theoretical foundations for data science, Bayesian inference, probabilistic reasoning, stock market and portfolio theory. Prerequisite: Must be in the professional EE program and grade C or better in EE 3330.

**EE 4370. ELECTRIC MOTOR DRIVES. 3 Hours.**

Fundamentals of electromechanical energy conversion devices and systems; Principles of inductors, transformers, force/torque formulation, and reference frame transformation; induction motors and permanent magnet machines; Inverter topologies and switching strategies; Scalar and vector control methods for machine drive systems. Prerequisite: Must be in the professional EE program and grade of C or better in EE 3407.

**EE 4371. POWER SYSTEM PROTECTIVE RELAYING. 3 Hours.**

Fundamental understanding of symmetrical components, applications of symmetrical components in system protection, philosophy of power system protection, various protective relay systems, and the special considerations in applying the microprocessor-based relays are covered. Experiments utilizing the Power System Simulation Laboratory are required. Prerequisite: Must be in the professional EE program and grade of C or better in EE 3346.

**EE 4372. POWER SYSTEM DISTRIBUTION. 3 Hours.**

The basic functions of a Distribution Company are presented. Load representation, distribution load flow and the philosophy of simulation for a distribution system are discussed in detail. Prerequisite: Must be in the professional EE program and grade of C or better in EE 3346.

**EE 4373. POWER QUALITY. 3 Hours.**

Principles of harmonics and filtering, source of voltage surges and surge protection, causes of voltage sags, flickers, and interruptions, and voltage supporting devices, and utility and end-user strategies for improving power quality are covered. Prerequisite: Must be in the professional EE program and grade of C or better in EE 3318 (or concurrent enrollment).

**EE 4375. INTRODUCTION TO POWER ELECTRONICS. 3 Hours.**

This course discusses conceptualization, design, and analysis of power electronics components, circuits, and systems. It discusses different classes of switching converters, including dc-dc converters, ac-dc rectifiers, dc-ac inverters, and ac-ac converters. Prerequisite: Grade of C or better in EE 2403 and EE 3446.

**EE 4378. INTRODUCTION TO UNMANNED VEHICLE SYSTEMS. 3 Hours.**

Introduction to UVS (Unmanned Vehicle Systems) such as UAS (Unmanned Aircraft Systems), UGS (Unmanned Ground System) and UMS (Unmanned Maritime System), their history, missions, capabilities, types, configurations, subsystems, and the disciplines needed for UVS development and operation. UVS missions could include student competitions sponsored by various technical organizations. This course is team-taught by engineering faculty.

**EE 4379. UNMANNED VEHICLE SYSTEM DEVELOPMENT. 3 Hours.**

Introduction to the technologies needed to create an UVS (Unmanned Vehicle System). Integration of these technologies (embodied as a set of sensors, actuators, computing and mobility platform sub-systems) into a functioning UVS through team work. UVS could be designed to compete in a student competition sponsored by various technical organizations or to support a specific mission or function defined by the instructors. This course is team-taught by engineering faculty. Prerequisite: EE 4378.

**EE 4380. PRINCIPLES OF PHOTONICS AND OPTICAL ENGINEERING. 3 Hours.**

Optical fields with applications to laser, optical fibers, and photonic signal processing. Encoding, manipulating, transmitting, storing, and retrieving information using light. Light propagation including isotropic and birefringent optical media, dielectric interfaces, interference and diffraction, Gaussian beams, optical cavities and principles of laser action, optical waveguides and fibers, electro- and acousto-optic modulation. Design, analysis and application of optical devices in communications and signal processing. Prerequisite: Must be in the professional EE program and grade of C or better in EE 3407.

**EE 4382. OPTICAL BIOSENSORS. 3 Hours.**

Introduction to modern biological and chemical sensing for in-vivo and in-vitro disease diagnosis. Photonics and nanotechnologies for biomolecular analysis. Bio/chemical sensor principle, instrumentation, and applications. Prerequisite: Grade of C or better in EE 3407, or PHYS 3445, or PHYS 4324.

**EE 4391. ADVANCED PROBLEMS IN ELECTRICAL ENGINEERING. 3 Hours.**

A research project under the direction of a faculty supervisor. May be taken as a technical elective with the permission of the department.

**EE 5190. ELECTRICAL ENGINEERING GRADUATE SEMINAR. 1 Hour.**

Topics vary from semester to semester. May be repeated for credit. Graded F, P. Prerequisite: graduate standing or consent of the department.

**EE 5191. ADVANCED STUDY IN ELECTRICAL ENGINEERING. 1 Hour.**

Individual research projects in electrical engineering. Prior approval of the EE Graduate Advisor is required for enrollment. A written report is required. Graded F, I, P.

**EE 5302. RANDOM SIGNALS AND NOISE. 3 Hours.**

Probability, random variables, and stochastic processes in physical systems. Topics include probability space, discrete and continuous random variables, density and conditional density functions, functions of random variables, mean-square estimation, random signals, system response, optimum system design, and Markov processes.

**EE 5304. CYBER-PHYSICAL SYSTEMS. 3 Hours.**

Cyber-physical system fundamentals; model-based designs; data-driven analytics; co-design techniques of integrated communication, control, and computing components; implementation considerations; and applications, such as internet of things, intelligent transportation, and robot networking. Topics include but are not limited to hybrid systems, stochastic networks, uncertainty quantification, experimental design, data fusion techniques, stochastic optimal control, networking and edge computing, network control, and related software, hardware, and middleware issues.

**EE 5305. ANALOG INTEGRATED CIRCUIT DESIGN. 3 Hours.**

Analysis and design of basic analog integrated circuits; device physics; single-stage and differential amplifiers; current mirror and biasing technique; feedback and operational amplifier; noise analysis.

**EE 5306. ELECTROMAGNETIC THEORY. 3 Hours.**

Advanced study of electromagnetic theory, its content, methods, and applications. Topics include theorems in electromagnetic theory, cylindrical and spherical wave functions, waveguides, integral equation methods, scattering and diffraction.

**EE 5307. LINEAR SYSTEMS ENGINEERING. 3 Hours.**

Topics include state-space description of dynamic systems, analysis and design of linear systems, similarity transformation, state feedback, state observers, and matrix characterization of multivariable systems.

**EE 5308. POWER SYSTEM MODELING AND ANALYSIS. 3 Hours.**

Fundamental concepts for modeling transmission lines, distribution lines, power system generators, power transformers and power system load. The method of symmetrical components is discussed. Simulation of power systems during normal and abnormal conditions are presented. The philosophy of deregulation regarding separation of power systems into generation, transmission and distribution companies is introduced.

**EE 5309. TOPICS IN ELECTRICAL ENGINEERING. 3 Hours.**

Material may vary from semester to semester. Topics are selected from current areas of electrical engineering interest. May be repeated when topic changes.

**EE 5310. DIGITAL VLSI DESIGN. 3 Hours.**

Introduction of VLSI digital circuit design methodology and processing technology. Application of various design software packages for circuit analysis and layout. Design of basic CMOS digital logic circuits. Implementation of digital logic design at the transistor level.

**EE 5311. VLSI SIGNAL PROCESSING ARCHITECTURES. 3 Hours.**

Design and synthesis of DSP and telecommunication systems using integrated modeling, design, and verification tools. Exploration of high-level architectural transformations that can be used to design families of DSP architectures for a given signal processing algorithm. Prerequisite: EE 5350.

**EE 5312. CMOS RFIC DESIGN. 3 Hours.**

Basic concept of RF design; CMOS transceiver architectures for wireless communications; low noise amplifiers; mixers; oscillators; phase-locked loops; frequency synthesizer; power amplifier. Prerequisite: EE 5305.

**EE 5313. MICROPROCESSOR SYSTEMS. 3 Hours.**

Hardware/software development techniques for microprocessors with emphasis on asynchronous and synchronous memory interfaces, optimizing data throughput, and modern bus architectures. Topics include DMA controller design, SDRAM controller design, and real-world interfacing.

**EE 5314. EMBEDDED MICROCONTROLLER SYSTEMS. 3 Hours.**

Hardware/software development techniques for microcontroller systems with an emphasis on hardware-software interactions, programming internal peripherals, interfacing with external sensors and devices, and real-time control applications.

**EE 5315. SYSTEM ON CHIP (SOC) DESIGN. 3 Hours.**

Programming and implementation of FPGA-based system on chip solutions, including processor subsystems, FPGA fabric, processor to FPGA bridges, and device drivers. Prerequisite: EE 5314.

**EE 5316. CMOS MIXED SIGNAL IC DESIGN. 3 Hours.**

Design of CMOS mixed signal ICs with emphasis on full custom chip design. Comparators, switched-capacitor circuits, converter architectures, analog-to-digital converters, digital-to-analog converters, integrator-based filters. A project is required, including design, simulation and layout using an IC design tool. Prerequisite: EE 5305 or EE 5318.

**EE 5317. ADVANCED DIGITAL VLSI DESIGN. 3 Hours.**

Design of logical gates using CMOS technologies; static and dynamic circuit techniques; advanced techniques in logic circuits; general VLSI system components design; arithmetic circuits in VLSI; low power design; chip layout strategies. A design project using computer tools is required. Prerequisite: EE 5310.

**EE 5319. TOPICS IN DIGITAL SYSTEMS. 3 Hours.**

Formal instruction in selected topics in digital systems and microcomputers. May be repeated when topic changes.

**EE 5321. OPTIMAL CONTROL. 3 Hours.**

Design of optimal control systems. Topics include optimization under constraints, linear quadratic regulators, Riccati's equation, suboptimal control, dynamic programming, calculus of variations, and Pontryagin's minimum principle. A prior introductory systems course, such as EE 5307, is desirable.

**EE 5322. INTELLIGENT CONTROL SYSTEMS. 3 Hours.**

Principles of intelligent control including adaptive, learning, and self-organizing systems. Neural networks and fuzzy logic systems for feedback control. Mobile robots. Discrete event systems and decision-making supervisory control systems. Manufacturing work-cell control. Advanced sensor processing including Kalman filtering and sensor fusion. A prior introductory systems course, such as EE 5307, is desirable.

**EE 5323. NONLINEAR SYSTEMS. 3 Hours.**

Analysis and design of nonlinear systems. A general course in nonlinear systems with examples from multiple engineering and science disciplines. Topics include phase planes, Lyapunov's theory, describing functions, iterative maps, chaos and fractals, and nonlinear optimization methods. A prior introductory systems course, such as EE 5307, is desirable.

**EE 5325. ROBOTICS. 3 Hours.**

Principles of kinematics, dynamics, and control of robot manipulators and mobile robots. Analysis of dynamical equations and design of robot control systems using modern nonlinear systems techniques. Computer simulation of robotic and mobile robot systems. Path planning, workcell coordination and control. Also listed as ME 5337.

**EE 5327. SYSTEM IDENTIFICATION AND ESTIMATION. 3 Hours.**

Introduction to parametric and non-parametric modeling and identification and estimation methods for linear and nonlinear systems. Methods covered include linear and non-linear least squares, LTI (linear time-invariant) black-box models, empirical transfer function estimate, state-space and frequency domain model reduction methods, Kalman filtering and self-tuning adaptive control. Introductory systems and signals courses, such as EE 5302 and EE 5307, are desirable.

**EE 5329. TOPICS IN SYSTEMS ENGINEERING. 3 Hours.**

Formal instruction in selected topics in systems engineering, such as advanced controls, systems performance, manufacturing, graphics subsystems design, stochastic control, decision and information theory, hierarchical or distributed parameter control. May be repeated when topic changes.

**EE 5330. DISTRIBUTED DECISION AND CONTROL. 3 Hours.**

Topics include cooperative decision and control algorithms for networked teams of dynamical agents on communication graphs. Included are multi-agent local decision protocols that yield global team behavior, synchronization of dynamics including coupled oscillators and chaotic systems, analysis of stability and consensus convergence behaviors, and group decision and adversarial games on graphs. Applications are to engineering systems such as dynamical systems on communications networks, networked teams of autonomous systems and vehicles, and formation flight.

**EE 5331. RF SYSTEMS ENGINEERING. 3 Hours.**

Topics include design and performance analysis of transmitter and receiver systems for communications and radar, including digital and analog modulators, transmit lineups, power amplifiers and linearization techniques, feedline structures, antennas, RF propagation channels, receiver lineups, and demodulation techniques. Additional topics include frequency planning, noise and interference mitigation, and regulatory and compliance issues.

**EE 5332. ANTENNA SYSTEM ANALYSIS. 3 Hours.**

Fundamental study of antennas and antenna design techniques, directed toward applications. Topics include electromagnetic basis of antenna radiation and reception; antenna characterization and measurements; analysis and simulation of wire antennas, aperture antennas, patch antennas, horns and reflector antennas; antenna elements in arrays; system architectures for beamsteering, beamforming, and MIMO; and introduction to antenna array processing.

**EE 5333. WAVE PROPAGATION AND SCATTERING. 3 Hours.**

Fundamentals of electromagnetic wave propagation and scattering in radar and wireless communications. Propagation over irregular terrain, in built-up areas, and inside buildings. Scattering from objects and area extensive targets. Propagation and scattering modeling and their applications in wireless communications and remote sensing. Signal statistics. Prerequisites: EE 5302 and EE 5306.

**EE 5334. FUNDAMENTALS OF RADAR REMOTE SENSING. 3 Hours.**

Active and passive remote sensing systems, platforms for remote sensing, radar equation, interaction of electromagnetic waves with matter, radar cross section, scattering from area extensive targets, surface scattering, volume scattering, radiative transfer theory, radar data collection and analysis, retrieval of target parameters, and subsurface sensing.

**EE 5335. FUNDAMENTALS OF RADAR IMAGING. 3 Hours.**

Radar system, electromagnetic waves scattering from targets, radar signal and noise, detection and extraction of signal from noise or clutter, range and Doppler profiles, ambiguity function, radar image formation, real aperture radar imaging, SAR imaging, ISAR imaging, and superresolution radar imaging techniques.

**EE 5336. FOUNDATIONS OF MEDICAL IMAGING. 3 Hours.**

This course introduces the engineering, physics, mathematics, and signal processing methods fundamental to medical image acquisition and processing: X-ray projection, X-ray computed tomography, magnetic resonance imaging, and ultrasound imaging. Brief introduction to optical and infrared imaging and nuclear imaging (SPECT/PET) will be included. Open to graduate students in College of Engineering or College of Science.

**EE 5338. COMPUTATIONAL METHODS IN ELECTRICAL ENGINEERING. 3 Hours.**

Mathematical and computational methods to analyze physical phenomena in electrical engineering, including Fourier transformation, finite difference method, finite element method, and integral equation method.

**EE 5339. TOPICS IN ELECTROMAGNETICS. 3 Hours.**

Formal instruction in selected topics in electromagnetics. May be repeated when topic changes.

**EE 5340. SEMICONDUCTOR DEVICE THEORY. 3 Hours.**

Quantum mechanics applicable to semiconductor theory. Energy band theory, density of states and effective mass theory. Intrinsic and extrinsic semiconductors, equilibrium statistics for electrons and holes. Transport, generation and recombination of excess carriers. Device equations and physics. Theory and performance of p-n and Schottky diodes, bipolar and MOS transistor electronic devices, and optoelectronic devices.

**EE 5341. ELECTRONIC MATERIALS: FUNDAMENTALS AND APPLICATIONS. 3 Hours.**

Fundamental theory required for the study of electronic materials: waves and particles, quantum mechanics, crystal structures, chemical bonds, and band theory. Materials and properties considered will be metals, semiconductors, and dielectrics including effective mass, doping, and carrier statistics, and electronic, dielectric, magnetic, and optical properties of materials as applied to integrated circuits, wireless communication, optoelectronics, optical communication, and data storage.

**EE 5342. SEMICONDUCTOR DEVICE MODELING AND CHARACTERIZATION. 3 Hours.**

Device models and characterization procedures for the pn junction and Schottky diodes, the BJT, JFET, MOSFET, HBT, and optical sources and detectors. SPICE derived and higher level circuit simulator models will be presented. Prerequisite: EE 5340 or EE 5341.



**EE 5343. SILICON INTEGRATED CIRCUIT FABRICATION TECHNOLOGY. 3 Hours.**

Basic integrated circuit fabrication processes: crystal growth (thin film and bulk), thermal oxidation, dopant diffusion/implantation, thin film deposition/etching, and lithography. Introduction to process simulators, such as SUPREM. Fabrication and characterization of resistors, MOS capacitors, junction diodes and MOSFET devices. Prerequisite: Pass the NanoFAB Safety and Clean Room Protocol test.

**EE 5344. INTRODUCTION TO MICROELECTROMECHANICAL SYSTEMS (MEMS) AND DEVICES. 3 Hours.**

Develops the basics for microelectromechanical devices and systems including microsensors, and micromotors, principles of operation, different micromachining techniques, and thin-film technologies as they apply to MEMS.

**EE 5345. INTRODUCTION TO BIO-NANOTECHNOLOGY. 3 Hours.**

Introduction to the area of bio-nanotechnology. Basics of nanotechnology as applicable to biological and biomedical sensing, therapy and diagnostics. Theory, fabrication, techniques and uses of nano-scale devices and objects in biomedical and biology.

**EE 5346. MICROWAVE DEVICES. 3 Hours.**

Device physics and applications of microwave semiconductor devices and vacuum tubes. Topics include operation, modeling and characterization of MESFETs and HEMTs, microwave diodes, and microwave vacuum tubes. Prerequisite: EE 5340 and EE 5341.

**EE 5348. RADIO-FREQUENCY CIRCUIT DESIGN. 3 Hours.**

Design of lumped- and distributed-element radio-frequency circuits; scattering parameters; impedance-matching circuits; transmission line theory and design; low noise amplifiers; power amplifiers; resonant circuits; noise analysis; RF filter design. Prerequisite: EE 5305.

**EE 5349. TOPICS IN INTEGRATED CIRCUIT TECHNOLOGY. 3 Hours.**

Formal instruction in selected topics in integrated circuit technology. May be repeated when topic changes.

**EE 5350. DIGITAL SIGNAL PROCESSING. 3 Hours.**

Time and frequency domain analyses of linear time invariant systems. Stability analyses of causal and non-causal systems using the Z-transform. FIR digital filter design. Design of frequency selective IIR digital filters using frequency transformations and the bilinear transform. Design of infinite and finite impulse response filters.

**EE 5351. DIGITAL VIDEO CODING. 3 Hours.**

Fundamentals, principles, concepts and techniques of data compression such as Huffman, Lempel-Ziv, Arithmetic, Facsimile, Transform, DPCM, VQ, and Hybrid coding and applications in ITU, ISO, and IEC standards related to audio, video, and image compression.

**EE 5352. STATISTICAL SIGNAL PROCESSING. 3 Hours.**

Estimation of correlation functions, power spectra, and probability density functions using training data. Algorithm development using maximum likelihood and Bayes approaches. Lower bounds on estimates of error variance. Optimal feature extraction. Design of approximate Bayes discriminants for classification using training data. Feature selection using subsetting and transformation approaches. Branch and bound. Applications in bioengineering, remote sensing, and telecom.

**EE 5353. NEURAL NETWORKS AND DEEP LEARNING. 3 Hours.**

First and second order training algorithms for both shallow and deep neural networks. Initialization lemmas. Approximation of continuous functions and Bayes discriminants using feedforward networks. Structure and training of convolutional networks, and their relationship to conventional pattern recognition systems. Analyses of drop out and mini-batches. Methods for evaluating network performance. Applications in pattern recognition, estimation and forecasting.

**EE 5354. MACHINE LEARNING. 3 Hours.**

Fundamental principles and techniques on detecting meaning patterns in data. Supervised learning with applications in regression and classification. Kernel methods and nonlinear spaces along with support vector machines in classification and training of neural networks. Clustering techniques in unsupervised learning. Feature extraction and dimensionality reduction. Graphical models and Hidden Markov models for sequential data and latent variables. Advanced boosting methods, recommended systems as well as online and reinforcement learning techniques.

**EE 5355. DISCRETE TRANSFORMS AND THEIR APPLICATIONS. 3 Hours.**

Principles and properties of discrete transforms such as discrete Fourier, discrete cosine, Walsh-Hadamard, slant, Haar, discrete sine, discrete Hartley, LOT and Wavelet transforms, and their applications in signal and image processing.

**EE 5356. DIGITAL IMAGE PROCESSING. 3 Hours.**

Digital image processing as applied to image sampling and quantization, image perception, image enhancement, image restoration, image reconstruction from projections, and filtering and image coding.

**EE 5357. STATISTICAL PATTERN RECOGNITION. 3 Hours.**

Theories of optimal feature extraction for statistical pattern recognition. Feature extraction using transform based methods, convolutional and other block based approaches. The relationships of Bayes discriminants to neural net, nearest neighbor, SVM, and deep classifiers. Sensor fusion in conventional and convolutional systems. Feature selection using transformation and subsetting approaches.

**EE 5358. COMPUTER VISION. 3 Hours.**

Techniques for the interpretation, analysis, and classification of digital images. Methods for segmentation, feature extraction, object recognition, stereo vision and 3-D modeling. A research project will be assigned.

**EE 5359. TOPICS IN SIGNAL PROCESSING. 3 Hours.**

Formal instruction in selected topics in signal processing. May be repeated when topic changes.

**EE 5360. DATA COMMUNICATIONS ENGINEERING. 3 Hours.**

Layered approach to data communications and networking will be presented. Network models such as TCP/IP and OSI will be introduced. Protocols and technologies related to each layer will be studied in depth. For physical layer, analog and digital signaling, modulation, bandwidth, multiplexing as well as line and block coding techniques. For data link layer, various MAC layer protocols involving multiple access, error detection (CRC), wired (Ethernet) versus wireless (Wi-Fi) LANs, switching. For network layer, internet protocol (IP) and routing principle. Underlying technologies learned from this course are applicable to wide range of traditional and current data communication protocols. Performance analysis of well-known protocols using probabilistic model will also be studied.

**EE 5362. DIGITAL COMMUNICATIONS. 3 Hours.**

The course presents fundamental principles underlying the transmission and reception of digital information, and studies the different parts of a modern digital communication system. Specifically, the course will touch upon different digital modulation schemes, as well as the design and performance analysis of optimum receivers for additive white Gaussian noise (AWGN) channels. Some concepts of information theory and channel coding will also be studied. Further, techniques for carrier and symbol synchronization will be presented. Communication over bandlimited channels will also be explored, and the effects of intersymbol interference (ISI), as well as channel equalization techniques will be considered.

**EE 5364. INFORMATION THEORY FOR DATA SCIENCE. 3 Hours.**

Entropy, conditional entropy, relative entropy, mutual information, transfer entropy, data compression, Huffman coding, Shannon coding, compressive sensing, encoding of correlated data, source coding with side information, channel capacity, differential entropy, rate distortion, information theoretical foundations for data science, Bayesian inference, probabilistic reasoning, stock market and portfolio theory.

**EE 5365. FIBER OPTIC TRANSMISSION SYSTEMS. 3 Hours.**

Propagation in optical fibers, characteristics and manufacture of fibers, semiconductor lightwave sources and detectors, optical transmitters and receivers, lightwave transmission systems for wide area and local area networks.

**EE 5368. WIRELESS COMMUNICATION AND IoT. 3 Hours.**

Fundamental principles of radio system design and propagation. Basics of cellular systems, environment, propagation models, traffic models and spectral capacity. Multiple-access techniques including FDMA (frequency division multiple access), TDMA (time division multiple access), CDMA (code division multiple access). Machine learning for wireless communications. Internet of Things (IoT) system architecture, IoT enabling technologies such as sensors and sensor networks, IoT communication and networking protocols, IoT services and applications. IoT demands, impacts, and implications on sensors technologies, big data management, and future internet design for various IoT use cases, such as smart cities, smart environments, smart homes, etc.

**EE 5369. TOPICS IN COMMUNICATIONS. 3 Hours.**

Formal instruction in selected topics in communications. May be repeated when topic changes.

**EE 5370. ELECTRIC MOTOR DRIVES. 3 Hours.**

Fundamentals of electromechanical energy conversion devices and systems; Principles of inductors, transformers, force/torque formulation, and reference frame transformation; induction motors and permanent magnet machines; Inverter topologies and switching strategies; Scalar and vector control methods for machine drive systems.

**EE 5371. POWER SYSTEM PLANNING, OPERATION, AND CONTROL IN A DEREGULATED ENVIRONMENT. 3 Hours.**

Current market structure and practices are discussed. The issues of system planning, operation, and control in a deregulated environment are addressed. Prerequisite: EE 5308.

**EE 5372. CONGESTION MANAGEMENT. 3 Hours.**

Phenomena of congestion and transmission pricing are presented. Thermal related congestion, such as power flow, and stability related congestion, such as voltage stability, transient stability, and dynamic stability, are covered. The effects of reactive power are discussed. Reliability and security issues of power transmission systems are presented. Congestion management and congestion relief measures are discussed. Prerequisite: EE 5308.

**EE 5373. UNBUNDLING SERVICES OF A DEREGULATED POWER SYSTEM. 3 Hours.**

The fundamental operating functions of a deregulated power system are presented. Unbundling of these functions and cost allocations are discussed. Topics of ancillary services, power marketing, price forecasting, and load forecasting are covered. Prerequisite: EE 5308.

**EE 5374. POWER SYSTEM PROTECTIVE RELAYING. 3 Hours.**

Fundamental understanding of symmetrical components, applications of symmetrical components in system protection, philosophy of power system protection, various protective relay systems, and the special considerations in applying the microprocessor based relays are covered. Experiments utilizing the Power System Simulation Laboratory are required.

**EE 5375. POWER SYSTEM DISTRIBUTION. 3 Hours.**

The basic functions of a Distribution Company are presented. Load representation, distribution load flow and the philosophy of simulation for a distribution system are discussed in detail.

**EE 5376. POWER SYSTEM RELIABILITY IN PLANNING AND OPERATION. 3 Hours.**

Loss of Load indices, Loss of Energy indices, Frequency and Duration methods, Interconnected Reliability methods, and Composite Generation and Transmission Reliability methods will be covered.

**EE 5377. PROGRAMMABLE LOGIC CONTROLLERS IN INDUSTRIAL AUTOMATION. 3 Hours.**

The application of Programmable Logic Controllers (PLC) in industrial automation and energy systems monitoring will be covered. Transducers, Supervisory Control and Data Acquisition (SCADA) systems, and Distributed Control Systems (DCS) will be discussed. Material covered is also applicable to various mechanical and civil engineering fields, thus enrollment of graduate engineering students from other disciplines is welcome. Experiments utilizing the Power System Simulation Laboratory are required.

**EE 5378. POWER QUALITY. 3 Hours.**

Principles of harmonics and filtering, source of voltage surges and surge protection, causes of voltage sags, flickers, and interruptions, and voltage supporting devices, and utility and end-user strategies for improving power quality are covered.

**EE 5379. TOPICS IN POWER SYSTEM ENGINEERING. 3 Hours.**

Formal instruction in selected topics in power system engineering. May be repeated when topic changes.

**EE 5380. PRINCIPLES OF PHOTONICS AND OPTICAL ENGINEERING. 3 Hours.**

Optical fields with applications to laser, optical fibers, and photonic signal processing. Encoding, manipulating, transmitting, storing, and retrieving information using light. Light propagation including isotropic and birefringent optical media, dielectric interfaces, interference and diffraction, Gaussian beams, optical cavities and principles of laser action, optical waveguides and fibers, electro- and acousto-optic modulation. Design, analysis and application of optical devices in communications and signal processing.

**EE 5381. FOUNDATIONS IN SEMICONDUCTORS. 3 Hours.**

Electronic properties of semiconductors affecting semiconductor devices: quantum behavior; Kronig-Penny model; energy bands; carrier statistics; density of states; one, two, and three dimensional systems; carrier transport; thermoelectric effects; surface and bulk generation-recombination statistics; continuity equations and their solutions; optical properties; semiconductor characterization techniques.

**EE 5382. OPTICAL DETECTORS AND RADIATION. 3 Hours.**

Basic principles of optical detectors used in imaging and communications. The course focuses on infrared detectors. Geometric optics, blackbody radiation, radiometry, photon detection mechanisms, thermal detection mechanisms, noise in optical detectors, figures of merit for detectors, photovoltaic detectors, photoconductive detectors, bolometers, pyroelectric detectors, and quantum well detectors.

**EE 5383. SOLAR ELECTRICITY & PHOTOVOLTAICS. 3 Hours.**

Solar radiation and other forms of renewable energy: wind, tide, biomass and hydropower. Fundamental theory of photovoltaics: crystal structures, band theory, semiconductors, doping, carrier statistics, optical absorption, and p-n junctions. Status of solar cell, including cost, optical design, system engineering, silicon solar cells and thin film solar cells. Prospects of solar cells, regarding low-cost and high-efficiency solar cells. Prerequisite: EE 5340 or EE 5341.

**EE 5384. OPTOELECTRONIC DEVICES FOR COMMUNICATION. 3 Hours.**

Electronic and optical processes in semiconductors. Light emitting diodes. Laser diodes: structures, properties and operating principles. Photodetectors and solar cells. Noise and the photoreceiver. Optoelectronic modulators and switching devices. Systems needs and new device challenges.

**EE 5385. NONLINEAR OPTICS. 3 Hours.**

Nonlinear optical processes and applications in crystals, optical fibers and waveguides. Second- and third- order nonlinear susceptibility, symmetry properties, coupled-wave propagation, phase-matching techniques, sum- and difference-frequency generation, parametric amplification, four-wave mixing, self- and cross-phase modulation, soliton propagation, and Raman scattering.

**EE 5386. INTEGRATED OPTICS. 3 Hours.**

Theory and techniques of integrated optics including optical waveguiding, coupling, modulation, grating diffraction, detection and integrated systems.

**EE 5387. FOURIER OPTICS AND HOLOGRAPHY. 3 Hours.**

Theory of Fourier optics and holography including scalar diffraction theory, Fresnel and Fraunhofer diffraction, Fourier transforming properties of lenses, optical imaging systems, spatial filtering, and the theory and applications of holography. Prerequisite: EE 5306.

**EE 5388. LASERS. 3 Hours.**

Propagation of optical rays and waves, Gaussian laser beams, laser resonators, atomic systems, lasing and population inversion, laser amplifiers, practical gas and solid-state lasers including continuous-wave and pulsed lasers, mode locking, Q-switching, frequency doubling, tunable lasers, semiconductor lasers, vertical-cavity lasers and applications of lasers.

**EE 5389. TOPICS IN OPTICS. 3 Hours.**

Formal instruction in selected topics in optics. May be repeated when topic changes.

**EE 5391. ADVANCED STUDY IN ELECTRICAL ENGINEERING. 3 Hours.**

Individual research projects in electrical engineering. Prior approval of the EE Graduate Advisor is required for enrollment. A written report is required. Graded F,P,R.

**EE 5392. PROJECT IN ELECTRICAL ENGINEERING. 3 Hours.**

Individual research projects performed for fulfilling the requirements of the thesis substitute option. Prior approval of the EE graduate advisor is required for enrollment. A written and oral report is required. Graded F, P, R.

**EE 5398. THESIS. 3 Hours.**

Graded F, P, R. Prerequisite: Graduate standing in electrical engineering.

**EE 5698. THESIS. 6 Hours.**

Graded F, P, R. Prerequisite: Graduate standing in electrical engineering.

**EE 6313. ADVANCED MICROPROCESSOR SYSTEMS. 3 Hours.**

Study of the advanced microprocessor architectures including 32/64-bit RISC and CISC families of microprocessors will be compared based on detailed architectural analysis of the selected devices. Topics include: address/instruction pipelines, burst cycles, memory caching and cache coherency issues, register renaming, speculative instruction execution and other performance-oriented techniques. Prerequisite: EE 5313.

**EE 6314. ADVANCED EMBEDDED MICROCONTROLLER SYSTEMS. 3 Hours.**

Study of advanced microcontroller system designs with an emphasis on multi-tasking, real-time control of devices. Topics include: design of real-time control systems, design of bootloaders, USB peripherals, and Ethernet applications. Prerequisite: EE 5314.

**EE 6321. INTRODUCTION TO UNMANNED VEHICLE SYSTEMS. 3 Hours.**

Introduction to UVS (Unmanned Vehicle Systems) such as UAS (Unmanned Aircraft Systems), UGS (Unmanned Ground System) and UMS (Unmanned Maritime System), their history, missions, capabilities, types, configurations, subsystems, and the disciplines needed for UVS development and operation. UVS missions could include student competitions sponsored by various technical organizations. This course is team-taught by engineering faculty.

**EE 6322. UNMANNED VEHICLE SYSTEM DEVELOPMENT. 3 Hours.**

Introduction to the technologies needed to create an UVS (Unmanned Vehicle System). Integration of these technologies (embodied as a set of sensors, actuators, computing and mobility platform sub-systems) into a functioning UVS through team work. UVS could be designed to compete in a student competition sponsored by various technical organizations or to support a specific mission or function defined by the instructors. This course is team-taught by engineering faculty. Prerequisite: EE 6321.

**EE 6342. ADVANCED QUANTUM DEVICES. 3 Hours.**

Advanced concepts in quantum theory of semiconductors. Epitaxial growth and characterization of heterostructures, quantum wells, and superlattices including strained layers; electronic and optical properties of these structures; electronic and optoelectronic devices based on quantum wells and superlattices. Prerequisite: Graduate standing.

**EE 6343. QUANTUM WELL LASERS. 3 Hours.**

Introduction to semiconductor heterostructures and quantum wells. Quantum theory of optical processes and laser operation. Threshold, spectral, and dynamical behavior. Modern laser structures and technologies, including strained-layer and surface emitting lasers. Prerequisite: EE 5340 and EE 5341.

**EE 6344. NANOSYSTEMS AND QUANTUM ELECTRONIC DEVICES. 3 Hours.**

Design, analysis, and techniques for conceptualizing and fabricating nanoscale systems. Role of quantum confinement and mesoscopic behavior, phase coherence, quantum transport, single electron devices, semiconductor heterostructures, self-assembly and molecular electronic schemes, lithographic methods, atomic epitaxy, and surface analysis techniques. Prerequisite: EE 5340 and EE 5341.

**EE 6345. ADVANCED MEMS -- MICROELECTROMECHANICAL SYSTEMS. 3 Hours.**

Microelectromechanical systems (MEMS) and devices including micro-actuators and optical MEMS. Application strategy of MEMS; fabrication and design; actuation mechanism and architectures; optical sensor and communication applications. Mask layout and hands-on design, fabrication procedures, design rules, demonstrated examples, and integration architectures. Prerequisite: EE 5344.

**EE 6353. CONVEX OPTIMIZATION FOR ENGINEERS. 3 Hours.**

This course presents an overview of standard methods in convex optimization with applications to real-world problems from multiple areas of engineering and sciences including, signal processing, machine learning, control, networks, power system analysis, mechanical and aerospace, and circuit design. Course materials include advanced linear algebra, numerical algorithms, constrained and unconstrained optimization, duality theory, semidefinite programming, nonlinear and mixed-integer optimization, convex algebraic geometry, and several engineering applications.

**EE 6356. IMAGE AND VIDEO CODING. 3 Hours.**

Fundamentals, principles, concepts, and techniques of data (image/video/audio) compression such as Huffman coding, arithmetic coding, Lempel-Ziv coding, facsimile coding, scalar and vector quantization, DPCM, PCM, sub-band coding, transform coding, hybrid coding and their applications. Prerequisite: EE 5350.

**EE 6364. ADVANCED DATA NETWORKS. 3 Hours.**

Network performance analysis, link and upper layer. Internet and ATM protocols, Internet routing and traffic management, ATM switch design and ATM traffic management. Prerequisite: EE 5360.

**EE 6365. ADVANCED FIBER OPTICS SYSTEMS. 3 Hours.**

Course reviews the modern WDM systems and methods of their design. Topics include architecture of state-of-the-art WDM systems; design of optical amplifiers; signal-to-noise-ratio budget; estimation of various system impairments; popular modulation formats; transmitter and receiver design issues; balancing optical nonlinearity and dispersion; optical networking; and characterization of WDM system's performance. Familiarity with fiber optics and telecommunications is desirable.

**EE 6367. ADVANCED AND NEXT-G WIRELESS COMMUNICATIONS. 3 Hours.**

Performance analysis of wireless communication systems with multiple input multiple output (MIMO). Space time coding design criteria, space time trellis codes, space time block codes. The next-G wireless communications including mm-wave communications, advanced channel coding, BCJR decoding, Turbo codes, Polar codes, and selected topics in Next-G wireless communications.

**EE 6373. RENEWABLE ENERGY SYSTEMS. 3 Hours.**

Wind energy harvest, solar energy sources and harvesting, hydropower resources, geothermal, fuel cell and hydrogen economy, power grid interface and distributed generation, microscopic energy harvest from vibration and thermal, role of power electronics in integration of renewable energy systems. Familiarity with the principles of power electronics and electric power recommended.

**EE 6375. POWER ELECTRONICS ENGINEERING. 3 Hours.**

The course presents selected topics in modeling and analysis of power electronics devices and systems, including dc-dc and dc-ac converters, studies different converter topologies, and investigates various control techniques. The course content helps graduate students to develop and/or improve their research skills in power and energy systems.

**EE 6381. NANOPHOTONICS. 3 Hours.**

Introduction to nanophotonic materials, devices, systems integration, and applications. Principles of nanoscale structures, quantum dots, photonic crystals, near field optics, plasmonics and metamaterials. Design, modeling, synthesis and fabrication of nano-structures and devices. Scaling of photonic components and optoelectronic integration.

**EE 6382. OPTICAL BIOSENSORS: INSTRUMENTATION AND TECHNIQUES. 3 Hours.**

Introduction to modern biological and chemical sensing for in-vivo and in-vitro disease diagnosis. Photonics and nanotechnologies for biomolecular analysis. Bio/chemical sensor principle, instrumentation, and applications.

**EE 6397. RESEARCH IN ELECTRICAL ENGINEERING. 3 Hours.**

Individually approved research projects leading to a doctoral dissertation in the area of electrical engineering. Graded F, P, R.

**EE 6399. DISSERTATION. 3 Hours.**

Graded F, R.

**EE 6697. RESEARCH IN ELECTRICAL ENGINEERING. 6 Hours.**

Individually approved research projects leading to a doctoral dissertation in the area of electrical engineering. Graded F, P, R.

**EE 6699. DISSERTATION. 6 Hours.**

Graded F, R, P, W.

**EE 6997. RESEARCH IN ELECTRICAL ENGINEERING. 9 Hours.**

Individually approved research projects leading to a doctoral dissertation in the area of electrical engineering. Graded F, P, R.

**EE 6999. DISSERTATION. 9 Hours.**

Graded F, P, R.

**EE 7399. DOCTORAL DEGREE COMPLETION. 3 Hours.**

This course may be taken during the semester in which a student expects to complete all requirements for the doctoral degree and graduate. Enrolling in this course meets minimum enrollment requirements for graduation, for holding fellowships awarded by The Office of Graduate Studies and for full-time GTA or GRA positions. Students should verify that enrollment in this course meets other applicable enrollment requirements. To remain eligible in their final semester of study for grants, loans or other forms of financial aid administered by the Financial Aid Office must enroll in a minimum of 5 hours as required by the Office of Financial Aid. Other funding sources may also require more than 3-hours of enrollment. Additional hours may also be required to meet requirements set by immigration law or by the policies of the student's degree program. Students should contact the Financial Aid Office, other sources of funding, Office of International Education and/or their graduate advisor to verify enrollment requirements before registering for this course. This course may only be taken twice. Students who do not complete all graduation requirements while enrolled in this course must enroll in a minimum of 6 dissertation hours (6699 or 6999) in their graduation term. Graded P/F/R.

## COURSES

**ELED 4311. TEACHING MATHEMATICS IN EARLY AND ELEMENTARY EDUCATION. 3 Hours.**

Principles of integration of mathematics concepts in relation to cognitive development. Emphasis on developing dispositions promoting scientific investigation and appropriate objects, materials, activities and programs to assist in assimilation of mathematics concepts. Course will also address the instructional needs and appropriate assessment of all students in inclusive, multicultural and multilingual classrooms for this content area; 20 hours field-based experiences required. Prerequisite: ELED 4312, ELED 4314. Taken concurrently with BEEP 4385.

**ELED 4312. TEACHING SCIENCE AND HEALTH IN EARLY AND ELEMENTARY EDUCATION. 3 Hours.**

Principles of integration of science and health concepts in relation to cognitive, socio-emotional, and psychomotor development. Emphasis on developing dispositions promoting scientific investigation and appropriate objects, materials, activities and programs to assist in assimilation of science and health concepts. Course will also address the instructional needs and appropriate assessment of all students in inclusive, multicultural and multilingual classrooms for this content area; 20 hours field-based experiences required. Prerequisite: Taken concurrently with ELED 4314.

**ELED 4314. TEACHING SOCIAL STUDIES AND FINE ARTS IN EARLY AND ELEMENTARY EDUCATION. 3 Hours.**

Examination of materials, methods, content, and assessment learning experiences associated with elementary social studies and fine arts. Content areas include history, geography, economics, government, citizenship, culture, science, technology and society. Opportunities to demonstrate applications in field settings. Course will also address the instructional needs and appropriate assessment of all students in inclusive, multicultural, and multilingual classrooms for this content area; 20 hours field experiences required. Prerequisites: Taken concurrently with ELED 4312.

**ELED 4317. GROWTH, DEVELOPMENT, AND LEARNING THEORY. 3 Hours.**

Examination of the relationship between major theories and principles of cognitive, socio-emotional, and psychomotor development and EC-6 student learning, home-school connections, and behavior in the classroom. Emphasis on environmental and cultural influences on children's development and learning, prenatal through age 12. Prerequisite: ELED 4311, ELED 4312, ELED 4314.



**ELED 4321. CLASSROOM MANAGEMENT, PEDAGOGY, AND PRACTICES IN EC-6 EDUCATION. 3 Hours.**

A study of developmentally appropriate curriculum and methods for elementary classrooms, including diversity, assessment, behavior guidance and management, planning instruction, and creating a positive learning environment. Course will also address instructional needs and appropriate assessment of all students in inclusive, multicultural, and multilingual classrooms. Field observations required. Prerequisites: EDUC 4316, ELED 4317.

**ELED 4687. CLINICAL TEACHING IN EARLY AND ELEMENTARY EDUCATION. 6 Hours.**

Full-day, Monday - Friday, supervised and directed clinical teaching in university-approved EC-6 classrooms. Candidates will have two placements: one in PK-2 and one in grade 3-6. Clinical teaching must immediately follow the field-based experiences semester. Candidates will follow the school district's calendar, and report to the classroom all day and each day of the semester. Prerequisites: ELED 4311, ELED 4312, ELED 4314, ELED 4317, BEEP 4306, BEEP 4384; LIST 4373, LIST 4374, LIST 4376, EDUC 3301, EDUC 4318, EDUC 4319.

**ELED 5309. TRENDS AND ISSUES IN EARLY CHILDHOOD AND ELEMENTARY EDUCATION. 3 Hours.**

In-depth analysis of current research and practical articles on trends and issues in early childhood and elementary education. Emphasis on the evaluation and impact of historical, political, and social policy; overview of legislation and advocacy on behalf of young children.

**ELED 5312. EC6: INSTRUCTIONAL STRATEGIES IN SCIENCE. 3 Hours.**

Study of principles of integration of content in EC-6 classrooms with focus on science concepts and cognitive development. Emphasis on developing dispositions toward scientific inquiry and the use of appropriate objects, materials, activities, and programs to assist in the learning of science concepts.

**ELED 5315. CLINICAL TEACHING. 3 Hours.**

Clinical teaching in candidate's certification area(s). This semester-long experience will help candidates apply theory and research to practice.

**ELED 5317. THEORIES OF CHILD DEVELOPMENT AND LEARNING. 3 Hours.**

Human growth and development, including developmental anomalies, from birth through middle childhood with emphasis on cognitive, social, emotional, and physical growth. Attention is given to current research regarding establishment of learning environments that foster development of the child's self-concept, cognitive competencies, oral language and literacy development, and positive social behaviors including appreciation of diversity among individuals and groups.

**ELED 5318. FOUNDATIONS IN EC6 EDUCATION. 3 Hours.**

An overview of historical and philosophical influences and current research in early and elementary education on promoting educational environments that support development of the whole child. Attention is given to the development and implementation of appropriate EC-6 curricula and programs that extend and integrate learning experiences of children, including the home-school relationship; 20 hours field experiences required.

**ELED 5319. EC6 EDUCATION: INSTRUCTIONAL STRATEGIES IN MATHEMATICS. 3 Hours.**

Study of principles of integration of content in EC-6 classrooms with focus on mathematics concepts and cognitive development. Emphasis on developing dispositions toward the use of appropriate objects, materials, activities, and programs to assist in learning of mathematics concepts.

**ELED 5320. EC6 EDUCATION: INSTRUCTIONAL STRATEGIES IN SOCIAL STUDIES AND THE CREATIVE ARTS. 3 Hours.**

Study of principles of integration of content in EC-6 classrooms with focus on social studies, the creative arts, and cognitive and socio-emotional development. Emphasis on developing dispositions promoting awareness of self and others, and the study of group dynamics involved in the socialization process in a diverse community. Strategies for enhancing creativity and risk-taking characteristics in EC-6 classrooms.

**ELED 5321. EC-6: CLASSROOM MANAGEMENT & INSTRUCTIONAL STRATEGIES. 3 Hours.**

This course explores a variety of effective classroom management and instructional strategies which include developmentally appropriate, research-based, and anti-biased curricular and materials to teach the core content subjects of English language arts, mathematics, science, and social studies in ESL elementary classrooms. This course also examines challenges to inquiry-based instruction, including those related to assessment, behavior guidance and management, planning instruction, and diversity; 20 hours of field observations are required.

**ELED 5390. SELECTED TOPICS IN ELEMENTARY EDUCATION. 3 Hours.**

An examination of different topics related to elementary education. This course may be repeated for credit with permission.

**ELED 5391. INDEPENDENT RESEARCH. 3 Hours.**

Research over a topic agreed upon between the student and instructor. May be repeated for credit with permission.

**COURSES****EM 2311. STATICS. 3 Hours.****COURSES****EMBA 5101. LEADERSHIP LABORATORY MODULE 2. 1 Hour.**

1.0 Hours This module focuses on the importance of teams for leadership and management effectiveness and focuses on the process of combining talented individuals into a high-performance cohort. Students will learn the skills and techniques that enable high-performance teams and what is required to be both an effective team member and leader.

**EMBA 5105. LEADERSHIP LABORATORY MODULE 4. 1 Hour.**

1.0 Hours. This module explores the impact of ethics on managerial decisions, creating ethical environments for employees, establishing expected norms of behavior, and topical issues such as Corporate Social Responsibility and the consequences of unethical behavior.

**EMBA 5106. LEADERSHIP LABORATORY MODULE 5. 1 Hour.**

1.0 Hours. This module 'brings it all together' and summarizes, enhances, and builds upon the models and competencies explored throughout the Leadership Laboratory series with a particular focus on students' future direction and ongoing development.

**EMBA 5111. LEADERSHIP LABORATORY MODULE 3. 1 Hour.**

1.0 Hours. This course module focuses on various human capital competencies that firms and individuals can use to enhance organizational capabilities and achieve strategic objectives. The course details how the acquisition, deployment, assessment, and retention of an organization's workforce impacts productivity and firm performance in various contexts. Diversity, Inclusion, and the multi-cultural workforce issues are explored in this module.

**EMBA 5123. NEGOTIATIONS. 1 Hour.**

Effective Leadership requires strong communication and negotiation skills. The course will cover techniques and tools for effective negotiating.

**EMBA 5192. CAPSTONE: SPECIAL TOPICS IN INTERNATIONAL BUSINESS. 1 Hour.**

The course combines class discussion of lessons learned from the international project experience with case-based analysis. Discussion merges diverse functional business perspectives with student presentations on concepts covered in the EMBA program.

**EMBA 5199. STRATEGIC SALES MANAGEMENT AND PROFESSIONAL SELLING. 1 Hour.**

This course will focus on two key areas: building and managing a superior sales organization and understanding the professional selling process with an emphasis on B2B sales. Topics to be covered include strategic decisions such as sales force structure and deployment, key account and sales territory management, and sales leadership and evaluation of sales organization effectiveness. The second component of the course will cover key selling steps (e.g., prospecting, customer needs development and discovery, objection handling) as well as hands-on skills/techniques for building strong customer relationships in the consultative selling process.

**EMBA 5202. PRICING STRATEGIES AND TACTICS. 2 Hours.**

Often, managers treat pricing as a tactical problem. By pricing to cover costs, they undermine profit. By pricing for competitive advantage, they undermine value. In fact, pricing products and services is a strategic challenge that requires insight, analysis, and perspective. This course will introduce senior managers and executives responsible for pricing decisions and approvals to the theory and techniques needed to understand strategic pricing. The course will focus on how to use price to achieve strategic objectives, including successfully introducing new products to the market, responding to significant price competition, and achieving prices that reflect the true value of your products.

**EMBA 5206. DIGITAL TRANSFORMATION OF THE ENTERPRISE. 2 Hours.**

In the modern economy, digital and technological literacy are of key importance for any top executive. Modern executives and business leaders must be able to leverage technology to reimagine their businesses and unlock value through data-driven decision making. In this course, students will be exposed to transformative technological areas that are changing business and are key for leaders to understand and master: AI/ML, IoTs, Cybersecurity, Blockchain, and Cloud Computing with a particular emphasis on analytics (AI, ML, Visualization, NLP).

**EMBA 5211. COMPETING IN A GLOBAL ENVIRONMENT. 2 Hours.**

With an ever-growing number of industries becoming global in scope, managers are being increasingly challenged to manage strategies within a global perspective. This course provides participants with the skills, knowledge and sensitivity required to successfully manage organizations and organizational units within a multinational environment.

**EMBA 5212. LEADERSHIP LABORATORY MODULE 1. 2 Hours.**

2.0 Hours. The module explores key characteristics of high-performing leaders and organizations and weaves these into a single integrated model that students can apply to improve their individual and organizational effectiveness. This course introduces students to a leadership and organizational effectiveness framework and assesses individual competencies using a comprehensive leadership 360 analysis.

**EMBA 5225. FOUNDATIONS OF QUANTITATIVE ANALYSIS. 2 Hours.**

This course is designed to introduce foundational statistical building blocks used in applied managerial reasoning and decision making. Coverage will include (1) the computation, interpretation, and visualization of descriptive statistics (e.g., quantities reported as key performance indicators and/or metrics on dashboards), (2) tests of statistical differences (e.g., period over period, segment vs. segment, comparisons, etc.), (3) tests for statistical association (e.g., correlations, associations among categorical variables), and (4) an introduction to predictive modeling using multiple regression. In addition to gaining working knowledge of foundational statistics, an intended outcome is to equip organizational leaders to evaluate analysis results prepared by others, a critical skill for modern data-rich business contexts with expanding applications of business analytic techniques.

**EMBA 5299. SPECIAL TOPICS IN EXECUTIVE BUSINESS EDUCATION. 2 Hours.**

New topics or independent study options to be offered as needed.

**EMBA 5303. STRATEGIC COST MANAGEMENT. 3 Hours.**

Tools for cost management to meet strategic as well as tactical organizational goals are examined. Emphasis is on leveraging accounting information for decision making, strategic management, and for the control of processes and organizations.

**EMBA 5304. MAKING STRATEGIC DECISIONS WITH FINANCIAL DATA. 3 Hours.**

A review of the elements of accounting measurement principles and practical analytical skills needed to manage the resources of a firm. This includes exposure to the fundamentals of financial statement analysis with a focus on profitability, liquidity, solvency and risk management. Reporting incentives and disclosure requirements are explored within this framework.

**EMBA 5307. DESIGNING GLOBAL SUPPLY CHAINS FOR COMPETITIVE ADVANTAGE. 3 Hours.**

The course focuses on coordination and integration of global logistics, purchasing, operations and market channel strategies. Issues on global supply chains include: forecasting demand and technology and market growth; likelihood of regulation or political instability; activities to do in-house as opposed to outsourcing; global facility location; and managing a geographically dispersed supply chain including relations with vendors.

**EMBA 5308. MARKETING AND CUSTOMER VALUE CREATION. 3 Hours.**

This course focuses on marketing strategies and tactics to create customer value and build long term relationships to meet organizational goals. Students are exposed to tools that enable managers to understand the ever-changing marketplace and then build an effective marketing strategy to meet corporate goals. Not all customers are profitable or even desirable. Customer management strategies to build marginal buyers into valued customers are also covered.

**EMBA 5309. FINANCIALMANAGEMENT FOR EXECUTIVES. 3 Hours.**

This course provides an overview of strategic financial management for executives. The first module begins by introducing the tools needed for financial analysis at the executive level. We examine the strategic concept of opportunity cost by analyzing how to use bond yields to model the net present value of business projects. The second module adds advanced financial modeling skills for corporate financial analysis, applied to decisions on capital structure, payout policy, and M&A opportunities. The third module concludes by expanding the executive's perspective to incorporate international financial management and corporate real estate.

**EMBA 5310. COMPETITIVE STRATEGY, INTRAPRENEURIAL AND ENTREPRENEURIAL. 3 Hours.**

This course broadens student perspectives on strategy and competitive advantage. Strategic vision is developed for mature businesses and entrepreneurial startups. Conceptual tools associated with industry dynamics and the assessment of core competencies are presented. Students learn how to evaluate key competitors to formulate and implement winning strategies.

**EMBA 5311. STRATEGIC MARKETING MANAGEMENT. 3 Hours.**

The course focuses on how to develop and deliver products and services with meaningful customer value. Students learn to evaluate market potential, price products optimally, and evolve marketing strategies to capitalize on business shifts.

**EMBA 5313. EXPERIENCING THE GLOBAL ENVIRONMENT: INTERNATIONAL PROJECT. 3 Hours.**

A key factor in understanding how a business may operate in the global marketplace is to understand the culture, business practices, laws and regulations, and logistical challenges that exist in another country. This is particularly true for one as important to the world economy (let alone the U.S.) as China has become. The class will travel to China and participate in a two-week immersion into the cultural and economic aspects of how business is conducted there. Through our extensive network, that has been developed through the graduates of our China EMBA program, we are able to provide an experience like no other program of its kind can offer.

**EMBA 5399. SPECIAL TOPICS IN EXECUTIVE BUSINESS EDUCATION. 3 Hours.**

New topics or independent study options to be offered as needed.

**EMBA 5413. INTERNATIONAL BUSINESS EXPERIENCE. 4 Hours.**

A key factor in understanding how a business may operate in the global marketplace is to understand the culture, business practices, laws and regulations, and logistical challenges that exist in another country. The class will travel internationally and participate in a two-week immersion into the cultural and economic aspects of how business is conducted in an international country.

**EMBA 5415. EXPERIENCING THE INTERNATIONAL ENVIRONMENT: SPECIAL PROJECT. 4 Hours.**

Key factors in how business operates in the global marketplace means understanding the culture, business practices, laws, and logistical challenges that exist in another country. The class travels to an international destination and participate in a two-week immersion into the cultural and economic aspects of how business is conducted there. This course is an alternative to EMBA 5413 with destinations and itineraries specially designed.

**EMBA 5417. EXPERIENCING THE BUSINESS ENVIRONMENT: INDUSTRY PROJECT. 4 Hours.**

Understanding the challenges of management by experiencing the dynamics of industry and company culture, business practices, laws and regulations, and logistical challenges that confront today's business enterprises. This course is an alternative to EMBA 5413, with domestic destinations and itineraries specially designed.

**EMBA 5499. SPECIAL TOPICS IN EXECUTIVE BUSINESS EDUCATION. 4 Hours.**

New topics or independent study options to be offered as needed.

## COURSES

**ENGL 0100. INTEGRATED READING AND WRITING WORKSHOP. 1 Hour.**

A corequisite developmental course that focuses on the rhetorical knowledge, critical thinking skills, and writing and revising processes required in ENGL 1301. Students work with an instructor to review assigned readings and revise essays. This course fulfills Texas Success Initiative (TSI) requirements for reading and/or writing. This course may not substitute for any other English course, and credit in this course does not fulfill any degree requirements. Prerequisite: Concurrent enrollment in the associated section of ENGL 1301 required.

**ENGL 0101. INTEGRATED READING AND WRITING NCBO. 1 Hour.**

A Non-Course-Based-Option (NCBO) developmental co-requisite for ENGL 1301; eligible students must also enroll in the corresponding ENGL 1301 course. Includes self-study with individualized instructor feedback and tutoring sessions as well as instructor-led workshops focusing on the rhetorical knowledge, critical thinking, and writing and revising processes required in ENGL 1301. Fulfills Texas Success Initiative (TSI) requirements. Corequisites: Concurrent enrollment in the associated section of ENGL 1301 required.

**ENGL 0300. INTRODUCTION TO CRITICAL READING AND WRITING. 3 Hours.**

Offers additional preparation in academic reading and writing. Focus is on comprehending college-level reading material and writing academic essays in standard written English. Fulfills Texas Success Initiative (TSI) requirements. This course may not substitute for any other English course, and credit in this course does not fulfill any degree requirement.

**ENGL 0301. INTEGRATED READING AND WRITING FUNDAMENTALS. 3 Hours.**

A corequisite developmental course that focuses on the rhetorical knowledge, critical thinking skills, and writing and revising processes required in ENGL 1301. Students work with an instructor to closely analyze assigned readings and assignment prompts, thoroughly revise and edit essays, and review ENGL 1301 lectures. This course fulfills Texas Success Initiative (TSI) requirements for reading and/or writing. This course may not substitute for any other English course, and credit in this course does not fulfill any degree requirements. Prerequisite: Concurrent enrollment in the associated section of ENGL 1301 required.

**ENGL 1200. ENGLISH STUDIES PROFESSIONALIZATION AND STUDENT SUCCESS. 2 Hours.**

Introduces students to the profession of English Studies at the college level. Teaches student success skills that will assist new students in their transition to college. Helps students identify their individual needs, determine what resources are appropriate to address those needs, recognize the role faculty play in their development, and formulate a plan for an actively engaged and enriched experience from campus to career. Will be taught by Peer Academic Leaders (PALS) and faculty, staff, and/or graduate students, who will provide guidance, raise awareness and understanding of the English and English with Teaching Certification majors and related minors, and help support collaborative and co-curricular opportunities available within the College of Liberal Arts. Reserved exclusively for students planning to major in the English BA or English BA with Teacher Certification degree tracks. Fulfills the University requirement for UNIV 1131.

**ENGL 1301. RHETORIC AND COMPOSITION I. 3 Hours. (TCCN = ENGL 1301)**

Introduction to college reading and writing. Emphasizes recursive writing processes, rhetorical analysis, synthesis of sources, and argument.

**ENGL 1302. RHETORIC AND COMPOSITION II. 3 Hours. (TCCN = ENGL 1302)**

Continues ENGL 1301, but with an emphasis on advanced techniques of academic argument. Includes issue identification, independent library research, analysis and evaluation of sources, and synthesis of sources with students' own claims, reasons, and evidence. Prerequisite: Grade of C or better in ENGL 1301.

**ENGL 1350. WRITING ABOUT FILM. 3 Hours.**

Introduces students to the technical language and elements specific to film criticism. Develops appreciation of two artistic crafts: making film and writing about it. Considers how both professional critics and academics watch and write about what they see on their screens and fosters critical engagement with ethical and social issues by teaching students how to appraise and analyze film in innovative ways in order to communicate a specific argument or point of view.

**ENGL 1375. INTRODUCTION TO CREATIVE WRITING. 3 Hours.**

This course introduces students to genres of creative writing through modes that are common to all of them, including language, sound, character, setting, exposition, and voice. Students will learn to appreciate, synthesize, and analyze contemporary poetry, short fiction, and creative non-fiction essays, first by learning to closely read these works as writers and then by using these learned techniques to compose creative writings of their own in various genres. Individual and class criticism of these works in a workshop setting, as well as lecture on and discussion of literary forms and techniques, will allow students to more fully comprehend revision techniques. This course satisfies the University of Texas at Arlington core curriculum requirement in creative arts.

**ENGL 2300. LITERATURE AND THE GOOD LIFE. 3 Hours.**

Fosters a humanistic approach to literature that equips students to explore the moral, ethical, and social questions that have long defined the search for a good life. Emphasizes attentive reading practices, close textual analysis, and the application of literature to personal development. Prerequisite: C or better in ENGL 1301.

**ENGL 2303. TOPICS IN LITERATURE. 3 Hours. (TCCN = ENGL 2341)**

Focuses on a particular genre, theme, or issue to enable comparison and analysis of several texts. Emphasizes critical thinking, reading, and writing. Topics may include disability in comics, working-class literature, magical realism, or environmental literature and film. May be repeated for credit when course content changes. Satisfies the University of Texas at Arlington core curriculum requirement in Language, Philosophy, and Culture. Prerequisite: C or better in ENGL 1301.

**ENGL 2309. WORLD LITERATURE. 3 Hours. (TCCN = ENGL 2331)**

Covers significant works of world literature chosen from various national and cultural traditions, focusing on cross-cultural issues. Topics may include moral ambiguities across cultures, the transition from colonial to postcolonial literatures, or the nature of translation; the course may also be structured as a chronological survey. Examines at least three genres and six authors. Emphasizes critical thinking, reading, and writing. Satisfies the University of Texas at Arlington core curriculum requirement in Language, Philosophy, and Culture. Prerequisite: C or better in ENGL 1301.

**ENGL 2319. BRITISH LITERATURE. 3 Hours. (TCCN = ENGL 2321)**

Concentrates on how cultural, geographic, and political issues shape and are shaped by British literature. Topics may include the nature of empire, Romantic conceptions of heroism, or literary representations of the sciences; the course may also be structured as a chronological survey. Examines at least three genres and six authors. Emphasizes critical thinking, reading, and writing. Satisfies the University of Texas at Arlington core curriculum requirement in Language, Philosophy, and Culture. Prerequisite: C or better in ENGL 1301.

**ENGL 2329. AMERICAN LITERATURE. 3 Hours. (TCCN = ENGL 2326)**

Concentrates on how cultural, geographic, and political issues shape and are shaped by American literature. Topics may include the struggle to discover a national identity, the transition from war to postwar periods, or the tensions of a multicultural society; the course may also be structured as a chronological survey. Examines at least three genres and six authors. Emphasizes critical thinking, reading, and writing. Satisfies the University of Texas at Arlington core curriculum requirement in Language, Philosophy, and Culture. Prerequisites: C or better in ENGL 1301.

**ENGL 2338. TECHNICAL WRITING. 3 Hours. (TCCN = ENGL 2311)**

Covers the processes of researching, drafting, designing, editing, and revising technical reports, proposals, instructions, resumes, and professional correspondence for specific audiences. Prerequisites: C or better in ENGL 1301 and ENGL 1302.

**ENGL 2375. GENRES OF CREATIVE WRITING. 3 Hours.**

Covers the craft of creative writing in the genres of poetry, fiction, and creative nonfiction. Prerequisites: C or better in ENGL 1301 or ENGL 1375.

**ENGL 3300. TOPICS IN LITERATURE. 3 Hours.**

May include such topics as Utopian literature, the American short story, literature and philosophy, introduction to theatre, and modern British fiction. May be repeated for credit when content changes. Prerequisites: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 3301. TOPICS IN RUSSIAN LITERATURE IN TRANSLATION. 3 Hours.**

Covers the works of major Russian authors during the period from the beginning of Russian literature until the 1917 Revolution, focusing on the interrelationship of various literary movements and philosophies. Students receiving credit in Russian will complete a research project using the Russian language. May be repeated for credit as topics and periods vary. Offered as ENGL 3301 and RUSS 3301; credit will be granted in only one department. Prerequisites: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 3306. TOPICS IN SOVIET AND POST-SOVIET LITERATURE IN TRANSLATION. 3 Hours.**

Covers the works of major Soviet and post-Soviet authors from 1917 to the present against the background of unfolding social and political development in the USSR and post-USSR. Students receiving credit in Russian will complete a research project using the Russian language. May be repeated for credit as topics and periods vary. Offered as ENGL 3306 and RUSS 3306; credit will be granted in only one department. Prerequisites: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 3333. DYNAMIC TRADITIONS IN LITERATURE. 3 Hours.**

An introduction to literary study that focuses primarily on changes over time to a movement, genre, or motif, such as Romanticism, detective fiction, or animals. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 3334. ADVANCED CREATIVE WRITING: FICTION. 3 Hours.**

A workshop-intensive course on writing fiction. Prerequisite: C or better in ENGL 2375.

**ENGL 3335. ADVANCED CREATIVE WRITING: POETRY. 3 Hours.**

A workshop-intensive course on writing poetry. Prerequisite: C or better in ENGL 2375.

**ENGL 3336. ADVANCED CREATIVE WRITING: CREATIVE NONFICTION. 3 Hours.**

A workshop-intensive course on writing creative nonfiction. Prerequisite: C or better in ENGL 2375.

**ENGL 3339. CLASSICAL BACKGROUNDS. 3 Hours.**

Literature of the Greco-Roman world including, but not limited to, The Odyssey, selected Greek tragedies, The Aeneid, Metamorphoses, and selected lyrics, epigrams, and satires. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 3340. HISTORY OF AMERICAN LITERATURE I. 3 Hours.**

Surveys American literature from its origins up to the Civil War. Readings will include not only prose fiction, poetry, and essays, but also First People's narratives; letters and travel narratives; sermons; and narratives of enslaved people. Provides the historical context necessary to understand early American literature and the aesthetic, ideological, and intellectual debates central to early American culture. Prerequisite: English majors must have earned a C or better in ENGL 3350 or must be concurrently enrolled in ENGL 3350. Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 3341. HISTORY OF AMERICAN LITERATURE II. 3 Hours.**

Surveys American literature from the Civil War to the present. Covers literary movements including realism, naturalism, modernism, and post-modernism with a focus on prose fiction, poetry, and drama. Provides the historical context necessary to understand modern American literature and the aesthetic, ideological, and intellectual debates central to American culture since the Civil War. Prerequisite: English majors must have earned a C or better in ENGL 3350 or must be enrolled concurrently in ENGL 3350. Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 3342. AMERICAN POETRY. 3 Hours.**

Examines the forms, traditions, and cultural contexts of the poetry of the United States. May include the relationship between American poetry and poetry written in English elsewhere, and/or poetry written in other languages. Prerequisites: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).



**ENGL 3343. LATINO/A LITERATURE. 3 Hours.**

Explores Latino/a literature of the United States from the nineteenth century through the present as conditioned by the intersections of race, class, gender, sexuality, and regional variation. Texts may include novels, poetry, drama, short fiction, and non-fiction by and about peoples in the U.S. with heritage from South America, Central America, the Caribbean, and Mexico. Offered as ENGL 3343 and MAS 3343; credit will be granted in only one department. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 3344. NATIVE AMERICAN LITERATURES. 3 Hours.**

Examines selected oral and written texts composed by Native peoples of North America. Includes selections of oral narratives, autobiography, fiction, and poetry, and may include drama and film. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 3345. AFRICAN-AMERICAN LITERATURE. 3 Hours.**

Examines African-American literature in its various traditions, forms, and cultural and historical contexts. Offered as AAST 3345 and ENGL 3345; credit will be granted in only one department. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 3346. MEXICAN AMERICAN AND CHICANO/A LITERATURE. 3 Hours.**

Surveys Mexican American literature from 1848 to the present, including literature of the Chicano movement, focusing on important genres, themes, and historical developments. Offered as ENGL 3346 and MAS 3346; credit will be granted in only one department. Prerequisites: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 3347. TOPICS IN MULTICULTURAL AMERICAN LITERATURES. 3 Hours.**

Focuses on literature produced within one or more ethnic communities in the U.S. in order to trace a theme or to explore issues such as intersectionality, hybridity/mestizaje, diaspora, or immigrant experiences. Topics may include Afro-Latino poetry, third-world feminist writing, multicultural literature of the Southwest, cultural memory and the Jewish literary tradition, or Asian-American fiction. Offered as ENGL 3347, AAST 3347, and MAS 3347; credit will be granted in only one department, and credit for MAS 3347 will be granted only once. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 3350. ANALYSIS AND INTERPRETATION. 3 Hours.**

Teaches students to identify characteristics of genres, to recognize and understand critical and literary terms, and to develop and use methods and strategies for analyzing and interpreting texts. Acquainting students with the unique characteristics of their discipline and reflecting on the significance of the discipline beyond the university, this course is required for English majors in their first semester of upper-division study and also satisfies the UNIV 1101 requirement. Prerequisite: C or better in ENGL 1301, ENGL 1302, and 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 3351. HISTORY OF BRITISH LITERATURE I. 3 Hours.**

Examines British literature from its origins through the eighteenth century, focusing on the relationship between literature and its social and historical contexts. Covers the emergence of major genres and modes of the time period, which may include epic, pastoral, lyric, sonnets, drama, and satire. Prerequisite: English majors must have earned a C or better in ENGL 3350 or must be enrolled concurrently in ENGL 3350. Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 3352. HISTORY OF BRITISH LITERATURE II. 3 Hours.**

Examines British literature from Romanticism to the present, focusing on the relationship between literature and its social and historical contexts. Texts may include poetry, novels, plays, essays, and short stories. Prerequisites: English majors must have earned a C or better in ENGL 3350 or must be enrolled concurrently in ENGL 3350. Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 3353. GOTHIC LITERATURE. 3 Hours.**

Examines the established conventions, cultural contexts, and theoretical underpinnings of gothic literature. May focus on a particular region and/or time period, such as the gothic literature of the British Empire during the fin de siècle, or on a major theme, such as identity construction in gothic literature. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 3355. POST-COLONIAL LITERATURE IN ENGLISH. 3 Hours.**

Examines twentieth and twenty-first-century literature produced in formerly colonized nations. May include literature from the Indian subcontinent; various countries in Africa; Korea; Australia; New Zealand; Canada; and/or Latin America. Emphasizes critical and theoretical methods, examining such themes as identity, belonging, exile, place, language, sovereignty, and hybridity, and considers the pervasive artistic, psychological, and political impacts of colonization. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 3361. HISTORY OF WORLD LITERATURE I. 3 Hours.**

Examines major texts from early oral and manuscript traditions through the first centuries of printing. Texts and authors studied may include the Bible, Homer, the Greek dramatists, Vergil and other Roman poets, medieval epic and romance, Dante, Petrarch, Ariosto, Montaigne, and Cervantes.

Prerequisites: English majors must have earned a C or better in ENGL 3350 or must be enrolled concurrently in ENGL 3350. Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 3362. HISTORY OF WORLD LITERATURE II. 3 Hours.**

Examines major literary texts from the mid-seventeenth century to the present. Material might cover Neoclassicism, Romanticism, Realism, Modernism, Postcolonial literature, Magical Realism, and the literature of globalization, as well as various theoretical problems involved in such a study of world literature, including delimiting the field, translation, and English as a global language. Prerequisites: English majors must have earned a C or better in ENGL 3350 or must be enrolled concurrently in ENGL 3350. Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 3363. BOOK HISTORY AND PRINT CULTURE. 3 Hours.**

Examines the creation, production, distribution, and reception of books, serials, and ephemera across history, with a focus on the shifts from orality to literacy, writing to printing, and analog to digital media. Draws upon theories and concepts from rhetoric, material culture, sociology, economics, and graphic design, as well as studies in reading, literacy, and the creation and transmission of meaning. Introduces students to principles of bibliographical description and analysis. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 3364. TOPICS IN LGBTQIA+ LITERATURE AND THEORY. 3 Hours.**

Studies representations of the sexual and/or gender identities of LGBTQIA+ people and the intersectionality among them through a variety of texts. Specific topics may include the history of marginalized sexualities, crossdressing in literature, or transvestite saints; the texts may be philosophical, political, literary, and/or scientific. May be repeated for credit as course content changes. Offered as ENGL 3364 and GWSS 3364; credit will be granted in only one department. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 3366. TOPICS IN LITERATURE AND ENVIRONMENT. 3 Hours.**

Investigates the relationship between literature and the environment, considering how texts and other cultural practices represent and engage with the natural world. Topics may include nature writing, animal studies, plant studies, environmental justice, climate change, or posthumanism. May be repeated for credit when course content changes. Prerequisites: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 3368. TOPICS IN FEMINIST THEORY, GENDER, AND SEXUALITY. 3 Hours.**

Examines issues of gender and sexuality through literary, theoretical, and philosophical texts that foreground questions feminist theory raises about desire, sexual identity, and gender asymmetry. Considers how gender and sexuality shape and are shaped by race, ethnicity, class, ability/disability, religion, and age. May be repeated for credit as course content changes. Offered as ENGL 3368 and GWSS 3368; credit will be granted in only one department. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 3369. TOPICS IN TECHNICAL AND PROFESSIONAL WRITING. 3 Hours.**

Examines a topic in the history, theory, or practice of technical and professional writing. Topics may include copy writing, information architecture (IA), social justice in technical communication, user experience (UX), or audience-specific applications of technical writing. May be repeated for credit when content changes. Prerequisite: C or better in ENGL 2338 or concurrent enrollment in ENGL 2338.

**ENGL 3370. HISTORY OF WOMEN'S WRITING. 3 Hours.**

Examines women's writing in English from the Medieval period to the present. Offered as ENGL 3370 and GWSS 3370; credit will be granted in only one department. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 3371. ADVANCED EXPOSITION. 3 Hours.**

An advanced writing course emphasizing writing that explains, demonstrates, or explores a subject. Attention given to audience, invention, arrangement, style, and revision. Prerequisite: C or better in ENGL 1301 and ENGL 1302.

**ENGL 3372. COMPUTERS AND WRITING. 3 Hours.**

An advanced writing course taught in a computer classroom. Emphasizes rhetorical analyses of electronic discourse and writing in electronic environments. Prerequisite: C or better in ENGL 1301 and ENGL 1302.

**ENGL 3373. TECHNICAL AND PROFESSIONAL WRITING. 3 Hours.**

An advanced writing course, taught in a computer classroom, that focuses on writing in technical, scientific, and/or professional subject matters. Examines technical writing theory and style for producing documents for genre-specific audiences. Assignments may include the creation of a knowledge base, a data visualization, a reference guide, a usability testing report, and/or a video or multimedia tutorial. Prerequisite: C or better in ENGL 2338 or concurrent enrollment in ENGL 2338.

**ENGL 3374. WRITING, RHETORIC, AND MULTIMODAL AUTHORING. 3 Hours.**

Analyzes the rhetorical structure of multimodality (linguistic, visual, oral, gestural, and spatial modes of communication). Emphasizes composing writing-intensive and research-oriented projects for academic, business, and/or creative audiences. Prerequisite: C or better in ENGL 1301 and ENGL 1302.

**ENGL 3376. BUSINESS AND PROFESSIONAL WRITING. 3 Hours.**

An advanced writing course, taught in a computer classroom, that focuses on writing in the workplace. Emphasizes producing business and professional documents based on current, standardized formats; considering the role of audience; writing in a clear, concise, and appropriate style; and revising texts to improve their effectiveness. Prerequisite: C or better in ENGL 2338 or concurrent enrollment in ENGL 2338.

**ENGL 3377. TECHNICAL EDITING. 3 Hours.**

Editing at different scales of document design, including copyediting, proofreading, and developmental editing. Editing and designing drafts of technical and professional documents. Applying rules and style guides governing technical writing for organizations. Prerequisite: C or better in ENGL 2338 or concurrent enrollment in ENGL 2338.

**ENGL 3378. TECHNICAL PROCEDURES AND MANUALS. 3 Hours.**

Principles of technical communications for developing procedural documentation and manuals. Extensive practice in writing technical procedures and manuals. Students are encouraged to take ENGL 2338: Technical Writing before enrolling. Prerequisite: C or better in ENGL 2338 or concurrent enrollment in ENGL 2338.

**ENGL 3379. GRANT AND PROPOSAL WRITING. 3 Hours.**

Explores how foundational principles of technical communication for user-centered design and document design may be applied to writing persuasive grant applications and proposals relevant for business, philanthropy, the humanities, and/or the sciences, including medicine. Individual and collaborative assignments may include identifying elements of successful and unsuccessful grant applications and proposals, creating a proposal for a client, writing a mock grant application, and/or engaging in service-learning for a local non-profit organization to assist its preparation of a grant application. Prerequisite: C or better in ENGL 2338 or concurrent enrollment in ENGL 2338.

**ENGL 3380. RHETORIC AND WRITING WITH SOUND. 3 Hours.**

An introduction to rhetorical engagement with recorded sound. Includes work with digital audio tools for writing with sound, critical writing about sound recordings, and readings in the interdisciplinary field of sound studies. May also consider histories and ethnographies of listening, studies of built and natural soundscapes, sound media, sound art, and the nature of listening. Prerequisite: English majors must have earned a C or better in ENGL 3350 or must be concurrently enrolled in ENGL 3350. Non-majors must have earned a C or better in ENGL 1301 and ENGL 1302.

**ENGL 3381. RHETORICAL MAKING. 3 Hours.**

Examines the rhetorical impact of designing and developing objects using makerspaces (collaborative technological workshops). Uses modern rhetorical theory to analyze the persuasive and communicative dimensions of fabrication and coding. Projects may include making objects using the university's FabLab, technical writing about and rhetorical analysis of those objects, and website coding and design. Emphasizes student-led collaboration throughout iterative design cycles. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 3382. LISTENING TO LITERATURE. 3 Hours.**

Focuses on literary works in the form of audiobooks and podcasts. These increasingly popular and influential forms invite us to consider how the longstanding traditions of oral storytelling and performance are sustained and reimagined through new media. Whether written works of literature that are adapted to audio formats, in the case of audiobooks, or original audio productions, in the case of short- and longform fiction podcasts, this body of literature demands new interpretive strategies. In this course, we explore how listening to literature compares to reading literature, including learning and applying the analytical method of critical listening or close listening. Moreover, students will learn the skills of making audiobooks or podcasts, in order to produce their own audio interpretations or performances of literary texts. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in ENGL 1301 and ENGL 1302.

**ENGL 3383. INFORMATION DESIGN. 3 Hours.**

Covers the theory and practice of information design for professional and technical projects. Focuses on developing critical and rhetorical digital literacies in order to analyze and create effective information design. Students will analyze, design, and redesign print and web materials. Intermediate computer proficiency required for learning the basics of the industry standard software for desktop publishing. Prerequisite: C or better in ENGL 2338 or concurrent enrollment in ENGL 2338.

**ENGL 3384. STRUCTURE OF MODERN ENGLISH. 3 Hours.**

Explores Modern English grammar at the level of the word, phrase, and sentence, not to teach "proper" English but to discover and understand the unique structure of the language. Required for English and English/Education majors. Prerequisites: C or better in ENGL 1301 and ENGL 1302.

**ENGL 3385. TOPICS IN RHETORIC AND COMPOSITION. 3 Hours.**

Examines a topic in the history, theory, and practice of rhetoric and composition, such as digital rhetoric and composition, environmental rhetoric, history of writing instruction, rhetoric of science, and rhetoric of sound. May be repeated for credit as course content changes. Prerequisites: C or better in ENGL 1301 and ENGL 1302.

**ENGL 3386. WRITING ABOUT MUSIC. 3 Hours.**

Provides a foundation in sound studies, lyric theory, and close-listening practices that students will use to analyze and produce various genres and modalities of writing about music, including music criticism, liner/album notes, and/or music in literature. Prerequisite: English majors must have earned a C or better in ENGL 3350 or must be concurrently enrolled in ENGL 3350. Non-majors must have earned a C or better in ENGL 1301 and ENGL 1302.

**ENGL 3387. TUTORING WRITING. 3 Hours.**

Explores practical approaches and techniques for tutoring writers and the theory that informs them. Will involve observing, recording, transcribing, and analyzing student-led tutoring sessions in the Writing Center. Prerequisite: B or better in ENGL 1301 or ENGL 1302.

**ENGL 3388. THE EARLY HISTORY OF TECHNICAL WRITING. 3 Hours.**

Focuses on writing in technical, scientific, and/or professional subject matters of the medieval or early modern periods to understand the relation between an earlier stage in the development of technical writing and current practices. Assignments may include transcription and coding from medieval or early modern texts to a searchable database; a comparison of a genre of medieval or early modern technical writing with a current genre; a rewriting of technical, scientific, and/or professional subject matters from the medieval or early modern texts into modern parlance; a user manual on how to code and upload manuscripts; and/or a Fab Lab, maker-space project based on early technical writing. Prerequisite: C or better in ENGL 2338 or concurrent enrollment in ENGL 2338.

**ENGL 3389. WRITING WITH AI AND DIGITAL TOOLS. 3 Hours.**

Teaches students to write with Artificial Intelligence (AI), positing AI as a technology to aid writers, not replace them. Equips students to critically assess the strengths and weaknesses of various AI writing tools, including the inherent biases in training corpora. Emphasizes critical reflection in the writing process and empowers students to demonstrate their value as writers in a rapidly evolving marketplace. Prerequisite: English majors must have earned a C or better in ENGL 3350 or must be concurrently enrolled in ENGL 3350. Non-majors must have earned a C or better in ENGL 1301 and ENGL 1302.

**ENGL 3390. STUDENT AMBASSADORS. 3 Hours.**

A professional development practicum for English majors that gives students experience promoting the humanities and cultivates leadership and mentorship skills. Student Ambassadors publicize the Department of English's programs on campus and build community within the Department by organizing and attending events. Prerequisite: C or better in ENGL 3350, C or better in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362), and permission of the instructor.

**ENGL 3391. ENGLISH IN PROFESSIONAL AND PUBLIC LIFE. 3 Hours.**

Exploration of and initial practice in diverse applications of English Studies across academic, professional, and public life. Students will research career paths, plan future coursework to gain essential experience, begin professional profiles and portfolios, learn about resources and programs across campus, and engage in professional development activities. Prerequisite: English majors must have earned a C or better in ENGL 3350 or must be concurrently enrolled in ENGL 3350. Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4191. LITERATURE CONFERENCE COURSE. 1 Hour.**

Requires permission of the department chair and the instructor.

**ENGL 4301. HISTORY OF THE ENGLISH LANGUAGE. 3 Hours.**

Examines the sounds and structure of the English language from pre-history to the present. Prerequisite: C or better in ENGL 1301 and ENGL 1302.

**ENGL 4311. EARLY AMERICAN LITERATURE. 3 Hours.**

Investigates the earliest literature and cultures of the peoples inhabiting the North American continent from prehistory to the end of the eighteenth century. May focus on oral and written narratives by Native Americans, Puritans, and/or other non-indigenous settlers who colonized the North American continent. Genres may include oral tales, letters, autobiography, fiction, poetry, drama, journalism, and/or scientific writing. Prerequisites: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4312. NINETEENTH-CENTURY AMERICAN LITERATURE. 3 Hours.**

Covers American literature across the nineteenth century, including such literary topics as sentimental fiction, the American Renaissance, Gothic fiction, realism, and regionalism. The course may address various historical contexts, such as slavery and abolition, the Civil War, the women's rights movement, immigration and urbanization, and westward expansion and the frontier. Genres may include fiction, poetry, essays, autobiography, and letters. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4313. TWENTIETH- AND TWENTY-FIRST-CENTURY AMERICAN LITERATURE. 3 Hours.**

Examines literature written in the United States from the turn of the twentieth century to the present. Focuses on major figures and literary movements such as Realism, Modernism, and Postmodernism as they were shaped by historical, cultural, and political contexts including the World Wars, movements for civil rights, the Cold War, and globalization. Genres may include the novel, poetry, and drama, as well as emerging genres such as graphic fiction. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4321. MEDIEVAL LITERATURE. 3 Hours.**

Examines various aspects of Western literature from the fifth to the end of the fifteenth century. May focus on major figures and their cultural and historical contexts or on particular genres, themes, or topics. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4322. EARLY MODERN LITERATURE. 3 Hours.**

Investigates Western European literature and culture of the sixteenth and seventeenth centuries. May focus on Petrarchan and anti-Petrarchan, Platonic and anti-Platonic poetry and essays; meditative poetry; epic poetry; drama by Shakespeare or his contemporaries; manuscript or coterie writing; women's writing; early scientific writing; or the relationship between literature and the arts. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4324. RESTORATION AND EIGHTEENTH-CENTURY LITERATURE. 3 Hours.**

Examines literature from the 1660s through the end of the eighteenth century. Focuses on the tenets of Neoclassicism, the rise of the Enlightenment, and the emergence of Romanticism, expressed in genres that may include drama, coterie writing, satire, essays, journals and diaries, poetry, and epic works. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4325. CHAUCER. 3 Hours.**

Examines the works of the fourteenth-century English poet Geoffrey Chaucer, their historical and cultural contexts, and his literary influences. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4326. SHAKESPEARE. 3 Hours.**

Examines selected plays and poetry by Shakespeare in their historical, cultural, and literary contexts. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4328. J. R. R. TOLKIEN. 3 Hours.**

Examines the mythology created in the fantasy writings of J. R. R. Tolkien, especially *The Lord of the Rings* and *The Silmarillion*, along with its roots in culture, history, language, literature, and religion. May cover some of Tolkien's lesser-known creative or critical texts as well as recent appropriations of Tolkien's work, such as in film, music, fan fiction, and gaming. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4330. TOPICS IN CREATIVE WRITING. 3 Hours.**

A creative writing course that focuses on a topic spanning one or more literary genres. Topics may include flash fiction, memoir, narrative poetry, speculative fiction, or screenwriting. May be repeated for credit as course content changes. When the topic is screenwriting, 4330 will be cross-listed with ART 3350: Screenwriting I; credit will be granted in only one department. Prerequisite: C or better in ENGL 3375.

**ENGL 4331. BRITISH ROMANTICISM. 3 Hours.**

Covers the British Romantic period (roughly 1789-1837), with special attention to the relationship between literature and culture. Genres may include lyric and epic poetry; novels and romances; essays and journals; science fiction and the Gothic. Topics may include nature and the imagination, science and industry, travel and empire, and revolutions in politics, culture, and the arts. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4332. THE VICTORIAN ERA. 3 Hours.**

Covers the literature of Britain from 1837 to 1901, a period shaped by the literary movements of Realism and Naturalism. Genres may include the novel, poetry, drama, scientific writing, or essays. Focuses on major themes or issues in social, ethical, and aesthetic thought, such as Darwinism, democracy, class conflict, and empire. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4333. LITERARY GENRES. 3 Hours.**

Examines one or more literary genres, such as the epistolary novel, the epic, the diary, or historical fiction. May be repeated for credit as course content changes. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).



**ENGL 4334. TOPICS IN BRITISH LITERATURE. 3 Hours.**

Concentrates on a topic, on a particular historical era, or on significant British authors. May address important themes, movements, regions, genres, or cross-cultural comparisons. Examples include country and city, the Bloomsbury Group, and Jane Austen. May be repeated for credit as course content changes. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4335. TOPICS IN NATIVE AMERICAN LITERATURES. 3 Hours.**

May focus on a period, women writers, film studies, transnational indigenous comparative studies, or a genre of written or oral literature. Topics may include the challenges of translation and mediation, as well as the identity politics of "Indian" authorship. May be repeated for credit as course content changes. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4336. TOPICS IN AMERICAN LITERATURE. 3 Hours.**

Concentrates on a topic, on a particular historical era, or on one to three significant American authors. May address important themes, movements, regions, genres, or cross-cultural comparisons. Examples include work and the workplace, the Beat Generation, and Henry James and Edith Wharton. May be repeated for credit as course content changes. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4337. TOPICS IN COMPARATIVE LITERATURE. 3 Hours.**

Concentrates on a topic, a genre, a particular historical era, a movement, or a group of significant authors in order to illuminate cross-cultural comparisons. May be repeated for credit as course content changes. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4338. TWENTIETH- AND TWENTY-FIRST-CENTURY BRITISH LITERATURE. 3 Hours.**

Covers the literature of Britain, and possibly the Republic of Ireland, from the turn of the twentieth century. Focuses on major figures, literary movements, and the social and political developments that continue to preoccupy writers, such as women's rights, class conflict, and postcolonialism. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4339. TOPICS IN AFRICAN-AMERICAN LITERATURE. 3 Hours.**

Concentrates on a topic or theme within the canon of African-American literature, such as a particular genre or era, significant authors, or a philosophical movement. Examples include the Harlem Renaissance, the Civil-Rights/Black-Power era, African-American autobiography, short fiction, and Afrofuturism. Offered as AAST 4339 and ENGL 4339; credit will be granted in only one department. May be repeated for credit as course content changes. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4340. TOPICS IN WOMEN'S WRITING. 3 Hours.**

Focuses on women's writing in a particular genre or historical period or on a concept or issue of importance to women writers. May be repeated for credit as course content changes. Offered as ENGL 4340 and GWSS 4340; credit will be granted in only one department. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4341. RHETORIC AND COMPOSITION: HISTORY, THEORY, AND PRACTICE I. 3 Hours.**

Surveys the history of rhetorical theory and practice from their earliest formulations in Greek and Roman antiquity to the early modern period. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4342. RHETORIC AND COMPOSITION: HISTORY, THEORY AND PRACTICE II. 3 Hours.**

Surveys the history of rhetorical theory and practice from the early modern period to the present. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4343. TOPICS IN SOUND STUDIES. 3 Hours.**

Investigates culture and the environment through sound. Topics may include histories and ethnographies of listening, studies of built and natural soundscapes, machine listening, sound media, sound art, and the nature of listening. Prerequisite: English majors must have earned a C or better in ENGL 3350 or must be concurrently enrolled in ENGL 3350. Non-majors must have earned a C or better in ENGL 1301 and ENGL 1302.

**ENGL 4344. TOPICS IN ENGLISH LANGUAGE STUDY. 3 Hours.**

Examines texts primarily for their use of language or their engagement with linguistic issues. May include such topics as Old English, the emergence of the vernacular, literature and dialect, global English, or slang. May be repeated for credit when course content changes. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4345. TOPICS IN CRITICAL THEORY. 3 Hours.**

May include the study of major figures (e.g., Agamben, Barthes, Derrida, Foucault, Heidegger, Levinas, Said, Spivak) or topics (e.g., aesthetics, digital technology, disability studies, feminist views of science, film theory). May be repeated for credit as course content changes. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4346. TOPICS IN THEORIES OF LANGUAGE AND DISCOURSE. 3 Hours.**

May include the study of a major theorist or a broader survey of related theories (e.g., discourse analysis; evolutionary theories of language and mind; integrational linguistics; speech-act theory) that investigate "language-in-general" and/or "language-in-use" and that question the limitations of these terms. May be repeated for credit as course content changes. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4350. TOPICS IN FILM AND LITERATURE. 3 Hours.**

Studies film and the methods for comparing films to literary or other texts, considering them in relation to history, critical theory, and culture. May include such topics as ecohorror, adaptations of Shakespeare and/or Austen, or Native American cinema. May be repeated for credit as course content changes. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4351. THE BUSINESS OF WRITING. 3 Hours.**

Prepares students for the professional and practical aspects of being a creative writer, such as submitting work for publication, organizing and conducting public readings, and developing effective daily writing practices. Students must already have a preliminary portfolio of prose (a minimum of 30 pages) or poetry (a minimum of 15 pages) ready to be intensively workshopped and edited in small peer groups, culminating in the production of a polished final collection. Prerequisite: C or above in ENGL 3375 and in 6 hours of advanced creative writing (ENGL 4330, ENGL 4347, ENGL 4348, ENGL 4349, ENGL 4352) or permission of the Coordinator of Creative Writing.

**ENGL 4352. ADVANCED CREATIVE WRITING: SCREENWRITING. 3 Hours.**

Focuses on the format, styles, structures, and syntax of writing narrative film for television, online, and theatrical platforms. Students will study screenplays, analyze films, and learn about the conventions of various narrative film genres as well as principles for film adaptations. Students will complete one or more original screenplays, including at least one feature-length screenplay, as well as other assignments. Offered as ART 4378; credit will be granted in only one department. Prerequisite: C or better in ENGL 1301.

**ENGL 4353. STRUCTURING YOUR NOVEL. 3 Hours.**

Focuses on the structuring of a novel. Students will study various approaches to long-length storytelling, complete a detailed outline for a novel structured in three acts, and workshop drafted chapters. Prerequisite: C or better in ENGL 3375.

**ENGL 4355. LITERARY CRITICISM AND THEORY I. 3 Hours.**

Examines classics of literary criticism from Greek antiquity through the nineteenth century, focusing on the nature, function, and history of criticism. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4356. LITERARY CRITICISM AND THEORY II. 3 Hours.**

Examines twentieth-century and contemporary methodologies, such as New Criticism; formalism; structuralism; poststructuralism; hermeneutics; semiotics; reader response; psychoanalysis; Marxism; theories of gender, sexuality, and race; and cultural studies. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4365. CHILDREN'S LITERATURE. 3 Hours.**

Examines literature for children, with attention to theoretical perspectives and cultural contexts. May present a history of the genre or focus on specific issues, such as gender, social class, disability, or the environment. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4366. YOUNG ADULT LITERATURE. 3 Hours.**

Examines literature for young adults, with attention to theoretical perspectives and cultural contexts. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4370. RHETORIC AND COMPOSITION FOR SECONDARY SCHOOL TEACHERS. 3 Hours.**

Surveys recent scholarship in rhetoric and composition as it applies to middle school and high school settings. Focuses on the development of reading and writing assignments, formative response to student writing, and assessment of student writing. Prerequisite: English majors must have earned a C or better in ENGL 3350. Non-majors must have earned a C or better in 6 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329) or an A in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4371. ADVANCED ARGUMENTATION. 3 Hours.**

Examines classical and contemporary theories of argumentation and applies them to academic and nonacademic writing. Assignments focus on the analysis and production of argumentative discourse in various forms (e.g., academic essays, advertising, editorials, political speeches, etc.). Prerequisite: C or better in ENGL 1301 and ENGL 1302.

**ENGL 4372. PROFESSIONAL PRACTICE IN TECHNICAL COMMUNICATION. 3 Hours.**

Covers the professional practices of technical and professional writers and designers, as informed by histories, theories, and methods of the field. Addresses historical and current trends in technical communication, including communicating for transnational audiences, writing for social justice, and multimodal design. Includes professionalization for careers in the field of professional and technical communication. Assignments may include a professional portfolio, a professional development plan, or a case study of an historical or current issue relevant to the field. Prerequisite: C or better in ENGL 2338 or concurrent enrollment in ENGL 2338.

**ENGL 4373. SOCIAL MEDIA TEAM. 3 Hours.**

A writing-intensive experiential learning course in which students work in teams with English's Coordinator of Social Media to create content for the department's social media platforms and the online professional portfolios they will develop during the course. Includes Maverick Advantage distinguishing activities and requires active participation and weekly reflection. Experience with social media or graphic design is not required. Prerequisite: English majors: C or better in ENGL 3350. Non-majors: C or better in ENGL 1301 and ENGL 1302 and 60 hours toward their degree.

**ENGL 4374. GAME STUDIES. 3 Hours.**

A survey of approaches to the study of games, such as ludology, formalism, ethnography, intersectionality, materialism, ecocriticism, and posthumanism. Students will play and analyze a range of analog and digital games. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4375. TOPICS IN DIGITAL STUDIES. 3 Hours.**

Advanced, theoretical work in digital studies in areas such as data analytics, social networking, videogame studies, or sound studies. May be repeated for credit when course content changes. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4376. DESIGNING TECHNICAL DOCUMENTS. 3 Hours.**

Builds on the topics of designing and creating effective technical documents as taught in Technical Writing (ENGL 2338). Covers foundations of user centered design, including both single and multipage design, using professional design software (e.g. Adobe InDesign, Photoshop), typography, color theory, basic information architecture (IA), and user experience (UX). Assignments could include identifying successful design elements in sample texts, selecting appropriate colors and typefaces to enhance document content and message, producing a single and multi-page redesign, editing raster graphics in an ethical manner, editing vector graphics for publication, and producing a professional portfolio. Prerequisite: C or better in ENGL 2338 or concurrent enrollment in ENGL 2338.

**ENGL 4377. TOPICS IN SCIENCE AND TECHNOLOGY. 3 Hours.**

Explores issues in the rhetorical, cultural, and aesthetic dimensions of science and technology. May include such topics as the medical humanities, speculative fiction, or theories of cultural spaces. May be repeated for credit as course content changes. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4385. MODERNISM. 3 Hours.**

Covers major works of the early and mid-twentieth century in Europe and/or the Americas that belong to the movement known as Modernism. May also include the study of Freud and literature, Impressionism, Surrealism, and Existentialism. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4387. CONTEMPORARY LITERATURE. 3 Hours.**

Examines contemporary literary movements and forms such as postmodernism, magical realism, dystopian fiction, and the graphic novel. Works may be from a single national tradition or several. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4388. MAJOR AUTHORS. 3 Hours.**

In-depth study of the works of one or two authors who had an enduring impact on literary history. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4389. PROFESSIONAL PROJECTS IN ENGLISH STUDIES. 3 Hours.**

Provides experiential learning opportunities to apply academic skills learned in English classes through semester-long team projects that culminate in products for publication, circulation, or other kinds of use beyond the course. Emphasizes career development, teamwork, and leadership; uses reflection to connect experiences to learning and professionalization; and generates content students can include in portfolios or on platforms like LinkedIn. May include such topics/projects as creating a YouTube channel for the Department of English, editing and publishing a journal or collection, or creating and running a conference. May be repeated for credit as course content changes. Prerequisite: English majors: C or better in ENGL 3350. Non-majors: C or better in ENGL 1301 and ENGL 1302 and 60 hours toward their degree.

**ENGL 4390. INTERNSHIP IN ENGLISH. 3 Hours.**

Provides an opportunity to apply academic skills learned in English classes to practical situations by working in a business, government, or non-profit organization in a role related to the discipline. May be repeated once for credit if internship duties change. Prerequisite: English majors: C or better in ENGL 3350; C or better in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362); and permission of instructor. Non-majors: C or better in ENGL 1301 and ENGL 1302, 60 hours toward their degree, and permission of instructor.

**ENGL 4391. ENGLISH CONFERENCE COURSE. 3 Hours.**

An independent study of a topic not otherwise available. Requires permission of the department chair and the instructor. May be repeated once for credit as long as the topics differ. Prerequisites: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**ENGL 4394. HONORS THESIS/SENIOR PROJECT. 3 Hours.**

Required of all students in the University Honors College. During the senior year, the student must complete a thesis or project of equivalent difficulty under the direction of a faculty member in the major department.

**ENGL 4399. SENIOR SEMINAR. 3 Hours.**

Capstone course for English majors. A writing-intensive, seminar-style, in-depth study of a topic. Content may consist of a figure or figures, a period, a literary movement, a theme, or a critical theory. Offerings have included "Data Storytelling and African American Literature," "Diversity on Big and Small Screens," "Early Modern Manuscripts and the Archive," "Ecogothic and Environmental Apocalypse," "Existentialism," and "Rhetoric and the Future." Prerequisite: C or better in ENGL 3350; C or better in two literature survey courses (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362); and completion of 18 hours of required 3000-4000 level English courses.

**ENGL 5191. INDEPENDENT STUDY. 1 Hour.**

Supervised independent study at the M.A. or Ph.D. level.

**ENGL 5300. THE PROFESSION OF ENGLISH STUDIES. 3 Hours.**

Core graduate course, introduction to graduate study in English. Covers major issues and debates within the field of English Studies, including an introduction to graduate-level research and writing methods and to professional development for diverse career paths. Enrollment requires the approval of the Graduate Advisor in English.

**ENGL 5301. MEDIEVAL ENGLISH LITERATURE. 3 Hours.**

English literature of the period before 1500. May include Old English poetry, Anglo-Latin prose, William Langland, the alliterative revival, romances, Malory, and Chaucer.

**ENGL 5302. 16TH CENTURY BRITISH LITERATURE. 3 Hours.**

Non-dramatic literature of the 16th century, including works by Thomas More, Sir Philip Sidney, Sir Walter Raleigh, John Skelton, Edmund Spenser, and Elizabeth I.

**ENGL 5303. 17TH CENTURY ENGLISH LITERATURE. 3 Hours.**

Poetry and prose of the 17th Century. May include a study of Milton and/or a study of writers and motifs of the period.

**ENGL 5304. RESTORATION AND 18TH CENTURY BRITISH LITERATURE. 3 Hours.**

Drama, poetry, fiction, and essays from 1660 to 1798. Includes writers such as John Dryden, Aphra Behn, Alexander Pope, Samuel Johnson, Henry Mackenzie, Ignatio Sancho, and Maria Edgeworth, as well as issues of the period such as the nature of reason.

**ENGL 5305. ROMANTIC BRITISH LITERATURE. 3 Hours.**

Poetry and fiction from 1798 to 1837. Includes writers such as William and Dorothy Wordsworth, Mary and Percy Shelley, Felicia Hemans, and Walter Scott, as well as issues such as the meaning of nature.

**ENGL 5306. VICTORIAN ENGLISH LITERATURE. 3 Hours.**

Concepts and problems in texts by Victorian novelists, poets, and essayists (writers will vary). Attention to historical and cultural as well as literary issues.

**ENGL 5307. 19TH CENTURY BRITISH LITERATURE AND CULTURE. 3 Hours.**

An overview of the writings and culture of the long 19th century in Britain from 1798 to 1914. Makes connections between Romantic and Victorian periods, covers literary and other relations with the empire, and includes significant non-literary figures such as Darwin and Freud.

**ENGL 5308. STUDIES IN SHAKESPEARE. 3 Hours.**

Representative works of Shakespeare and contemporary Shakespeare criticism. May vary from comprehensive readings in the dramatic literature to intensive examination of certain plays, or to other related topics and plays of the period.

**ENGL 5310. INTRODUCTION TO CRITICAL THEORY. 3 Hours.**

Core graduate course, introduction to critical theory. Covers a wide range of theoretical approaches to prepare students for graduate-level work in English Studies.

**ENGL 5311. FOUNDATIONS OF RHETORIC AND COMPOSITION. 3 Hours.**

An intellectual and institutional history of rhetoric and composition studies. Special attention will be given to the history and ethics of writing instruction; the importation of classical rhetoric into contemporary composition classrooms; the institutional formation of the field and its ambiguous status in the academy; and the major contemporary pedagogical approaches (e.g., expressivism, cognitivism, social constructionism). May also address recent topics that have attracted the attention of the field (e.g., dialogism, institutional critique, plagiarism, post-process theory, service learning, writing across and beyond the curriculum).

**ENGL 5313. 20TH CENTURY BRITISH LITERATURE. 3 Hours.**

A study of English and Irish writing in the 20th Century; may focus on major authors, themes, or topics.

**ENGL 5315. LITERATURE AND RELIGION. 3 Hours.**

Explores the role of religion in literature, including the representation of religion in literature and the study of religious texts as literature. May focus on a single faith tradition such as Christianity or Judaism, or may present a comparative analysis of more than one faith tradition in literature. Various historical periods and literary traditions may be covered.

**ENGL 5320. EARLY AMERICAN LITERATURE. 3 Hours.**

Explores significant authors, texts, and movements within literary, historical, and cultural contexts. Writers examined may include established figures as well as noncanonical authors, and a range of topics and genres, such as Native American and comparative Indigenous literatures, Puritan writing, captivity narratives, early national literature, the rise of the novel, and autobiographical narrative.

**ENGL 5322. 19TH CENTURY AMERICAN LITERATURE. 3 Hours.**

Considers significant authors, texts, and movements within literary, historical, and cultural contexts. Writers examined may include established figures as well as noncanonical authors, and a range of topics and genres, such as the domestic novel, nineteenth-century American poetry, the American Renaissance, slave narratives, realism, and naturalism.

**ENGL 5323. 20TH CENTURY AMERICAN LITERATURE. 3 Hours.**

Explores significant authors, texts, and movements within literary, historical, and cultural contexts. Writers examined may include established figures as well as noncanonical authors, and a range of topics and genres, such as modern American poetry and fiction, the Harlem Renaissance, regionalism, the Beats, and post-war fiction.

**ENGL 5324. TOPICS IN AMERICAN LITERARY GENRES. 3 Hours.**

Concentrates on a significant genre within American literary history. Genres examined may include, but are not limited to, poetry, fiction, autobiography, oral narratives, and American Gothic literature. May be repeated when content changes.

**ENGL 5326. TOPICS IN AMERICAN LITERATURE BEFORE 1900. 3 Hours.**

May focus on one to three writers such as Whitman and Dickinson, or Douglass, Stowe, and Melville, or a significant topic such as realism, African American literature, gender and sexuality, American literature and the environment, sentimental fiction, or women's writing. May be repeated when content changes.

**ENGL 5327. TOPICS IN AMERICAN LITERATURE AFTER 1900. 3 Hours.**

May focus on one to three writers such as Wharton, Faulkner, or Morrison, or a significant topic such as modernism and postmodernism, Mexican American literature, multicultural narrative, or feminist theory/feminist fiction. May be repeated when content changes.

**ENGL 5328. TOPICS IN LATINO/A LITERATURE. 3 Hours.**

Considers literature of the United States by and about people with heritage from South America, Central America, the Caribbean, and Mexico. Texts may include novels, poetry, drama, short fiction, and non-fiction and may be composed from the colonial period to the present. Analysis may emphasize representations of migration, translation, racialization, or cultural, ethnic, social, or spatial belonging.

**ENGL 5330. TOPICS IN CRITICISM. 3 Hours.**

Studies in critical topics such as textual criticism, psychoanalytic criticism, philosophy and criticism, Renaissance poetics and literature, critical movements, or focus on a major theorist in criticism. May be repeated when content changes.

**ENGL 5331. TOPICS IN LANGUAGE OR DISCOURSE STUDIES. 3 Hours.**

Concentration on historical and theoretical approaches to the study of language and the specific discursive practices of its users. May be repeated for credit when content changes.

**ENGL 5333. TOPICS IN TECHNICAL AND PROFESSIONAL COMMUNICATION. 3 Hours.**

Focused study of technical and professional communication theories and practices that are relevant to corporate, government, academic, or other specific contexts (e.g., healthcare, engineering, or software development). Course may focus on specific technical and professional documents (e.g., software documentation), TPC research methods and designs (e.g., usability and user experience), or movements within the scholarship and practice of the field (e.g., social justice in technical and professional communication). May be repeated when course content changes.



**ENGL 5337. SEMINAR IN TEACHING LITERATURE. 3 Hours.**

Study of recent scholarship in English Studies and other disciplines pertaining to the teaching of literature. Comparative analysis of methods and objectives for the teaching of literature. Course will include a practicum component in which students observe the teaching of experienced faculty, teach particular texts, design syllabi and write statements of teaching philosophy. The course is intended to prepare graduate students to teach literature courses at the university, college or community college level, and to provide a range of pedagogical models to enhance the skills of secondary school teachers.

**ENGL 5340. CRITICAL THEORY: THE MAJOR TRADITIONAL TEXTS. 3 Hours.**

A study of literary and cultural theory and practice from the Greco-Roman period to the early 20th Century. May include such theorists as Plato, Aristotle, Horace, Longinus, Dante, Sidney, B. Jonson, Dryden, Pope, Johnson, Coleridge, Arnold, Richards, Eliot, and others.

**ENGL 5350. HISTORY OF RHETORIC I: CLASSICAL RHETORIC. 3 Hours.**

A study of the theory and practice of Greco-Roman rhetoric from its pre-Socratic origins to the Second Sophistic. Attention will be given to major theorists, such as Gorgias, Protagoras, Plato, Aristotle, Isocrates, Hermagoras, Hermogenes, Cicero, Quintilian and the transitional figure of St. Augustine.

**ENGL 5351. HISTORY OF RHETORIC II: MEDIEVAL AND RENAISSANCE RHETORIC. 3 Hours.**

A study of the theory and practice of western rhetoric from the early medieval period through the Renaissance. Attention will be given to major theorists, such as St. Augustine, Geoffrey of Vinsauf, Robert of Basevorn, Christine de Pizan, Desiderius Erasmus, Baldesar Castiglione, Juan Luis Vives, Sir Philip Sidney, Peter Ramus and Francis Bacon.

**ENGL 5352. HISTORY OF RHETORIC III: MODERN AND CONTEMPORARY RHETORIC. 3 Hours.**

A study of the theory and practice of western rhetoric from the 18th century to the present. Attention will be given to major theorists, such as Whatley, Blair, Bain, Campbell, Spencer, Richards, Burke, Weaver, Toulmin, Perelman, Bitzer, Vatz, Harriman, Leff, Farrell, McGee, Gaonkar, Kinneavy, Scott, Crosswhite, Meyer, Gross, Miller, Fuller and Kent.

**ENGL 5353. RHETORIC AND SOUND. 3 Hours.**

An introduction to rhetorical engagement with recorded sound. Includes critical engagement with sound recordings (sonic data and archives, podcasting, field recording, etc.), work with digital audio tools for writing with sound, as well as studies in the interdisciplinary field of sound studies. May also consider work in areas that include histories and ethnographies of listening, studies of built and natural soundscapes, sound media, sound art, and the nature of listening.

**ENGL 5355. STUDIES IN ENGLISH DISCOURSE. 3 Hours.**

Analysis of English grammatical structures above the level of the clause, including the sentence, the paragraph, and the whole text; examination of the work of major discourse theorists Dik, Harris, Halliday, Longacre, Pike and van Dijk.

**ENGL 5356. COMPOSING PROCESSES. 3 Hours.**

Study of research about writing processes and examination of the available methods of conducting research; special attention given to major researchers and theorists.

**ENGL 5357. READING PROCESSES. 3 Hours.**

Contemporary theories of interpretation and empirical research into reading processes; special attention given to major researchers and theorists.

**ENGL 5358. WRITING ASSESSMENT, EVALUATION, AND RESPONSE. 3 Hours.**

Study of the methods and ethics of assessing, evaluating, and responding to the writing of students individually or collectively.

**ENGL 5359. ARGUMENTATION THEORY. 3 Hours.**

Emphasis on theories of argumentation and persuasion that further the rhetorical aims of convincing or achieving agreement through identification and consensus. Attention to classical and contemporary approaches to issue analysis, invention, audience analysis, building common ground, stasis theory, types of proofs and tests of validity, organizational strategies, and style. Special attention to argument on the Internet. Assignments may include constructing Web sites related to argument. Study of such theorists as Aristotle, Perelman, Toulmin, Ong, K. Burke, Brockriede and Ehninger, Bitzer, Young, Becker and Pike, and others.

**ENGL 5360. CONTEMPORARY CRITICAL THEORY. 3 Hours.**

Study of contemporary theories of interpretation, concentrating on one or more schools of critical and cultural theory may include, New Criticism, the Neo-Aristotelians, Marxist Critical Theory, Hermeneutics, psychoanalysis, Russian Formalism, semiotics, speech-act theory, phenomenology, structuralism, and post-structuralism. May be repeated when content changes.

**ENGL 5361. TOPICS IN MEDIA STUDIES. 3 Hours.**

Interdisciplinary examination of media representations and technologies that addresses the impact and affordances of emergent media technologies. Topics may include AI, digital media production, game studies, data mining, publics and counter-publics, race and technology, social media, and broadcast or electronic media.

**ENGL 5365. JUVENILE LITERATURE. 3 Hours.**

Examines the current state of the academic field of juvenile literature, which may be through attention to recent article-and book-length scholarship in the field and/or study of primary sources. Provides the opportunity to use the newest critical approaches to generate original scholarship on important works of juvenile literature, whether new or long-established.

**ENGL 5370. WRITING FOR PUBLICATION IN THE HUMANITIES. 3 Hours.**

Prepares students to transform academic writing in a variety of humanities fields into publishable scholarship. Covers the research, writing, revision, and proposal/submission skills necessary for scholarly publications. May also address adapting scholarly projects for general audiences or other media formats.

**ENGL 5380. TEXTUAL THEORIES OF CULTURE. 3 Hours.**

Study of the interpretations of culture yielded by the traditions of semiotics and hermeneutics and cultural studies may include works by the following: Lyotard, Foucault, Habermas, Derrida, Pierce, Barthes, Deleuze, Gadamer, Levi-Strauss, Butler, Haraway, and Hall.

**ENGL 5388. GTA PREPARATION. 3 Hours.****ENGL 5389. TOPICS IN TEACHING COMPOSITION. 3 Hours.**

Seminar for investigating problems of and approaches to teaching composition. Special attention given to current compositional theorists. May be repeated when content changes.

**ENGL 5390. INTERNSHIP IN ENGLISH STUDIES. 3 Hours.**

Provides an opportunity to apply academic skills learned in the English graduate program to practical situations by working in a business, governmental entity, or non-profit organization in a role related to the discipline. Prerequisite: MA students: At least 18 hours towards degree and permission of instructor. PhD students: At least 27 hours towards degree and permission of instructor.

**ENGL 5391. INDEPENDENT STUDY. 3 Hours.**

Supervised independent study at the M.A. or Ph.D. level.

**ENGL 5398. THESIS. 3 Hours.**

The graduate student must be registered for this course (a) when in consultation over the thesis with the supervisory committee, and (b) in the semester or term in which the Master of Arts degree will be conferred.

**ENGL 5698. THESIS. 6 Hours.**

The graduate student must be registered for this course (a) when in consultation over the thesis with the supervisory committee, and (b) in the semester or term in which the Master of Arts degree will be conferred.

**ENGL 5998. THESIS. 9 Hours.**

The graduate student must be registered for this course (a) when in consultation over the thesis with the supervisory committee, and (b) in the semester or term in which the Master of Arts degree will be conferred.

**ENGL 6191. INDEPENDENT STUDY. 1 Hour.**

Independent study at the M.A. or Ph.D. level. May be repeated as needed. Prerequisite: permission of instructor.

**ENGL 6329. TOPICS AND THEMES IN COMPARATIVE LITERATURE. 3 Hours.**

The study of a theme or topic, such as primitivism, utopianism, representations of the unconscious, or the quest, within different literary traditions. May be repeated as content changes.

**ENGL 6330. GENRE STUDIES IN BRITISH LITERATURE. 3 Hours.**

Intensive study of a genre in any period(s) of British Literature; may focus on autobiography, history of the novel, Restoration and eighteenth-century drama, nineteenth-century British fiction, or other. May be repeated when course content changes.

**ENGL 6333. GENRES IN COMPARATIVE LITERATURE. 3 Hours.**

Theory of literary forms or types and the conventions they embody. May focus on the epic, the novel, lyric poetry, autobiography, drama, or magical realism, across different literary traditions. May be repeated as course content changes.

**ENGL 6335. TOPICS IN ENGLISH LITERATURE. 3 Hours.**

Focus on writers or issues in literature written in English, including colonial and postcolonial literatures. May include poetry, drama, fiction, or non-fiction. May be repeated when content changes.

**ENGL 6339. TOPICS IN AMERICAN LITERATURE. 3 Hours.**

Topics not bound by particular historical periods, for example, women's writing, canon formation, Native American and comparative Indigenous literatures, African American literature, Latina/o literature, utopian literature, science fiction, popular literature and culture, and queer literature. May be repeated when content changes.

**ENGL 6340. METACRITICAL THEORY. 3 Hours.**

A study of theories of literature from the point of view of their systems-theoretical character. Focuses on the writing of selected metatheorists such as Barbour, Braithwaite, Bruss, Harr, Lakatos, Popper, Rescher, and others, on questions of the genesis, nature, function, validity, and potential of literary theory. May be repeated for credit as course content changes.

**ENGL 6350. TOPICS IN THE HISTORY AND THEORY OF RHETORIC. 3 Hours.**

An intensive study of specific problems or issues in classical, medieval, Renaissance, modern, or contemporary rhetoric, (e.g., civic functions of rhetoric, logic and rhetoric, rhetoric of science, theories of invention), especially those that involve the connections and collisions between rhetoric and other intellectual traditions (e.g., critical theory, cultural studies, feminist theory, history, literary studies, non-western rhetoric, philosophy). May focus on the work of a major theorist. May be repeated for credit when content changes.

**ENGL 6351. TOPICS IN COMPOSITION STUDIES. 3 Hours.**

An intensive study of specific problems or issues in contemporary composition studies (e.g., authorship and intellectual property, computers and composition, the ideologies of writing instruction, the role of empirical research, service learning), especially those that involve connections and collisions between composition studies and other intellectual traditions (e.g., cognitive science, critical theory, cultural studies, feminist theory, hermeneutics, history, linguistics, literary study, rhetoric, philosophy, psychology, sociology). May focus on the work of a major researcher or theorist. May be repeated for credit when content changes.

**ENGL 6360. TOPICS IN FEMINIST THEORY. 3 Hours.**

Study of interdisciplinary feminist theories of language, power, knowledge, culture, identity, gender, and sexuality. Course may focus on Marxist feminism, postmodern/poststructuralist feminism, feminist cultural studies, postcolonial feminism, material feminisms, feminist science studies, queer theory, or other topics. Course may include such theorists as Wollstonecraft, Woolf, Beauvoir, Irigaray, Spillers, Spivak, Anzaldúa, Bordo, Haraway, Butler, Grosz, Sedgwick, Wynter, and Halberstam.

**ENGL 6361. TOPICS IN GENDER AND SEXUALITY STUDIES. 3 Hours.**

Interdisciplinary study of a particular problem or research area within gender and sexuality studies from the perspective humanities, social sciences, and/or natural sciences. Topics may include LGBTQIA studies, masculinity studies, disability studies, and/or race and ethnicity studies.

**ENGL 6362. CHICANA LITERATURE AND PRAXIS. 3 Hours.**

Study of the fiction, drama, poetry, creative non-fiction, and scholarship of Mexican American women writers from the 19th to the 21st century with an emphasis on the interrelationship of Chicana feminist theory with praxis and literary form.

**ENGL 6370. TOPICS IN LITERATURE AND THE ENVIRONMENT. 3 Hours.**

Introduces interdisciplinary theories and methods of the environmental humanities while investigating how literature, film, and other cultural texts, media, and practices represent and engage with the natural world. Topics may include animal studies, plant studies, food studies, environmental science studies, science fiction, environmental justice, post-humanism, extinction, climate change, and the anthropocene. May be repeated for credit when course content changes.

**ENGL 6371. TOPICS IN RACE, GENDER, AND POPULAR CULTURE. 3 Hours.**

Critically examines popular culture texts and the messages and knowledge that popular culture employs, disseminates, and constructs about race and gender. Focuses on primary texts from popular or mass culture productions, such as advertising, television, music videos, popular music, and film, as well as on scholarly analysis of popular culture.

**ENGL 6375. TOPICS IN CREATIVE WRITING. 3 Hours.**

A workshop course in creative writing focusing on the study of craft, the works of published writers, and the production of original creative works. In addition, the course will cover pedagogical and professional concerns. The course may focus on a single genre, such as poetry, fiction, creative nonfiction or drama, or may be taught as a multi-genre course. May be repeated as content changes.

**ENGL 6389. TECHNICAL WRITING ACROSS THE DISCIPLINES. 3 Hours.**

Offers an integrated-language approach to technical writing across the disciplines designed to improve critical reading, writing, and thinking skills. Provides ESL-integrated feedback for writing projects. Focuses on writing research or grant proposals, but may also include writing abstracts, summaries, reports, and/or literature reviews. ENGL 6389 cannot be counted toward completing the requirements of any graduate degree plan in English.

**ENGL 6391. GRADUATE READINGS. 3 Hours.**

Supervised reading for the Ph.D. exam.

**ENGL 6399. DISSERTATION. 3 Hours.**

The graduate student must be registered for this course (a) when in consultation over the dissertation with the supervisory committee, and (b) in the semester or term in which the Ph.D. will be conferred. A minimum of 9 hours of dissertation credit is required for the Ph.D. Graduate teaching assistants must take ENGL 6699. ENGL 6999 must be taken during the final semester of the Ph.D.

**ENGL 6691. GRADUATE READINGS. 6 Hours.**

Independent Reading for the Comprehensive Exam.

**ENGL 6699. DISSERTATION. 6 Hours.**

The graduate student must be registered for this course (a) when in consultation over the dissertation with the supervisory committee, and (b) in the semester or term in which the Ph.D. will be conferred. A minimum of 9 hours of dissertation credit is required for the Ph.D. Graduate teaching assistants must take ENGL 6699. ENGL 6999 must be taken during the final semester of the Ph.D.

**ENGL 6991. GRADUATE READINGS. 9 Hours.**

Independent Reading for the Comprehensive Examination.

**ENGL 6999. DISSERTATION. 9 Hours.**

The graduate student must be registered for this course (a) when in consultation over the dissertation with the supervisory committee, and (b) in the semester or term in which the Ph.D. will be conferred. A minimum of 9 hours of dissertation credit is required for the Ph.D. Graduate teaching assistants must take ENGL 6699. ENGL 6999 must be taken during the final semester of the Ph.D.

**ENGL 7399. DOCTORAL DEGREE COMPLETION. 3 Hours.**

This course may be taken during the semester in which a student expects to complete all requirements for the doctoral degree and graduate. Enrolling in this course meets minimum enrollment requirements for graduation, for holding fellowships awarded by The Office of Graduate Studies and for full-time GTA or GRA positions. Students should verify that enrollment in this course meets other applicable enrollment requirements. To remain eligible in their final semester of study for grants, loans or other forms of financial aid administered by the Financial Aid Office must enroll in a minimum of 5 hours as required by the Office of Financial Aid. Other funding sources may also require more than 3-hours of enrollment. Additional hours may also be required to meet to requirements set by immigration law or by the policies of the student's degree program. Students should contact the Financial Aid Office, other sources of funding, Office of International Education and/or their graduate advisor to verify enrollment requirements before registering for this course. This course may only be taken twice. Students who do not complete all graduation requirements while enrolled in this course must enroll in a minimum of 6 dissertation hours (6699 or 6999) in their graduation term. Graded P/F/R.

**COURSES****ENGR 0251. PROBLEM SOLVING IN ENGINEERING PRACTICUM. 2 Hours.**

Supplementary material to ENGR 1251, and student success activities, including Peer-Led Team Learning. Corequisite: ENGR 1251.

**ENGR 1099. UNDERGRADUATE INDEPENDENT STUDY. 0 Hours.**

Independent study related to Engineering.

**ENGR 1101. ENTRANCE TO ENGINEERING FOR TRANSFER STUDENTS. 1 Hour.**

Entrance to Engineering for Transfer Students welcomes transfer students to the College of Engineering. Topics include engineering student life, fields of study, ethics, design, and preparing for a successful career.

**ENGR 1191. UNDERGRADUATE SPECIAL TOPICS IN ENGINEERING. 1 Hour.**

Topics in the field of engineering. Topic may vary from semester to semester. May be repeated for credit when topic changes. Departmental approval required in advance to use for degree credit. Prerequisite: consent of instructor.

**ENGR 1199. ENGINEERING PROBLEM SOLVING BRIDGE. 1 Hour.**

Expanding on prior knowledge of engineering topics, this course enhances problem solving skills in preparation for subsequent engineering courses. Prerequisite: permission of instructor.

**ENGR 1204. ENGINEERING FIRST YEAR SEMINAR. 2 Hours.**

Introduction to basic engineering concepts, engineering and its many subfields, ethical responsibilities, creativity and design. Self-management and academic skills necessary for academic and professional success.

**ENGR 1250. PROBLEM SOLVING IN ENGINEERING. 2 Hours.**

Broad introduction to engineering through the process of applying the principles of mathematics to solve real-life engineering problems. Math topics are presented within the context of engineering applications and reinforced through examples from engineering courses. Also introduces algorithm development through the use of the engineering analysis software MATLAB. Prerequisite: C or better in MATH 1426 (or concurrent enrollment), or C or better in (or concurrent enrollment in) a subsequent mathematics course (MATH 2425, MATH 2326, MATH 3319, HONR-SC 1426, HONR-SC 2425), or a qualifying score on the Math Placement Test (MPT).

**ENGR 1251. PROBLEM SOLVING IN ENGINEERING FOR PRECALCULUS STUDENTS. 2 Hours.**

Broad introduction to engineering through the process of applying the principles of mathematics to solve real-life engineering problems. Math topics are presented within the context of engineering applications and reinforced through examples from engineering courses. Also introduces algorithm development through the use of the engineering analysis software MATLAB. Available only to students taking Math 1421 (Preparation for Calculus) in the same semester. Additional student success activities will be required. Corequisite: ENGR 0251, and concurrent enrollment in Math 1421.

**ENGR 1291. UNDERGRADUATE SPECIAL TOPICS IN ENGINEERING. 2 Hours.**

Topics in the field of engineering. Topic may vary from semester to semester. May be repeated for credit when topic changes. Departmental approval required in advance to use for degree credit. Prerequisite: consent of instructor.

**ENGR 1300. ENGINEERING PROBLEM SOLVING. 3 Hours.**

Broad introduction to the profession of engineering and its different disciplines, through the process of applying the principles of mathematics to solve real-life engineering problems and technical writing assignments. Math topics are presented within the context of engineering applications and reinforced through examples from engineering courses. Also introduces algorithm development through the use of the engineering analysis software MATLAB. Prerequisite: C or better in MATH 1421 (or concurrent enrollment), or C or better in (or concurrent enrollment in) a subsequent mathematics course (Math 1426, Math 2425, Math 2326, Math 3319, HONR-SC 1426, HONR-SC 2425), or a qualifying score on the Math Placement Test (MPT).

**ENGR 1391. UNDERGRADUATE SPECIAL TOPICS IN ENGINEERING. 3 Hours.**

Topics in the field of engineering. Topic may vary from semester to semester. May be repeated for credit when topic changes. Departmental approval required in advance to use for degree credit. Prerequisite: consent of instructor.

**ENGR 2100. SUPERVISED ENGINEERING WORK EXPERIENCE. 1 Hour.**

Course is for cooperative education students in engineering to be taken in the semester or summer they are employed. Each student will prepare a technical report based upon their work experience. Students who complete the cooperative program will receive certificates and this will be entered on their transcript. Prerequisite: acceptance into and continuance in the Engineering Cooperative Education Program.

**ENGR 3000. SUPERVISED ENGINEERING WORK EXPERIENCE. 0 Hours.**

Course is for cooperative education students in engineering to be taken in the semester or summer they are employed. Each student will prepare a technical report based upon their work experience. Students who complete the cooperative program will receive certificates and this will be entered on their transcript. Prerequisite: acceptance into and continuance in the Engineering Cooperative Education Program. May be repeated.

**ENGR 3100. SUPERVISED ENGINEERING WORK EXPERIENCE. 1 Hour.**

Course is for cooperative education students in engineering to be taken in the semester or summer they are employed. Each student will prepare a technical report based upon their work experience. Students who complete the cooperative program will receive certificates and this will be entered on their transcript. Prerequisite: acceptance into and continuance in the Engineering Cooperative Education Program.

**ENGR 4100. SUPERVISED ENGINEERING WORK EXPERIENCE. 1 Hour.**

Course is for cooperative education students in engineering to be taken in the semester or summer they are employed. Each student will prepare a technical report based upon their work experience. Students who complete the cooperative program will receive certificates and this will be entered on their transcript. Prerequisite: acceptance into and continuance in the Engineering Cooperative Education Program.

**ENGR 4302. ENGINEERING ENTREPRENEURSHIP. 3 Hours.**

Topics include special problems of newly formed firms, planning, start-up business considerations, business strategy, management basics, and business plan design. Students will engage in business and entrepreneurship training and discussion, become aware of basic business operations, and learn about inventions, intellectual property, and the patenting process. Other topics include assessment of possible markets, venture feasibility, teambuilding, and leadership. Opportunities in university environments will be discussed including incubation centers and patent licensing. We address legal issues, Small Business Innovation Research (SBIR) proposal design, SBIR funding from the National Science Foundation (NSF), National Institutes of Health (NIH), and others. Additional topics include the proposal review process, grant reporting, local high-tech business accelerators, angel-group funding, venture plans, and venture capital. Classes will feature lectures from engineering and business faculty as well as presentations by successful entrepreneurs. Course taught as EE 4302, ENGR 4302 and ENGR 5302; credit will be granted only once. Prerequisite: Student must be in an engineering professional program.

**ENGR 4395. SUSTAINABLE ENGINEERING DESIGN PROJECT. 3 Hours.**

Following the engineering design process, students will brainstorm, evaluate, and select among engineering alternatives. Students will evaluate the alternatives based on sustainability criteria, including environmental, economic, and social impacts. Life cycle assessment will be used to quantify environmental and economic impacts of the design alternatives. Students will use decision-making methods and optimization in selecting among alternatives. Prerequisites: ENGR 2300, IE 3315, ECON 2305 or IE 2308.

**ENGR 5302. ENGINEERING ENTREPRENEURSHIP. 3 Hours.**

Topics include special problems of newly formed firms, planning, start-up business considerations, business strategy, management basics, and business plan design. Students will engage in business and entrepreneurship training and discussion, become aware of basic business operations, and learn about inventions, intellectual property, and the patenting process. Other topics include assessment of possible markets, venture feasibility, teambuilding, and leadership. Opportunities in university environments will be discussed including incubation centers and patent licensing. We address legal issues, Small Business Innovation Research (SBIR) proposal design, SBIR funding from the National Science Foundation (NSF), National Institutes of Health (NIH), and others. Additional topics include the proposal review process, grant reporting, local high-tech business accelerators, angel-group funding, venture plans, and venture capital. Classes will feature lectures from engineering and business faculty as well as presentations by successful entrepreneurs.

## COURSES

**ENTR 3325. ENTREPRENEURSHIP: THE NEW VENTURE CREATION PROCESS. 3 Hours.**

This course provides an introduction to the principles of entrepreneurship. Topics include the role of the entrepreneur, self-analysis of entrepreneurship readiness, opportunity recognition, market research and product development activities, legal issues, sources of capital, budgeting, and cash flow. Upon completion, students should have an understanding of the entrepreneurial process and issues faced by entrepreneurs. Prerequisite: 60 credit hours.

**ENTR 4333. CREATIVITY, TECHNOLOGY, AND INNOVATION. 3 Hours.**

Waves of innovations are disrupting nearly every sphere of modern life. This course helps you understand and experience just how creative entrepreneurs in either start-up or corporate environments do it. Working with others, using cutting-edge case studies, experiential exercises, and field research, you will consider how innovations across a broad range of emerging technologies meet the market, financial, and environmental demands of a diverse set of current and future stakeholders. Prerequisite: 60 credit hours.

**ENTR 4334. DIGITAL ENTREPRENEURSHIP. 3 Hours.**

This course introduces students to technologies that an entrepreneur can leverage to support various business activities. Students will be exposed to digital business tools including cloud, mobile, social, data analytics, and software-driven services. Students will gain a conceptual foundation and practical knowledge on using different technical tools to support decision-making and business strategy in entrepreneurial ventures. Prerequisite: 60 hours.

**ENTR 4338. ENTREPRENEURIAL FINANCE. 3 Hours.**

This course prepares the student to effectively plan for, execute, and control the financial aspects of a new venture. Topics include analyzing financial and accounting information for cash flow management and assessing business performance, identifying and evaluating sources of capital for emerging and small businesses, and strategies for growing and harvesting firms. This course cannot serve as a FINA or ACCT elective. Prerequisite: ACCT 3309 and MANA 3325 or permission of the instructor.



**ENTR 4339. PITCHING THE ENTREPRENEURIAL IDEA. 3 Hours.**

The course is designed to assist students in developing high quality business ideas, plans and pitches. The course also seeks to provide students with the resources, not only to develop comprehensive, complete and concise business strategies, but to assist students in actually launching their new businesses. Students are expected to participate in the Maverick Entrepreneurship Program and Award (MavPitch) and to compete for a share of cash prizes when offered. Prerequisite: MANA 3325 or with permission of the instructor.

**ENTR 4345. SOCIAL ENTREPRENEURSHIP. 3 Hours.**

Social entrepreneurship has its roots in the broader field of entrepreneurship, but differs in the fact that social entrepreneurs have a primary goal of creating social impact rather than personal or shareholder wealth. This course is intended for students from any discipline who have an interest in making a difference in communities locally and throughout the world. The course will introduce entrepreneurial concepts including social enterprise, impact investing/SROI, social marketing/movements, behavioral economics, strategic CSR practices and legal formation. This course includes a self-directed project to address a societal problem using the disciplines taught in class. Prerequisite: 60 credit hours.

## COURSES

**ENVR 1101. SUCCESS IN EARTH AND ENVIRONMENTAL SCIENCES. 1 Hour.**

A first-year experience course for new students and new transfer students interested in a career in Earth and Environmental Sciences. Provides the necessary foundation for success in a college environment while balancing personal and work obligations. Orients students to life on campus, demonstrates how to leverage campus resources to achieve career and academic goals, and emphasizes engagement outside the classroom through collaborative and co-curricular opportunities. This course is reserved exclusively for students planning to major in Earth and Environmental Sciences who are in their first semester at UTA. Fulfills the University requirement for either UNIV 1101 or UNIV 1131. Offered as GEOL 1101 and ENVR 1101. Credit will not be given for both.

**ENVR 1301. INTRODUCTION TO ENVIRONMENTAL SCIENCE. 3 Hours.**

This course provides an introduction to the basic principles of environmental science. Environmental science, as a discipline, along with key chemical, physical, geological, and biological aspects and relevant societal issues will be examined.

**ENVR 1330. GLOBAL WARMING. 3 Hours.**

Global environmental challenges confronting humanity such as pollution, depletion of natural resources, ecosystem deterioration, food production, and population growth. Offered as ENVR 1330 and GEOL 1330. Credit will not be given for both.

**ENVR 2314. THE GLOBAL ENVIRONMENT AND HUMAN HEALTH. 3 Hours.**

This course will assess the impact on human health of: 1) population growth and available resources; 2) exposure to man-made harmful substances; and 3) environmental degradation.

**ENVR 2316. CONSERVATION OF NATURAL RESOURCES. 3 Hours.**

During this course the students will explore natural resources, with special emphasis on new solutions to problems of resource scarcity and conservation. During this course the students will learn about energy, water, air, and food resources conservation. Students will work on developing proposals for addressing water conservation issues. Prerequisite: ENVR 1301, or consult instructor.

**ENVR 2318. CLIMATE CHANGE RISK AND RESILIENCE. 3 Hours.**

Climate risk is emerging as a key risk driver for systems as diverse as critical infrastructure (e.g. water, energy, transport, communications, buildings, transportation) and the natural environment. The course covers the topics of long-term climate trends, identification and management of climate risks, climate change's impact on extreme weather events and public health. Students will gain an understanding of climate equity, environmental justice, mitigation and adaptation strategies, and emerging concepts of climate resilience. The course also emphasizes the ethical responsibilities of scientists, engineers, and risk professionals, equipping students with the necessary theories, methods, and tools to conduct climate risk assessments.

**ENVR 3100. ENVIRONMENTAL SCIENCE PROFESSIONAL ORIENTATION. 1 Hour.**

Review of various careers in environmental science, and how to prepare a resume, network, and interview. Principles to follow for on-the-job success. Class will involve field trips and work force guest lectures. Prerequisite: ENVR 1301 or cons. inst.

**ENVR 3317. ENVIRONMENTAL HYDROLOGY. 3 Hours.**

An introduction to environmental hydrology topics including basic principles of the processes and measurements of precipitation, interception, infiltration, evaporation, evapotranspiration, interflow, overland flow, stream flow, and groundwater flow. Introduction to quantification of watershed metrics such as water budgets, hydrographs, discharge-concentration relationships, and flood routing. Examples and case studies will cover a broad spectrum of modern environmental scenarios (in a changing climate) across urban, agricultural, mining, and natural landscapes and biomes. Prerequisite: MATH 1426, or consent of instructor.

**ENVR 3387. ENVIRONMENTAL SCIENCE FIELD METHODS. 3 Hours.**

Measurement and analysis of environmental data collected in the field. Special fee covers cost of transportation and equipment. Prerequisite: CHEM 1442.

**ENVR 3454. STATISTICS FOR EARTH AND ENVIRONMENTAL SCIENTISTS. 4 Hours.**

This course provides students with basic principles of statistics and helps students apply statistics to analyze data and interpret results from the perspective of Earth and environmental scientists. The course will first introduce basic concepts and then focus on applications to various examples in Earth and environmental sciences. Offered as ENVR 3454 and GEOL 3454, credit will not be given for both. Prerequisite: MATH 1426 or HONR-SC 1426.

**ENVR 3457. ENVIRONMENTAL ANALYTICAL CHEMISTRY. 4 Hours.**

This course offers an introduction to chemical and biochemical phenomena that occur in water, air, terrestrial and living environments, and the effects of human activity on them. Environmental chemistry can broaden as much as atmospheric chemistry, aquatic chemistry, chemistry of soil/geosphere, toxicological chemistry and industrial ecology. In this course, mainly chemical substances in diverse environmental compartments and interactions and exposure impact to human and wildlife receptors will be focus based on analytical chemistry principles and perspective. Prerequisite: CHEM 1442.

**ENVR 4189. RESEARCH IN ENVIRONMENTAL SCIENCE. 1 Hour.**

Supervised undergraduate research in some aspect of environmental science. Prerequisite: Permission from Instructor.

**ENVR 4190. ENVIRONMENTAL SCIENCE INTERNSHIP. 1 Hour.**

Work in environmental sciences for a commercial concern at least 20 hours per week for three months. Requirements include: writing a resume, learning how to interview and function on the job, and a report describing the work.

**ENVR 4199. TECHNICAL SESSIONS. 1 Hour.**

Forum for presentation of results of undergraduate and graduate students and faculty research. Offered as ENVR 4199 and GEOL 4199. Credit will not be given for both. Prerequisite: For ENVR: ENVR 1301 or equivalent. For GEOL: GEOL 1301 or equivalent.

**ENVR 4289. RESEARCH IN ENVIRONMENTAL SCIENCES. 2 Hours.**

Supervised undergraduate research in any one of the various fields of environmental sciences. May be repeated but will not meet Environmental Science degree requirements. Prerequisite: permission from instructor.

**ENVR 4303. TOPICS IN SUSTAINABILITY. 3 Hours.**

Governmental and regulatory issues as they relate to sustainability. Course offered as SUST 5303 and EVSE 5303. Credit will be granted only once.

**ENVR 4305. SELECTED TOPICS IN ENVIRONMENTAL SCIENCES. 3 Hours.**

Environmental science topics not treated in the regular curriculum. Topic, format, and prerequisites to be determined by the instructor. May be repeated for Environmental Science elective credit as different topics are offered. Prerequisite: Determined by instructor.

**ENVR 4306. SYNOPTIC METEOROLOGY. 3 Hours.**

This course discuss the core principles of synoptic meteorology including the following topics: Earth observations (radar, satellite, ground-based), cloud classification, analysis and forecasting of major weather systems and extreme weather events (fronts, hurricanes, tornadoes, flood, heatwaves, wildfires, and dust storms), weather forecasts, numerical forecasting models, and data assimilation techniques. Prerequisite: MATH 1426 and PHYS 1441 or PHYS 1443.

**ENVR 4308. ENVIRONMENTAL GEOCHEMISTRY. 3 Hours.**

The geochemistry of natural waters with emphasis on processes that control solute concentrations including complexation reactions, oxidation and reduction reactions, biogeochemistry, and chemical weathering reactions. Offered as ENVR 4308 and GEOL 4308. Credit will not be given for both. Prerequisite: CHEM 1442 or GEOL 2445.

**ENVR 4312. ENVIRONMENTAL RISK BASED ACTION. 3 Hours.**

This course offers an introduction to environmental risk-based actions including environmental laws and regulations, hazard identification, toxicology, common contaminants, chemical intake models, chemical fate and transport models, and vapor intrusions. Prerequisite: ENVR 1301 or GEOL 1301 or equivalent.

**ENVR 4313. ENVIRONMENTAL REGULATION OF CHEMICAL HAZARDS. 3 Hours.**

This course offers an introductory knowledge about regulations and management of environmental and life quality in relation to chemical pollution, waste disposal, energy/resources sustainability, public health threats, and food/consumer product safety. Prerequisite: CHEM 1441 or equivalent.

**ENVR 4314. TOXICOLOGY FOR ENVIRONMENTAL SCIENTISTS. 3 Hours.**

This course offers an introduction to environmental toxicology and methods of measuring and using data on the adverse effects of chemical substances in line with understanding chemical and biochemical phenomena that occur in water, air, terrestrial and living environments, and the impact to human population. Prerequisite: CHEM 1441 or equivalent.

**ENVR 4315. INTRODUCTION TO ENVIRONMENTAL STUDIES. 3 Hours.**

This course serves as an introduction to and covers broad aspects of environmental studies. It is designed to foster an increased understanding of physical, chemical and biological systems of terrestrial and aquatic environments, their complex connections and patterns, and human interactions. In this course emphasis is placed on a holistic approach to environmental studies using case studies, learning activities, and discussions to reinforce scientific principles. Students will examine the relationship between humankind and nature in order to gain a broad understanding of issues, causes, and possible solutions to the array of environmental challenges faced in today's world. Prerequisite: Junior standing, core complete.

**ENVR 4323. ISSUES IN ENVIRONMENTAL HEALTH. 3 Hours.**

An introduction to health issues of current concern resulting from environmental exposures. Topics include: environmental asthma, endocrine disruptors, climate change and health, emerging contaminants, nanotechnology and health, airborne particles and pediatric health. Offered as ENVR 4323 and GEOL 4323. Credit will not be given for both.

**ENVR 4325. TRACER HYDROLOGY. 3 Hours.**

This course is primarily focused on the applications of chemical tracers to study the interaction between precipitation, surface water, and groundwater. The first part covers the basics of water fluxes and naturally occurring and artificial tracers such as stable and radioactive isotopes, noble gases, fluorescent nanoparticles, ions, and DNA. The second part is oriented towards the assimilation of chemical tracer information to enhance hydrological metrics, conceptual model development, and numerical modeling. Prerequisite: ENVR 1301, or GEOL 1301, or cons. inst.

**ENVR 4330. UNDERSTANDING GEOGRAPHIC INFORMATION SYSTEMS. 3 Hours.**

A practical introduction to GIS and methods of creating, maintaining and displaying spatial data using the ArcGIS software. Prerequisite: Junior Standing.

**ENVR 4353. DATA ANALYSIS FOR EARTH AND ENVIRONMENTAL SCIENTISTS. 3 Hours.**

This course is an introduction to data analysis and data science by means of mathematics and statistics. We analyze real-world data to find patterns, detect trends and better forecast complex systems in nature. This course provides quantitative methods and deep understanding of applications of data analysis in earth and environmental sciences. It covers analyzing a broad type of data related to geology, earth sciences and environmental engineering. Offered as ENVR 4353 and GEOL 4353; credit will not be given for both. Prerequisite: ENVR 3454, or GEOL 3454, or STATS 1301.

**ENVR 4389. RESEARCH IN ENVIRONMENTAL SCIENCES. 3 Hours.**

Supervised undergraduate research in any one of the various fields of environmental sciences. May be repeated but will not meet Environmental Science degree requirements.

**ENVR 4455. ENVIRONMENTAL DATA SCIENCE. 4 Hours.**

This course focuses on acquisition, analysis, interpretation, and presentation of environmental data. Available datasets will be utilized to explore different models and case studies of the fate and transport of contaminants in multimedia environments, climate and health, toxicology prediction, water quality, environmental epidemiology, etc. The course includes practical exercises with Python and R. Offered as ENVR 4455 and GEOL 4455. Credit will not be given for both.

**ENVR 4456. ENVIRONMENTAL RISK ASSESSMENT. 4 Hours.**

This course introduces the basic scientific components of environmental and occupational health risk assessment and describes the policy context in which decisions to manage environmental health risks are made. The course presents the quantitative methods used to assess the human health risks associated with exposure to toxic chemicals, focusing on the four major components of risk assessment-hazard identification, dose-response assessment, exposure assessment, and risk characterization. Offered as ENVR 4456 and GEOL 4456. Credit will not be given for both.

**ENVR 4458. MACHINE LEARNING FOR EARTH AND ENVIRONMENTAL SCIENTISTS. 4 Hours.**

This course provides students with basic principles of machine learning and helps students apply machine learning to analyze data, predict outcomes and interpret results from the perspective of earth and environmental scientists. The course will first introduce basic concepts and then focus on applications to various examples in earth and environmental sciences. Offered as GEOL 4458 and ENVR 4458. Credit will be not given for both. Prerequisite: GEOL 3454 or ENVR 3454 or equivalent.

## COURSES

**ESST 2300. INTRODUCTION TO ENVIRONMENTAL & SUSTAINABILITY STUDIES. 3 Hours.**

Introduces major topics, questions, issues and methods within interdisciplinary and cross-disciplinary environmental studies. Includes a study of some of the most significant texts, studies, practices, and creative works from at least four different fields as they pertain to questions of environment, ecology, and sustainability.

**ESST 3300. INDEPENDENT STUDY. 3 Hours.**

Consent of instructor and Director of Environmental and Sustainability Studies Minor required. Independent study required. Independent study on a specific topic related to sustainability and environmental studies. The student and the instructor will design the readings, research, and requirements. The supervising instructor may be from any department. The Director of Environmental and Sustainability Studies must approve of the topic and requirements. This course is open only to students minoring in Environmental and Sustainability Studies. Prerequisite: ESST 2300 and acceptance in the Environmental and Sustainability Minor.

**ESST 3350. INDEPENDENT PROJECT. 3 Hours.**

Consent of instructor and Director of Environmental and Sustainability Studies Minor required. Independent Study Required. Independent research project or design project related to sustainability and environmental studies. The project may be scientific or artistic, involving experiments, engineering, planning or design. Format will be designed by instructor and student. The supervising instructor may be from any department. The Director of Environmental and Sustainability Studies must approve of the project and requirements. This course is open only to students minoring in Environmental and Sustainability Studies. Prerequisite: ESST 2300 and acceptance in the Environmental and Sustainability Studies Minor.

**ESST 4300. INTERNSHIP IN ENVIRONMENTAL AND SUSTAINABILITY STUDIES. 3 Hours.**

Practicum Required. Consent of the Director of Environmental and Sustainability Studies required. Provides the student with the opportunity to apply academic skills learned in environmental and sustainability studies to campus operations, or business, community, or nonprofit organizations. Students will work a certain number of hours and submit a written account of their experience and accomplishments to the Director of Environmental and Sustainability Studies. This course is open only to students minoring in Environmental and Sustainability Studies. Prerequisite: ESST 2300 and acceptance in the Environmental and Sustainability Studies Minor.

## COURSES

**EVSE 5100. SELECTED TOPICS IN ENVIRONMENTAL SCIENCE AND ENGINEERING. 1 Hour.**

May be repeated for credit when topic changes.

**EVSE 5115. PROFESSIONAL EXPERIENCE. 1 Hour.**

Work in environmental science for a commercial concern at least 20 hrs/wk for 3 months. Requirements include writing a resume, learning how to interview and function on the job, and a report describing the work. Prerequisite: Cons. inst.

**EVSE 5120. ENVIRONMENTAL PROFESSIONAL MENTORING & BUSINESS ETHICS. 1 Hour.**

Provides credit to students participating in an approved mentoring program with an experience environmental professional. May be repeated once for credit.

**EVSE 5189. RESEARCH IN ENVIRONMENTAL SCIENCES. 1 Hour.**

Independent study in various areas of environmental research. May be repeated for credit. Graded R.

**EVSE 5199. SEMINAR IN ENVIRONMENTAL & EARTH SCIENCES. 1 Hour.**

Topics presented by faculty, students, and invited lecturers.

**EVSE 5200. SELECTED TOPICS IN ENVIRONMENTAL & EARTH SCIENCES. 2 Hours.**

May be repeated for credit when topic changes.

**EVSE 5289. RESEARCH IN ENVIRONMENTAL SCIENCES. 2 Hours.**

Independent study in various areas of environmental research. May be repeated for credit. Graded R.

**EVSE 5294. INDIVIDUAL PROBLEMS IN ENVIRONMENTAL & EARTH SCIENCES. 2 Hours.**

Individual research projects supervised by a faculty member.

**EVSE 5300. SELECTED TOPICS IN ENVIRONMENTAL & EARTH SCIENCE. 3 Hours.**

May be repeated for credit when topic changes.

**EVSE 5303. SUSTAINABILITY ISSUES SEMINAR III. 3 Hours.**

Governmental and regulatory issues as they relate to sustainability.

**EVSE 5306. SYNOPTIC METEOROLOGY. 3 Hours.**

This course discuss the core principles of synoptic meteorology including the following topics: Earth observations (radar, satellite, ground-based), cloud classification, analysis and forecasting of major weather systems and extreme weather events (fronts, hurricanes, tornadoes, flood, heatwaves, wildfires, and dust storms), weather forecasts, numerical forecasting models, and data assimilation techniques. Prerequisite: MATH 1426 and PHYS 1441 or PHYS 1443.

**EVSE 5309. ENVIRONMENTAL SYSTEMS-BIOLOGICAL ASPECTS. 3 Hours.**

An introduction to the biological components of environmental systems. Population dynamics, species interactions, community structure, biodiversity, bioenergetics, nutrient cycling and human impacts are reviewed. Focus will be on natural processes and their engineering applications.

**EVSE 5310. ENVIRONMENTAL SYSTEMS-CHEMICAL ASPECTS. 3 Hours.**

An introduction to the chemistries of air at different altitudes, of water systems and of soils. Chemical and physico-chemical processes at phase boundaries, modeling for kinetics and mass transport, analytical techniques and disposal and recycling are included as well as their impact on engineering decisions.

**EVSE 5311. ENVIRONMENTAL SYSTEMS-GEOLOGICAL ASPECTS. 3 Hours.**

Introduction to the tectonic, volcanic, atmospheric, climatic, hydrologic and geochemical processes and natural hazards of the earth, and their interaction with political, economic and engineering decisions.

**EVSE 5312. ENVIRONMENTAL RISK BASED ACTION. 3 Hours.**

This course offers an introduction to environmental risk-based actions including environmental laws and regulations, hazard identification, toxicology, common contaminants, chemical intake models, chemical fate and transport models, and vapor intrusions.

**EVSE 5313. ENVIRONMENTAL REGULATION OF CHEMICAL HAZARDS. 3 Hours.**

This course offers an introductory knowledge about regulations and management of environmental and life quality in relation to chemical pollution, waste disposal, energy/resources sustainability, public health threats, and food/consumer product safety. Prerequisite: CHEM 1441 or equivalent.

**EVSE 5314. TOXICOLOGY FOR ENVIRONMENTAL SCIENTISTS. 3 Hours.**

This course offers an introduction to environmental toxicology and methods of measuring and using data on the adverse effects of chemical substances in line with understanding chemical and biochemical phenomena that occur in water, air, terrestrial and living environments, and the impact to human population. Prerequisite: CHEM 1441 or equivalent.

**EVSE 5316. CONSERVATION OF NATURAL RESOURCES. 3 Hours.**

During this course the students will explore natural resources, with special emphasis on new solutions to problems of resource scarcity and conservation. During this course the students will learn about energy, water, air, and food resources conservation. Students will work on developing proposals for addressing water conservation issues. Prerequisite: ENVR 1301, or equivalent, or consult instructor.

**EVSE 5317. ENVIRONMENTAL HYDROLOGY. 3 Hours.**

An introduction to environmental hydrology topics including basic principles of the processes and measurements of precipitation, interception, infiltration, evaporation, evapotranspiration, interflow, overland flow, stream flow, and groundwater flow. Introduction to quantification of watershed metrics such as water budgets, hydrographs, discharge-concentration relationships, and flood routing. Examples and case studies will cover a broad spectrum of modern environmental scenarios (in a changing climate) across urban, agricultural, mining, and natural landscapes and biomes. Prerequisite: MATH 1426, or consent of instructor.

**EVSE 5318. CLIMATE CHANGE RISK AND RESILIENCE. 3 Hours.**

Climate risk is emerging as a key risk driver for systems as diverse as critical infrastructure (e.g. water, energy, transport, communications, buildings, transportation) and the natural environment. The course covers the topics of long-term climate trends, identification and management of climate risks, climate change's impact on extreme weather events and public health. Students will gain an understanding of climate equity, environmental justice, mitigation and adaptation strategies, and emerging concepts of climate resilience. The course also emphasizes the ethical responsibilities of scientists, engineers, and risk professionals, equipping students with the necessary theories, methods, and tools to conduct climate risk assessments.

**EVSE 5320. TOXICOLOGY. 3 Hours.**

An introduction to the general principles of toxicology with an emphasis on certain classes of toxic agents, their sources and toxic effects, as well as their environmental fate. Prerequisite: CHEM 2322.

**EVSE 5323. ISSUES IN ENVIRONMENTAL HEALTH. 3 Hours.**

An introduction to health issues of current concern resulting from environmental exposures. Topics include: environmental asthma, endocrine disruptors, climate change and health, emerging contaminants, nanotechnology and health, airborne particles and pediatric health.

**EVSE 5325. TRACER HYDROLOGY. 3 Hours.**

This course is primarily focused on the applications of chemical tracers to study the interaction between precipitation, surface water, and groundwater. The first part covers the basics of water fluxes and naturally occurring and artificial tracers such as stable and radioactive isotopes, noble gases, fluorescent nanoparticles, ions, and DNA. The second part is oriented towards the assimilation of chemical tracer information to enhance hydrological metrics, conceptual model development, and numerical modeling. Prerequisite: ENVR 1301, or GEOL 1301, or cons. inst.

**EVSE 5350. CONTAMINANT HYDROGEOLOGY. 3 Hours.**

Sources and types of various organic and inorganic contaminants; the physical, chemical, and biological factors and processes that affect the transport and fate of contaminants in the subsurface; non-aqueous phase liquids and multiphase flow; and various remedial techniques of contaminated sites. Prerequisite: GEOL 4320 or GEOL 5328 (or concurrent enrollment).

**EVSE 5351. GEOMORPHOLOGY AND QUATERNARY STRATIGRAPHY OF SEDIMENTARY SYSTEMS. 3 Hours.**

This course examines those physical processes that sculpt the surface of the Earth and result in deposition of sediments. Surface systems covered include weathering, mass wasting, rivers, shorelines, eolian processes, and glaciers. The course also examines the stratigraphic techniques used to decode the recent (2 million to present) stratigraphic record of these systems. Course is designed for geologists, biologists, and other fields concerned with interpreting and/or managing modern environments.

**EVSE 5353. DATA ANALYSIS FOR EARTH AND ENVIRONMENTAL SCIENTISTS. 3 Hours.**

This course is an introduction to data analysis and data science by means of mathematics and statistics. We analyze real-world data to find patterns, detect trends and better forecast complex systems in nature. This course provides quantitative methods and deep understanding of applications of data analysis in earth and environmental sciences. It covers analyzing a broad type of data related to geology, earth sciences and environmental engineering.

**EVSE 5357. MEDICAL GEOLOGY. 3 Hours.**

Introduction to geoscience and health. Students will learn how the geologic and geochemical environment can impact health. The historic background to geoscience and health will be presented followed by discussions on the natural abundance of elements in the earth, and the nature of essential and toxic elements (dose-response). Students will then learn about health responses following exposures in specific geologic/geochemical situations.

**EVSE 5389. RESEARCH IN ENVIRONMENTAL SCIENCES. 3 Hours.**

Independent study in various areas of environmental research. May be repeated for credit. Graded R.

**EVSE 5394. INDIVIDUAL PROBLEMS IN ENVIRONMENTAL & EARTH SCIENCES. 3 Hours.**

Individual research projects supervised by a faculty member. Prerequisite: consent of instructor.

**EVSE 5395. MASTER'S PROJECT. 3 Hours.**

May be used as elective for students in non-thesis program. Graded F, P.

**EVSE 5398. THESIS. 3 Hours.**

Graded F, R.

**EVSE 5405. METEOROLOGY AND CLIMATOLOGY. 4 Hours.**

A quantitative approach to the study of the structure, energy, and motions of the atmosphere.

**EVSE 5454. STATISTICS FOR EARTH AND ENVIRONMENTAL SCIENTISTS. 4 Hours.**

This course provides students with basic principles of statistics and helps students apply statistics to analyze data and interpret results from the perspective of Earth and environmental scientists. The course will first introduce basic concepts and then focus on applications to various examples in Earth and environmental sciences. Offered as EVSE 5454 and GEOL 5454. Credit will not be given for both.

**EVSE 5455. ENVIRONMENTAL DATA SCIENCE. 4 Hours.**

This course focuses on acquisition, analysis, interpretation, and presentation of environmental data. Available datasets will be utilized to explore different models and case studies of the fate and transport of contaminants in multimedia environments, climate and health, toxicology prediction, water quality, environmental epidemiology, etc. The course includes practical exercises with Python and R.



**EVSE 5456. ENVIRONMENTAL RISK ASSESSMENT. 4 Hours.**

This course introduces the basic scientific components of environmental and occupational health risk assessment and describes the policy context in which decisions to manage environmental health risks are made. The course presents the quantitative methods used to assess the human health risks associated with exposure to toxic chemicals, focusing on the four major components of risk assessment-hazard identification, dose-response assessment, exposure assessment, and risk characterization. Offered as EVSE 5456 and GEOL 5456, credit will not be given for both.

**EVSE 5457. ENVIRONMENTAL ANALYTICAL CHEMISTRY. 4 Hours.**

This course offers an introduction to chemical and biochemical phenomena that occur in water, air, terrestrial and living environments, and the effects of human activity on them. Environmental chemistry can broaden as much as atmospheric chemistry, aquatic chemistry, chemistry of soil/geosphere, toxicological chemistry and industrial ecology. In this course, mainly chemical substances in diverse environmental compartments and interactions and exposure impact to human and wildlife receptors will be focus based on analytical chemistry principles and perspective. Prerequisite: CHEM 1442 or equivalent courses.

**EVSE 5458. MACHINE LEARNING FOR EARTH AND ENVIRONMENTAL SCIENTISTS. 4 Hours.**

This course provides students with basic principles of machine learning and helps students apply machine learning to analyze data, predict outcomes and interpret results from the perspective of earth and environmental scientists. The course will first introduce basic concepts and then focus on applications to various examples in earth and environmental sciences. Offered as GEOL 5458 and EVSE 5458. Credit will not be given for both. Prerequisite: ENVR 3454 or GEOL 3454 or EVSE 5454 or GEOL 5454 or equivalent.

**EVSE 5465. PHYSICAL OCEANOGRAPHY AND LIMNOLOGY. 4 Hours.**

An introduction to physical processes in lakes and oceans. Changes in lakes and oceans influence heat, and momentum fluxes at the aquatic/oceanic and atmospheric interface. Topics include ocean/lake structure and circulation, and the impact of global climate change on lakes and oceans. Field excursions to nearby lakes combine theoretical knowledge and field measurements. Prerequisite: PHYS 1441 or PHYS 1443; and MATH 1426.

**EVSE 5689. RESEARCH IN ENVIRONMENTAL SCIENCES. 6 Hours.**

Independent study in various areas of environmental research. May be repeated for credit. Graded R.

**EVSE 5698. THESIS. 6 Hours.**

Graded F, P, R.

**EVSE 5998. THESIS. 9 Hours.**

Graded F, P, R.

**EVSE 6197. RESEARCH IN ENVIRONMENTAL & EARTH SCIENCES. 1 Hour.**

Individually approved research projects. May be repeated for credit. Graded F, P, R.

**EVSE 6297. RESEARCH IN ENVIRONMENTAL & EARTH SCIENCES. 2 Hours.**

Individually approved research projects. May be repeated for credit. Graded F, P, R.

**EVSE 6397. RESEARCH IN ENVIRONMENTAL AND EARTH SCIENCES. 3 Hours.**

Individually approved research projects. May be repeated for credit. Graded F, P, R.

**EVSE 6399. DISSERTATION. 3 Hours.**

Graded F, R.

**EVSE 6697. RESEARCH IN ENVIRONMENTAL & EARTH SCIENCE. 6 Hours.**

Individually approved research projects. May be repeated for credit. Graded F, P, R.

**EVSE 6699. DISSERTATION. 6 Hours.**

Graded F, R, P, W.

**EVSE 6997. RESEARCH IN ENVIRONMENTAL & EARTH SCIENCE. 9 Hours.**

Individually approved research projects. May be repeated for credit. Graded F, P, R.

**EVSE 6999. DISSERTATION. 9 Hours.**

Graded F, P, R.

**EVSE 7399. DOCTORAL DEGREE COMPLETION. 3 Hours.**

This course may be taken during the semester in which a student expects to complete all requirements for the doctoral degree and graduate. Enrolling in this course meets minimum enrollment requirements for graduation, for holding fellowships awarded by The Office of Graduate Studies and for full-time GTA or GRA positions. Students should verify that enrollment in this course meets other applicable enrollment requirements. To remain eligible in their final semester of study for grants, loans or other forms of financial aid administered by the Financial Aid Office must enroll in a minimum of 5 hours as required by the Office of Financial Aid. Other funding sources may also require more than 3-hours of enrollment. Additional hours may also be required to meet to requirements set by immigration law or by the policies of the student's degree program. Students should contact the Financial Aid Office, other sources of funding, Office of International Education and/or their graduate advisor to verify enrollment requirements before registering for this course. This course may only be taken twice. Students who do not complete all graduation requirements while enrolled in this course must enroll in a minimum of 6 dissertation hours (6699 or 6999) in their graduation term. Graded P/F/R.

## COURSES

**EXCH 1191. EXCHANGE COURSE. 1 Hour.**

For students participating in a reciprocal exchange program.



## COURSES

**EXSA 0101. ARCHERY. 1 Hour.**

**EXSA 0105. BADMINTON. 1 Hour.**

**EXSA 0106. BRAZILIAN JIU-JITSU. 1 Hour.**

This course is designed to provide students instruction in the art of Brazilian jiu-jitsu as popularized in the Ultimate Fighting Championship (UFC). Techniques, as well as live grappling in both the Gi (traditional martial arts uniform) and No-Gi (shorts and T-shirt) format will be taught. Males and females of all skill levels are welcome. Come learn one of the most dynamic and effective martial arts in a comfortable and welcoming atmosphere with a national and international competitor.

**EXSA 0107. MARTIAL ARTS. 1 Hour.**

**EXSA 0108. BASKETBALL. 1 Hour.**

**EXSA 0120. BOWLING. 1 Hour.**

**EXSA 0140. GOLF. 1 Hour.**

**EXSA 0145. BEGINNING FENCING. 1 Hour.**

**EXSA 0154. FITNESS WALK. 1 Hour.**

**EXSA 0156. JOGGING FOR FITNESS. 1 Hour.**

**EXSA 0157. AEROBIC DANCE. 1 Hour.**

**EXSA 0159. EXERCISE AND SPORT FOR THE HANDICAPPED. 1 Hour.**

**EXSA 0160. STEP AEROBICS. 1 Hour.**

**EXSA 0163. YOGA. 1 Hour.**

**EXSA 0164. CARDIO KICKBOXING. 1 Hour.**

**EXSA 0165. PILATES. 1 Hour.**

This course is designed to improve muscular strength, endurance, flexibility, posture and overall joint mobility as well as stress reduction techniques. Students will be provided with a basic working knowledge of Pilates positions, the benefits associated with Pilates, and knowledge to all students the basic skills needed to pursue independent training as part of their lifetime fitness program.

**EXSA 0166. RACQUETBALL. 1 Hour.**

**EXSA 0167. SOCCER. 1 Hour.**

**EXSA 0168. INTERMEDIATE YOGA. 1 Hour.**

Previous yoga experience preferred but not required.

**EXSA 0169. ADVANCED PILATES. 1 Hour.**

This course is designed to improve muscular strength, endurance, flexibility, posture, and overall joint mobility as well as stress reduction techniques. Students will be provided with an advanced working knowledge of Pilates positions, the benefits associated with Pilates, and knowledge of the advanced skills needed to pursue independent training as part of a lifetime fitness program.

**EXSA 0170. SWIMMING: BEGINNING. 1 Hour.**

**EXSA 0171. WATER POLO. 1 Hour.**

**EXSA 0172. SWIMMING FOR FITNESS. 1 Hour.**

**EXSA 0174. WATER AEROBICS. 1 Hour.**

**EXSA 0175. BODY SCULPTING/CORE STRENGTH. 1 Hour.**

This course is designed to improve total body muscular strength and flexibility. This is an all over body workout using a variety of exercise equipment such as hand weights, tubing, stability balls, balance boards, Bosu, and bars. Students will be provided with a basic working knowledge of proper biomechanics, anatomy, nutrition, and the benefits associated with long term strength training.

**EXSA 0176. ZUMBA INTERVAL TRAINING. 1 Hour.**

Zumba fuses hypnotic Latin rhythms and easy to follow moves to create a dynamic workout system. Zumba students achieve long term benefits while experiencing an absolute blast in one exhilarating class of caloric-burning, heart-racing, muscle-pumping, body-energizing, awe-inspiring movements meant to engage and captivate for life!

**EXSA 0177. TENNIS. 1 Hour.**

**EXSA 0178. TENNIS: ADVANCED. 1 Hour.**

**EXSA 0180. VOLLEYBALL. 1 Hour.**

**EXSA 0181. VOLLEYBALL: ADVANCED. 1 Hour.**

**EXSA 0184. WEIGHT TRAINING. 1 Hour.**

**EXSA 0189. INTERCOLLEGIATE ATHLETICS. 1 Hour.**

**EXSA 0191. DESIGNATED ACTIVITIES. 1 Hour.**

**EXSA 1116. PACE: EXERCISE AT YOUR OWN PACE. 1 Hour.**

Exercise and conditioning class for all levels of activity emphasizing individual physical needs and adapting exercise to meet those needs. For additional information: pmaxmwell@uta.edu.

**EXSA 1118. BOOT CAMP AEROBICS. 1 Hour.**

Boot camp aerobics.

**EXSA 1119. CO-ED SELF DEFENSE. 1 Hour.**

Co-ed Self Defense.

**EXSA 1220. LIFEGUARD TRAINING. 2 Hours.**

**EXSA 1246. SELF DEFENSE FOR WOMEN. 2 Hours.**

**EXSA 1247. EXERCISE & WEIGHT MANAGEMENT. 2 Hours.**

This class is designed to provide students with the practical skills and knowledge involving exercise and weight management. Along with a variety of fun and exciting exercise activities, fundamental nutrition and behavior/environmental modification techniques will also be discussed. Additional information: mevans@uta.edu.

**EXSA 1249. SCUBA DIVING. 2 Hours.**

**EXSA 1259. ADVANCED SCUBA. 2 Hours.**

## COURSES

**FINA 2330. MONEY, FINANCE AND THE MODERN CONSUMER. 3 Hours.**

An analysis of consumer and financial behavior in present-day society. Against this backdrop, students understand how consumption choices define one's identity in society and understand the importance of value-oriented financial goals for the wellbeing of individuals, families, and society at large. Students also develop the critical-thinking and quantitative decision-making skills needed for responsible spending and financial choices.

**FINA 3311. PERSONAL FINANCE. 3 Hours.**

This course is designed to equip students with several personal finance tools. Topics include the time value of money for personal financial decision-making, personal financial statements, credit, budgeting, investment planning, insurance planning, and retirement planning. Prerequisite: Completion of 30 credit hours.

**FINA 3313. BUSINESS FINANCE. 3 Hours.**

Emphasizes the financing and investment decisions of the corporate manager. Topics include financial statement analysis, working capital management, capital budgeting, financing costs, financial planning, leverage, and how diversity affects firm valuations and access to financing. Prerequisite: ECON 2306, ACCT 2302, MATH 1315 (or permission of instructor), and 30 credit hours.

**FINA 3315. INVESTMENTS. 3 Hours.**

Principles governing the proper investment of personal and institutional funds, information sources, security analysis, exchanges and regulations. Formerly FINA 4313; credit will be granted only once. Prerequisite: ECON 2306, ACCT 2302, FINA 3313 (or concurrent enrollment) and 60 credit hours.

**FINA 3317. FINANCIAL INSTITUTIONS AND MARKETS. 3 Hours.**

The structure of financial institutions and markets in the United States and their interactions. How and why the institution has evolved, how it fits within the financial system, how it operates, what is its current impact, and what may its future role be. Formerly FINA 4314; credit will be granted only once. Prerequisite: ECON 2306, ACCT 2302, and 60 credit hours.

**FINA 4191. STUDIES IN FINANCE. 1 Hour.**

Advanced studies, on an individual basis, in the various fields of finance. Prerequisite: 90 credit hours and permission of department. May be repeated for credit with consent of department chair.

**FINA 4291. STUDIES IN FINANCE. 2 Hours.**

Advanced studies, on an individual basis, in the various fields of finance. Prerequisite: 90 credit hours and permission of department. May be repeated for credit with consent of department chair.

**FINA 4311. MONEY AND CAPITAL MARKETS. 3 Hours.**

This in-depth analysis of the development, characteristics, and significance of money and capital markets explores how the markets interrelate, interact, and impact the financing/investment decisions that are the basis of finance. Prerequisite: FINA 3315 (with a grade of C or better).

**FINA 4315. ADVANCED BUSINESS FINANCIAL ANALYSIS. 3 Hours.**

To develop an ability to recognize financial problems, analyze financial data, formulate alternative solutions, and render financial decisions. Case materials are used in studying financial problems. Management of investment in current and fixed assets, planning of profits, forecasting of cash requirements, capital budgeting, planning of methods of financing and capital structure, dividend policy, valuation of assets, and mergers. Prerequisite: FINA 3313 and FINA 3315.

**FINA 4317. LENDING AND CREDIT ANALYSIS. 3 Hours.**

This course is about principles governing lending and credit analysis. The course covers topics such as loan structuring, commercial lending process, qualitative analysis and credit rating analysis, and detecting problematic loans. Prerequisite: FINA 3313, FINA 3317 (or concurrent enrollment).

**FINA 4318. PORTFOLIO MANAGEMENT AND SECURITY ANALYSIS. 3 Hours.**

This course develops an understanding of portfolio management and security analysis by focusing on the analytical techniques and empirical results of investment theorists and practitioners. Risk, efficiency, diversification, fundamental analysis, and technical analysis as they apply to corporate finance, international finance, and investments will be examined. Prerequisite: FINA 3313.

**FINA 4319. FINANCIAL DERIVATIVES. 3 Hours.**

Topics included in this course are an introduction to options and futures markets, investment and risk management strategies using these derivative products, and pricing of options and futures contracts. Additional coverage includes basic swap agreements, exotic options, and corporate risk management. Prerequisite: FINA 3313.

**FINA 4320. CAPITAL BUDGETING. 3 Hours.**

Development of the logic and methodology of the capital budgeting decision. Measurement of cash flows, present value techniques, evaluation of capital investments, ranking of capital investments, analysis of risk, and administration of capital investments. Prerequisite: FINA 3313.

**FINA 4324. INTERNATIONAL CORPORATE FINANCE. 3 Hours.**

Issues and questions which concern financial management of international corporations. Analysis of the financing of investment abroad and the management of assets in differing financial environments. The foreign investment decision, cost of capital and financial structure for multinational decision making, management of foreign subsidiary working capital, and financial control of multinational operations. Prerequisite: FINA 3313.

**FINA 4326. WEALTH AND EXCHANGE. 3 Hours.**

This course provides students with an introduction to the principles of financial management in the setting of a philanthropic organization. The focus is on the primary financial topics of capital budgeting, capital structure, and working capital management which have been modified to consider the philanthropy setting. The study of capital budgeting examines how modifications to traditional NPV analysis can be implemented and justified in a setting without corporate income taxes. The study of capital structure examines how the traditional choice between debt and equity is replaced with a choice between fundraising or debt issuance. Debt issuance is further explored through an analysis of the characteristics of muni bond markets and how muni markets differ from corporate bond markets. The study of liquidity management and financial analysis focuses on those measures that are most useful and available for studying the financial condition of philanthropic organizations. Throughout the course, a focus is put on applied analysis using excel spreadsheets and incorporating real world data drawn from the financial statements, bond quotes, and regulatory filings of local philanthropic institutions. Prerequisite: This course is open only to non-finance majors, 30 credit hours.

**FINA 4328. STUDENT MANAGED INVESTMENT FUND. 3 Hours.**

This course provides a conceptual and theoretical foundation for the activities of selected student managers involved with the on-going operations of the student managed investment fund (SMIF). Using a blend of academic- and practitioner-oriented readings, projects, and group analytical sessions, managers will be introduced to both the conventional wisdom and state-of-the-art methods used in performing many of the Fund's functional tasks, including security research, security trading, and economic forecasting. After establishing a background in the technical aspects of managing a security portfolio, we will focus on developing a solid intuition about what an investment professional in each of these positions must know to do his or her job well. Prerequisite: FINA 3315 and departmental permission.

**FINA 4331. SEMINAR IN FINANCE. 3 Hours.**

Readings and discussion of special topics in Finance. Prerequisite: Junior or senior standing and consent of instructor. May be repeated for credit with consent of department chair.

**FINA 4351. FINANCIAL MODELING. 3 Hours.**

The focus is on computer applications in the major areas of finance. Financial Modeling integrates financial theory and practice through software-driven hands-on experience. Students will learn how to utilize financial concepts and practice within a software framework. Core concepts are drawn from corporate finance, investments, and financial institutions and markets. Examples of topics include: financial statement forecasting and consolidation, mergers and acquisitions, statistical approaches in finance, the Capital Asset Pricing Model, portfolio analysis, predictive models of different risk categories, bond and stock valuation, and market interest rate behavior. Learning is enhanced using a lecture-lab format. Prerequisite: FINA 3313.

**FINA 4391. STUDIES IN FINANCE. 3 Hours.**

Advanced studies, on an individual basis, in the various fields of finance. Prerequisite: 90 credit hours and permission of department. May be repeated for credit with consent of department chair.

**FINA 4393. FINANCE INTERNSHIP. 3 Hours.**

Practical training in finance. Analysis of theory applied to real life situations. May be used as an advanced business elective only; graded on a pass/fail basis. No credit will be given for previous experience or activities. May not be repeated for credit. Prerequisite: FINA 3313, 60 credit hours, and consent of department internship advisor.



**FINA 5182. INDEPENDENT STUDIES IN FINANCE. 1 Hour.**

Extensive analysis of a finance topic. Prerequisite: consent of instructor and department chair.

**FINA 5199. GRADUATE FINANCE INTERNSHIP. 1 Hour.**

Practical training in finance. Analysis of theory applied to real life situations. Course counts as an elective and has a pass/fail grade. No credit will be given for previous experience or activities. Prerequisite: Minimum nine graduate semester hours completed.

**FINA 5299. GRADUATE FINANCE INTERNSHIP. 2 Hours.**

Practical training in finance. Analysis of theory applied to real life situations. Course counts as an elective and has a pass/fail grade. No credit will be given for previous experience or activities. Prerequisite: Minimum nine graduate semester hours completed.

**FINA 5311. BUSINESS FINANCIAL MANAGEMENT. 3 Hours.**

Study of providing the organization with funds necessary for its operation and of achieving effective utilization of funds. Primary emphasis on financial decision-making within organizations, and techniques of financial analysis and forecasting. Prerequisite: ACCT 5307 or departmental permission.

**FINA 5315. HEALTH CARE FINANCIAL MANAGEMENT. 3 Hours.**

Analysis of financial problems with an emphasis on the application of financial management principles and concepts to health care organizations.

**FINA 5317. LENDING AND CREDIT ANALYSIS. 3 Hours.**

This course is about principles governing lending and credit analysis. The course covers topics such as loan structuring, commercial lending process, qualitative analysis and credit rating analysis, and detecting problematic loans. Prerequisite: FINA 5311 or departmental permission.

**FINA 5323. INVESTMENTS. 3 Hours.**

Application of economic theory and principles to investment decisions of individuals and financial institutions. Considers how psychological influences, diversity, and biases affect wealth creation. Students who successfully complete the course will have the knowledge to be productive in a diverse professional environment where state-of-the-art investment models and techniques are implemented. Prerequisite: FINA 5311 or departmental permission.

**FINA 5327. FINANCIAL DERIVATIVES. 3 Hours.**

Nature and functions of the various futures and options markets; hedging for risk reduction, speculative trading for profit; the role of futures and options in overall portfolio strategy, along with fundamental concepts such as basis, spreading, normal and inverted markets and money management. Prerequisite: FINA 5311 and FINA 5323.

**FINA 5328. STUDENT MANAGED INVESTMENT FUND. 3 Hours.**

This course provides a conceptual and theoretical foundation for the activities of selected student managers involved with the on-going operations of the student managed investment fund (SMIF). Using a blend of academic- and practitioner-oriented readings, projects, and group analytical sessions, managers will be introduced to both the conventional wisdom and state-of-the-art methods used in performing many of the Fund's functional tasks, including security research, security trading, and economic forecasting. After establishing a background in the technical aspects of managing a security portfolio, we will focus on developing a solid intuition about what an investment professional in each of these positions must know to do his or her job well. Prerequisite: A course in investments and departmental permission.

**FINA 5329. PORTFOLIO AND SECURITY ANALYSIS. 3 Hours.**

The use of economic and accounting data in the selection of securities. Examination of current and traditional techniques used by investment practitioners. Prerequisite: FINA 5311 and FINA 5323.

**FINA 5330. REAL OPTIONS. 3 Hours.**

Option approaches to evaluating firm capital budgeting decisions. Techniques for making investment decisions involving physical assets of nonfinancial firms. Prerequisite: FINA 5311.

**FINA 5331. INTERNATIONAL FINANCE. 3 Hours.**

Examines ways in which financial decision-making processes are altered by operation in a multinational environment. Includes the effects of devaluation expectations, foreign exchange and investment controls. Also, case study materials related to actual decisions by multinational firms. Prerequisite: FINA 5311.

**FINA 5334. FINANCIAL INSTITUTIONS AND MARKETS. 3 Hours.**

An examination of major financial institutions and markets with emphasis on trends affecting the current operations, competitive position, and overall future of the primary financial intermediaries and the financial markets. Prerequisite: FINA 5311, or concurrent enrollment.

**FINA 5340. FINANCIAL APPLICATIONS. 3 Hours.**

Analysis of financial problems of business concerns, presented in case materials. Considers determination of capital needs, choosing among alternative capital investments, planning methods of financing new capital expenditures, and planning recapitalizations, mergers, and reorganizations. Prerequisite: FINA 5311.

**FINA 5350. MATHEMATICAL FINANCE. 3 Hours.**

Intensive review of the mathematics necessary for graduate work in finance, with application to selected areas of business finance, investment analysis and financial markets. Prerequisite: FINA 5311.

**FINA 5351. FINANCIAL MODELING FOR INVESTMENTS. 3 Hours.**

Study of common financial modeling techniques are explored in this course. The primary focus is on portfolio optimization models and models used for pricing and analyzing derivative stock options, although most of these techniques have other applications. Students are provided with the opportunity to develop the skills needed to build financial models of their own. Prerequisite: FINA 5311 or departmental permission.

**FINA 5352. FINANCIAL MODELING FOR CORPORATE ANALYSIS. 3 Hours.**

This course focuses on the financial modeling in the major areas of corporate finance, including financial statement forecasting, bond and stock valuation, and merger and acquisition analysis using computer software such as Excel. A lecture-lab format will be used to integrate financial theory and practice through software-driven hands-on experience. Prerequisite: FINA 5311 or departmental permission.

**FINA 5376. FINANCIAL DATA ANALYTICS. 3 Hours.**

This course is a hands-on introduction to the application of data science techniques to visualize, condition, transform, and model financial data using R. Topics include: the layered grammar of graphics, security and portfolio returns, risk analysis, portfolio optimization and performance, publishing results using R Markdown, and an introduction to processing large data sets from public data sources, WRDS, and the SEC's Edgar database. Prerequisite: FINA 5311 or departmental permission.

**FINA 5382. INDEPENDENT STUDIES IN FINANCE. 3 Hours.**

Extensive analysis of a finance topic. Prerequisite: departmental permission.

**FINA 5392. SELECTED TOPICS IN FINANCE. 3 Hours.**

In depth study of selected topics in finance. May be repeated when topics vary. Prerequisite: departmental permission.

**FINA 5398. THESIS. 3 Hours.**

Thesis. FINA 5398 graded R (Research) or F only. Prerequisite: STAT 5325 and approval of Graduate Advisor.

**FINA 5399. GRADUATE FINANCE INTERNSHIP. 3 Hours.**

Practical training in finance. Analysis of theory applied to real life situations. Course counts as an elective and has a pass/fail grade. No credit will be given for previous experience or activities. Prerequisite: Minimum nine graduate semester hours completed.

**FINA 5698. THESIS. 6 Hours.**

Thesis. Prerequisite: STAT 5325 and approval of Graduate Advisor.

**FINA 6192. RESEARCH IN FINANCE. 1 Hour.**

Independent study of advanced topics in finance under the direction of graduate faculty. May be repeated for credit when topics vary. Prerequisite: FINA 5311.

**FINA 6292. RESEARCH IN FINANCE. 2 Hours.**

Independent study of advanced topics in finance under the direction of graduate faculty. May be repeated for credit when topics vary. Prerequisite: FINA 5311.

**FINA 6301. SEMINAR IN THE THEORY OF FINANCE. 3 Hours.**

Development of the fundamental theories of modern finance from their microeconomic origins. Topics include: investment under uncertainty, asset pricing models, market equilibrium, market efficiency, and expected utility theory. Prerequisite: FINA 5311.

**FINA 6311. SEMINAR IN THE THEORY OF CORPORATE FINANCE. 3 Hours.**

Advanced theory of corporate finance. Capital budgeting, dividend policy, and capital structure. Prerequisite: FINA 5311.

**FINA 6312. SEMINAR IN THE THEORY OF INVESTMENTS. 3 Hours.**

Advanced theory of investments. Modern portfolio theory and the efficiency of capital markets. Prerequisite: FINA 5311.

**FINA 6313. ADVANCED RESEARCH IN FINANCE. 3 Hours.**

Analytical methods commonly applied in the academic finance literature. Topics such as factor analysis in arbitrage pricing models and techniques for identification of nonstationarities in risk. Prerequisite: FINA 5311 and STAT 5301.

**FINA 6314. ADVANCED RESEARCH IN FINANCE II. 3 Hours.**

Specialized and evolving techniques in financial research; topics such as identification of efficient markets, linear programming in capital budgeting, and multiple discriminant analysis in bankruptcy prediction and bond rating models. Prerequisite: FINA 5311 and STAT 5301.

**FINA 6390. SEMINAR IN SPECIAL TOPICS IN FINANCE. 3 Hours.**

Doctoral level coverage of advanced topics in finance. May be repeated for credit when topics vary. Prerequisite: FINA 5311.

**FINA 6392. RESEARCH IN FINANCE. 3 Hours.**

Independent study of advanced topics in finance under the direction of graduate faculty. May be repeated for credit when topics vary. Prerequisite: FINA 5311.

**COURSES****FO 1104. FRESHMAN ORIENTATION. 1 Hour.****FO 1113. FO PRE LAW. 1 Hour.****COURSES****FREN 1441. BEGINNING FRENCH I. 4 Hours. (TCCN = FREN 1411)**

Multimedia immersion in the culture and language of French-speaking countries. Designed to enable students to understand and communicate effectively in French at the beginning level. No prerequisites.

**FREN 1442. BEGINNING FRENCH II. 4 Hours. (TCCN = FREN 1412)**

Continuation of beginning French. Prerequisite: FREN 1441 with a grade of C or better.

**FREN 1491. CONFERENCE COURSE. 4 Hours.**

Independent study; consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: Permission of the instructor.

**FREN 2301. TOPICS IN FRENCH LITERATURE IN TRANSLATION. 3 Hours.**

Study of the works of major authors and intellectual trends of a given period or periods. May be repeated for credit as topics or periods vary. FREN 2301 may be taken to fulfill the foreign language literature requirement. Prerequisite: ENGL 1301 and ENGL 1302 with a grade of C or better.

**FREN 2310. FRENCH AND FRANCOPHONE CULTURES IN THE WORLD. 3 Hours.**

An overview of the cultures of the French-speaking world in a global context, examining cultural products such as food, art, music, popular culture, literature, and/or film. Taught in English.

**FREN 2313. INTERMEDIATE FRENCH I. 3 Hours. (TCCN = FREN 2311)**

Continued immersion in the culture and language of French -speaking countries. Application of strategies and technology in mastering listening, speaking, reading, and writing at the intermediate level. Prerequisite: FREN 1442 with a grade of C or better.

**FREN 2314. INTERMEDIATE FRENCH II. 3 Hours. (TCCN = FREN 2312)**

Continuation of intermediate French. Prerequisite: FREN 2313 with a grade of C or better.

**FREN 2391. CONFERENCE COURSE. 3 Hours.**

Independent study; consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: Permission of the instructor.

**FREN 3300. FRENCH PRONUNCIATION. 3 Hours.**

This course is designed for students who have taken a year or more of French. Emphasis is on speaking skills, pronunciation, and vocabulary. This class prepares you to have a conversation with native speakers of French about everyday life. Students will also be introduced to French phonetics and phonology. Not open to native and heritage speakers of French. Prerequisite: FREN 1442 with a grade of C or better.

**FREN 3303. FRENCH CONVERSATION. 3 Hours.**

French Conversation aims to refine the skills learned during the first years of language study and to develop fluency and confidence in speaking at the intermediate level. The focus will be on developing oral proficiency and listening comprehension while reinforcing the mastery of basic grammatical forms and structures. Special emphasis will be placed on vocabulary building and on producing longer and more complex sentences. Using films, songs, and games as content, students will learn to carry on conversations with greater sophistication and authenticity. Credit will not be granted to native or heritage speakers of French. Prerequisite: FREN 1442 with a grade of C or better.

**FREN 3304. READINGS AND WRITING IN FRENCH. 3 Hours.**

This course emphasizes reading comprehension, writing skills, and compositional techniques. Grammar is reviewed. Short stories, essays, movies, and social media provide content material. Credit will not be granted to native or heritage speakers of French. Prerequisite: FREN 2314 with a grade of C or better.

**FREN 3305. FRENCH CULTURE AND CIVILIZATION. 3 Hours.**

Historical development of the social, institutional, intellectual, and artistic life of France from inception to the present. Credit will not be granted to native or heritage speakers of French. Prerequisite: FREN 2314 with a grade of C or better.

**FREN 3309. FRENCH FILM: ART, TECHNOLOGY AND SOCIETY. 3 Hours.**

The course is an overview of major movements in French film from the Lumières brothers and Méliès to the contemporary cinema of Leconte, Varda, Bonello, and Denis. It introduces students to the technologies that helped shape French films and uses film to raise important issues about national identity, politics, and gender in France and in the wider Francophone world. Prerequisite: FREN 2314 or equivalent with a grade of C or better.

**FREN 3310. INTRODUCTION TO LITERATURE. 3 Hours.**

Principles of literary analysis pertaining to genre, concepts of literary structure, language, and criticism through examination of selected works. Prerequisite: FREN 2314 with a grade of C or better.

**FREN 3311. CATHEDRALS, CASTLES, AND REVOLUTIONS. 3 Hours.**

This course examines the conditions that shaped France from medieval times to the Renaissance, and onward to the Enlightenment and the Revolution of 1789. The course explores main currents of French literature, art, and thought. Prerequisite: FREN 2314 or equivalent with a grade of C or better.

**FREN 3312. FRENCH LITERATURE AND CULTURE 19th to 21st CENTURIES. 3 Hours.**

This course examines the conditions that shaped French culture From Napoleon I to modern times by exploring main currents of French literature, art, film, and thought. Prerequisite: FREN 2314 or equivalent with a grade of C or better.

**FREN 3316. TOPICS IN CITIES OF FRANCE AND THE FRENCH-SPEAKING WORLD. 3 Hours.**

The course explores cities and other places as geographical and cultural constructs in literature, the visual arts (including film), and the media. Topics may include large cities like Paris, Lyon, Montreal, Cairo, and Algiers, for example, as well as museums, metros, parks, and other public spaces in France, the Middle East, North Africa, Africa, the Americas, and Asia. FREN 3316 may be repeated for credit when content changes. Prerequisite: FREN 2314 or equivalent with a grade of C or better.

**FREN 3318. TOPICS OF IDENTITY IN FRANCE AND THE FRENCH-SPEAKING WORLD. 3 Hours.**

This course is a study of places, periods, persons, or questions that helped define French and French-speaking cultural identity, from its origins to the present. Issues studied include linguistic choice, immigration, citizenship, religion, schools, and the representation of women and other groups. No prior knowledge of French language or culture is necessary. Taught in English. May be repeated as the topic changes. Offered as MODL 3318 and FREN 3318; credit will be granted for either MODL or FREN. Students who are working toward a major or minor in French will be required to take FREN 3318.

**FREN 3320. LOCALIZATION AND TRANSLATION I. 3 Hours.**

Introduction to cultural and linguistic issues in the translation of French language texts. Students will explore current technologies used in various real-world translation contexts and how to adapt texts, products, and services to the locale for which they are intended. May be repeated for credit as focus of course changes. Exclusively for students pursuing a minor in Localization and Translation-French. Prerequisite: FREN 2314 with a grade of B or better.

**FREN 3321. LOCALIZATION AND TRANSLATION II. 3 Hours.**

Continued study of cultural and linguistic issues in the translation of French and English language texts. Systematic development of advanced skills in localization and computer-aided translation and in using TMX/TBX (international standards for translation memory and terminology exchange) tools. Translation practice, individually and in translation teams, with increasingly longer and more specialized texts. Prepares localization and translation specialists for real-world careers in the language-services industry. Exclusively for students pursuing a minor in Localization and Translation-French. Prerequisite: FREN 3320 with a grade of B or better.

**FREN 3345. INTRODUCTION TO COMPUTER-ASSISTED TRANSLATION. 3 Hours.**

Introduction to computer-assisted translation (CAT), machine translation (MT), translation memory (TM), and terminology management tools in modern translation and localization workflows. Prepares students for real-world careers in the language services industry. Exclusively for students pursuing a minor in Localization and Translation-French. FREN 3345 cannot be applied toward the minor in French. FREN 3320 is strongly recommended before FREN 3345.

**FREN 3391. CONFERENCE COURSE. 3 Hours.**

Independent study; consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: Permission of instructor.

**FREN 3393. FRENCH INTERNSHIP. 3 Hours.**

A combination of field-related experience in the business or service sector with an academic component. Coursework may include journal writing, outside readings, reflection papers, and formal presentations. Prerequisite: Permission of Instructor.

**FREN 4310. GRAPHIC NOVELS AND THE MEDICAL WORLD. 3 Hours.**

This course examines the ways in which the comic book medium can bring new insights to patient, healthcare, and clinical experiences. Students will become familiar with both major works of graphic medicine and key theoretical texts related to sequential art and to pathographies (autobiographies that revolve particularly around health issues). Includes a cultural comparison component through patient and practitioner stories from an American and from a French perspective. Taught in English. Students in French can read the material in French and write assignments in French with permission of the instructor. Prerequisite: FREN 2314.

**FREN 4314. IMPROVING FRENCH GRAMMAR AND WRITING. 3 Hours.**

A detailed study of French grammar with practice in composition requiring original themes, essays, and research papers. An overview of the history of the French language and the influences of other languages and cultures on its evolution. Recommended for senior French majors. Prerequisite: FREN 2314 with a grade of C or better.

**FREN 4316. GLOBAL FRENCH CUISINES. 3 Hours.**

This course examines the history and culture of French cuisines across the globe from the Metropole (France) to its colonies, protectorates, and spheres of influence in the Middle East, North Africa, West Africa, Asia, North America, Central America, and other geographic spaces across time. Topics include North African and Middle Eastern Cuisines, The Culinary Traditions of Provence, Caribbean Cuisine: History and Cultures, West African Cuisine: Colonial and Postcolonial Encounters, French Foods and Revolutions: The Socialist Baguette and the Bourgeois Croissant, Street Food and the Rise of Café and Bistro Cultures, and others. Prerequisite: FREN 2314 with a grade of C or better or permission of the instructor.

**FREN 4318. INTRODUCTION TO FRENCH LINGUISTICS. 3 Hours.**

An introductory course on the linguistic structure of modern standard French, including phonology, morphology and syntax. Prerequisite: Any two 3000 level French courses with a grade of C or better. FREN 3300 is strongly recommended before taking FREN 4318.

**FREN 4322. TOPICS IN 17TH-CENTURY FRANCE. 3 Hours.**

This course takes a close look at the political and artistic climate of a defining period in French culture. Prerequisite: FREN 2314 or equivalent with a grade of C or better.

**FREN 4324. TOPICS IN 19TH-CENTURY FRANCE. 3 Hours.**

The course surveys major currents like Romanticism, Realism, Impressionism, and Orientalism in literature and art. Strong emphasis on the possibilities of leisure (theatre, travel, the phenomena that are department stores, trains, cameras, moving pictures, and high fashion), bourgeois tastes and institutions, the role of Capitalism, and the Alliance network in empire building. FREN 4324 may be repeated for credit when the content changes. Prerequisite: FREN 2314 or equivalent with a grade of C or better.

**FREN 4325. TOPICS IN 18TH-CENTURY FRANCE. 3 Hours.**

Major currents such as Sensibility, Libertinism, the Republic of Letters, Exoticism, and Orientalism in literature and art. Patterns of French thought comprising the Enlightenment leading to the Revolution. May be repeated for credit when content changes. Prerequisite: FREN 2314 or equivalent with a grade of C or better.

**FREN 4328. TOPICS IN GLOBAL FRENCH IN THE 20TH-21ST CENTURIES. 3 Hours.**

Cultural and literary output of France, the Middle East, North Africa, Africa, the Americas, and Asia before and after the Second World War. Patterns of French thought, writing, and self-representation, New Europe, decolonization, and nationalism through various media. May be repeated for credit when content changes. Prerequisite: FREN 2314 or equivalent with a grade of C or better.

**FREN 4332. MEDIEVAL AND RENAISSANCE CULTURES. 3 Hours.**

Readings in modern French of Medieval and Renaissance French literature. Works include the adventures of King Arthur and the Knights of the Round Table, Gargantua, reflections on the self, friendship, education, and the "Other" in Montaigne's *Essais*, and the love poems of Ronsard. Emphasis on the importance of religion, the evolution and the meaning of cathedrals and monasteries, and the effect of the discovery of the "New World" on perceptions of self and of community. Prerequisite: FREN 2314 or equivalent with a grade of C or better.

**FREN 4334. GLOBAL FRENCH CULTURES TODAY. 3 Hours.**

This course examines French media, advertisement, journalism, and business culture. It explores the historical context and the social, political, and economic environment that informs these activities. Prerequisite: FREN 2314 or equivalent with a grade of C or better.

**FREN 4335. BUSINESS FRENCH. 3 Hours.**

Students learn to function in French in business environments, with emphasis on writing business letters, conducting telephone conversations and business meetings, using terminology for transactions in places such as banks, post offices, airports, and hotels. Video segments and interactive computer packages are used extensively to reinforce vocabulary and knowledge acquired through lectures, translations, and readings. Preparation for the DFP (Diplôme de Français Professionnel) Prerequisite: FREN 2314 or equivalent with a grade of C or better.

**FREN 4338. GLOBAL FRENCH LITERATURES AND CULTURES. 3 Hours.**

This course focuses on French-speaking cultures in Europe, the Middle East, North Africa, West Africa, the Americas, and Asia from the 17th century to the present through literature, music, film, and other forms of expression. Topics include The French Caribbean Novel, World War II in French Literature and Film, Colonial and Postcolonial Experience, French Canada: History and Culture, Mediterranean Readings, The Maghreb and the Levant. May be repeated for credit when topic changes. Prerequisite: FREN 2314 or equivalent with a grade of C or better.

**FREN 4339. ACQUISITION OF FRENCH. 3 Hours.**

Theory and practice of language acquisition. Techniques needed to understand and analyze the sounds, vocabulary, and grammar of the French language. Primarily for students seeking teacher certification. Prerequisite: FREN 2314 or equivalent with a grade of C or better.

**FREN 4341. TRANSLATION: FRENCH & ENGLISH. 3 Hours.**

Techniques of translation using different types of texts explore the special difficulties inherent in the translation process. Students will compare French and English grammars and explore the role culture plays in translation. Special emphasis on how ideas, words, and sentences are transposed across cultures, languages, and contexts. Prerequisite: FREN 3304 or FREN 4314 with a grade of C or better.

**FREN 4342. TOPICS IN TRANSLATION. 3 Hours.**

This course provides additional practice translating texts, comparing and evaluating professional or amateur translations, and/or post-editing machine translations. May be repeated for credit when content changes. Prerequisite: FREN 3304 or FREN 4314 with a grade of C or better, or permission of the instructor.

**FREN 4391. CONFERENCE COURSE. 3 Hours.**

Independent study in the preparation of a paper on a research topic and consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: Permission.

**FREN 4393. FRENCH INTERNSHIP. 3 Hours.**

This course is a combination of field-related experience in the business or service sector with an academic component. Coursework may include journal writing in French, outside readings, and formal presentations. Prerequisite: Two FREN 3000 level courses and permission of the instructor.

**FREN 4394. HONORS THESIS / SENIOR PROJECT. 3 Hours.**

Required of all students in the University Honors College. During the senior year, the student must complete a thesis or a project under the direction of a faculty member in the major department. May not be repeated for credit.

**FREN 5101. TEACHING PRACTICUM I. 1 Hour.**

Required of all teaching assistants in French in their first semester. May not be counted toward a master's degree. Graded P/F/R.

**FREN 5102. TEACHING PRACTICUM II. 1 Hour.**

Required of all teaching assistants in French in their second semester. May not be counted toward a master's degree. Graded P/F/R.

**FREN 5314. ADVANCED STYLISTICS. 3 Hours.**

Focuses on advanced problems of grammar and style, including syntax, morphology, semantics and stylistics. Surveys the history of the French language, including influences of other languages and cultures on its evolution. Attention given to pedagogical models and approaches as well as intensive composition practices.

**FREN 5316. MEDIEVAL AND RENAISSANCE LITERATURE AND CULTURE. 3 Hours.**

A study of the main currents of French literature and culture in their social, economic and political context through the representative genres of the period: epic verse, poetry, tales, fabliaux, comic narrative, and theatre to name a few.

**FREN 5317. 17TH AND 18TH CENTURY LITERATURE AND CULTURE. 3 Hours.**

A study of the main currents of French literature and culture in their social, economic and political context through the representative genres of the period: theatre, the romance, the novel, the portrait and maxim, the philosophic dialogue and tale, among others.

**FREN 5318. 19TH AND 20TH CENTURY LITERATURE AND CULTURE. 3 Hours.**

A study of the main currents of French literature and culture in their social, economic and political context through the representative genres of the period: theatre, the nouvelle, poetry, the novel, the anti-novel, etc.



**FREN 5320. TOPICS IN FRENCH LANGUAGE & LINGUISTICS. 3 Hours.**

Special studies in French language and linguistics not ordinarily covered by regular course offerings. Topics may include "Socio-Phonetics," French Phonetics and Phonology," and "History of the French Language." May be repeated for credit when content changes.

**FREN 5321. TOPICS IN GENRES OF THE 17TH CENTURY. 3 Hours.**

Investigates ideology and practice through literature, the visual arts, music and other cultural "texts." Major topics may include "Versailles: Architecture, Literature, and Politics," "Jansenism and its Discontents: Pascal, Racine, de Lafayette," "Libertins: Masks and Counter Masks." May be repeated for credit when topic changes.

**FREN 5325. TOPICS IN GENRES OF THE 18TH CENTURY. 3 Hours.**

Studies oppositional discourse as expressed through the different genres (theatre, poetry, fiction, political and philosophical writings) popular in the 18th century as well as the role and the effect of these works in constituting the Republic of Letters. May be repeated for credit when topic changes.

**FREN 5330. TOPICS IN GENRES OF THE 19TH CENTURY. 3 Hours.**

Concentrates on literature, the visual arts, entertainment, and fashion as expressions of popular culture. The rise of the "petite bourgeoisie," social utopias, the rebuilding of Paris, and responses to modernity will be studied in such courses as "Paris and Its Subcultures," Impressionism and the Bourgeoisie," "The Novel and the Body." May be repeated for credit when topic changes.

**FREN 5331. TOPICS IN GENRES OF THE 20TH CENTURY. 3 Hours.**

Focuses on the work of French and Francophone writers in the light of modernist and post-modernist aesthetics. Literature, art, architecture, music, film, video, television, and other forms of popular production are studied as reflections of an era in crisis. May be repeated for credit when topic changes.

**FREN 5338. TOPICS IN FRENCH CULTURE. 3 Hours.**

Survey of themes and structures on a range of topics such as "Women in/as Fiction," "Self and Society," & "Revolutions," "French Film." May be repeated for credit when topic changes.

**FREN 5391. CONFERENCE COURSE IN FRENCH LINGUISTICS, CULTURE, OR LITERATURE. 3 Hours.**

Graded R. Prerequisite: permission of Graduate Advisor. Course may be repeated for credit when the topic changes.

**FREN 5398. THESIS. 3 Hours.****FREN 5698. THESIS. 6 Hours.****FREN 5998. THESIS. 9 Hours.****FREN 6310. FRENCH STUDIES. 3 Hours.****COURSES****GEOG 2301. PHYSICAL GEOGRAPHY. 3 Hours. (TCCN = GEOG 1301)**

Survey of geographies of the natural environment and human-environment interactions with an emphasis on spatial patterns and processes.

**GEOG 2302. HUMAN GEOGRAPHY. 3 Hours. (TCCN = GEOG 1302)**

An introduction to geographical perspectives. An exploration of human activities from a local to a global scale. Emphasis on mapping and interpreting patterns and processes of human geography.

**GEOG 2303. WORLD REGIONAL GEOGRAPHY. 3 Hours. (TCCN = GEOG 1303)**

Survey of the geography of major world regions. Introduces global issues from a regional perspective with an emphasis on developing an understanding of the connections between and differences among world regions.

**GEOG 3300. RESEARCH METHODS IN GEOGRAPHY. 3 Hours.**

An introduction to geographic research that includes generating research questions, research design, methods of quantitative and qualitative data collection and analysis, and communication of research results. Prerequisite: GEOG 2302.

**GEOG 3305. MAPS AND MAPMAKERS. 3 Hours.**

A history of geography and cartography with an emphasis on the development of geographical ideas and mapmaking from antiquity to the modern era. Offered as GEOG 3305 and HIST 3305; credit will be granted only once.

**GEOG 3310. GEOGRAPHY OF THE UNITED STATES AND CANADA. 3 Hours.**

A survey of the geography of the United States and Canada. Includes environmental, cultural, economic, and political geographies with an emphasis on spatial patterns and processes.

**GEOG 3315. GEOGRAPHY OF LATIN AMERICA AND THE CARIBBEAN. 3 Hours.**

A regional survey of Latin American geography including Mexico, the Caribbean, Central America, and South America. Focuses on environmental, cultural, economic, political, and urban geographies with an emphasis on spatial patterns and processes.

**GEOG 3320. GEOGRAPHY OF AFRICA. 3 Hours.**

A survey of the human and physical geography of the whole continent of Africa. It assesses environmental, demographic, cultural, economic, and political geographies with an emphasis on spatial patterns and processes.

**GEOG 3327. CITIES AND SUBURBS IN THE UNITED STATES. 3 Hours.**

Explores the urban and suburban development of the United States from pre-colonial indigenous settlements to the present with an emphasis on the transformation of urban and suburban spaces over time and across regions. Attention to population, migration, land use, economics, politics, social and cultural identities, nature, and sustainability as factors in urban growth and change. Course taught as HIST 3327 and GEOG 3327. Credit will be granted only once.

**GEOG 3334. HISTORICAL GEOGRAPHY OF NORTH AMERICA. 3 Hours.**

Examines the intersection of the disciplines of geography and history including the creation of cultural landscapes, the spatial organization of human activities over time, and the interaction of humans with their environment over time with an emphasis on North America. Course taught as HIST 3334 and GEOG 3334. Credit will be granted only once.

**GEOG 3336. ENVIRONMENTAL HISTORY OF THE UNITED STATES. 3 Hours.**

People and the natural environment from the colonial period to the present. Ecological change, conservation movements, and artistic and literary interpretations of landscape and nature. Listed as GEOG 3336 and HIST 3336; credit will be granted only once.

**GEOG 3347. AMERICA'S BORDERS AND BORDERLANDS. 3 Hours.**

Covers the historical evolution of U.S. borders from independence to the present, and of the hybrid societies that have emerged along with them. Examines how borders have changed over time, and the people, commodities, ideas, and cultures, etc. that have crossed or straddled them. Particular attention is given to changing patterns of migration, border enforcement, and cultural hybridization, and the impact these have had on American society and politics. Offered as GEOG 3347 and HIST 3347; credit will be granted only once.

**GEOG 3380. THE SPATIAL HUMANITIES. 3 Hours.**

Introduction to the Spatial Humanities, including theory and methods concerning deep mapping, sense of place, and online open-source geospatial technology. Helps to develop an understanding of spatial and "palatial" thought and practice, drawing on perspectives found in literary, cultural, social, philosophical, linguistic, historical, artistic, dramatic, cinematographic, and media studies.

**GEOG 4191. CONFERENCE COURSE. 1 Hour.**

Topics assigned on an individual basis covering personal research or study in designated areas. Prerequisite: permission of the instructor.

**GEOG 4291. CONFERENCE COURSE. 2 Hours.**

Topics assigned on an individual basis covering personal research or study in designated areas. Prerequisite: permission of the instructor.

**GEOG 4314. GEOGRAPHY OF WAR. 3 Hours.**

This course investigates the complex relationships between war, the environment, and geography. It explores how landscapes, resources, and ecosystems are both tools and casualties of conflict. The course synthesizes perspectives from geography, history, literature, and geospatial technologies to analyze how the environment is weaponized, manipulated, transformed by war, and how resources, climate and human-physical geographies have been imbricated in the nature of warfare over the course of history.

**GEOG 4330. UNDERSTANDING GEOGRAPHIC INFORMATION SYSTEMS. 3 Hours.**

A practical introduction to GIS and methods of creating, maintaining and displaying spatial data using the ArcGIS software. This course is offered as GEOL 4330 and GEOG 4330; credit will not be granted for both. Prerequisite: Junior standing.

**GEOG 4331. ANALYSIS OF SPATIAL DATA. 3 Hours.**

Analyzing spatial data using ArcGIS, Spatial Analyst, and 3-D Analyst, topological surface analysis and modeling; 3-D visualization and viewscales; spatial statistics and data quality management. Course taught as GEOL 4331 and GEOG 4331. Credit will be granted in only one department. Prerequisite: GEOL 4330 or GEOG 4330.

**GEOG 4332. GLOBAL POSITIONING SYSTEM. 3 Hours.**

Review of the NAVSTAR Global Positioning System and its segments: space, operational control, and GPS receivers. Mechanics of the satellite constellation; GPS signal structure; datums and coordinate systems; precision and accuracy; error factors; absolute (point) versus relative (differential) positioning. Various positioning techniques using several types of GPS receivers; field data collection and input into GIS programs for data analysis and presentation. Course taught as GEOL 4332 and GEOG 4332. Credit will be granted in only one department. Prerequisite: GEOL 4330 or GEOG 4330.

**GEOG 4333. REMOTE SENSING FUNDAMENTALS. 3 Hours.**

The electromagnetic spectrum and the interaction of EM waves with matter; various types of sensing devices; spectral and spatial resolution parameters; airborne and satellite sensor platforms; aerial photographs and false-color images. The sequence of data acquisition, computer processing, and interpretation; sources of data; the integration of remote sensing data with other data types in GIS. Course taught as GEOL 4333 and GEOG 4333. Credit will be granted in only one department. Prerequisite: GEOL 4330 or GEOG 4330.

**GEOG 4334. GEOGRAPHIC DATA ANALYSIS. 3 Hours.**

Acquisition, processing and analysis of a set of spatial data selected by the student with approval of the instructor. A written report of the results is required. Course taught as GEOL 4334 and GEOG 4334. Credit will be granted in only one department. Prerequisite: GEOL 4330 or GEOG 4330; or cons. inst.

**GEOG 4340. GEOGRAPHIES OF FILM. 3 Hours.**

An exploration of film geographies with a focus on cinema as both a topic and a method for geographical representation, analysis, and learning.

**GEOG 4341. IMAGES OF THE SOUTHWEST BORDERLANDS. 3 Hours.**

Examines the changing culture, architecture, and landscapes of the American Southwest as depicted in literature, art, film, television, and advertising, including the role of popular culture and commerce in creating and marketing a regional "Southwestern style." Offered as GEOG 4341 and HIST 4341; credit will be granted only once.

**GEOG 4350. SPECIAL TOPICS IN MODERN GEOGRAPHY. 3 Hours.**

Selected topics in an identified area of geography. The course may be repeated for credit.

**GEOG 4391. CONFERENCE COURSE. 3 Hours.**

Topics assigned on an individual basis covering personal research or study in designated areas. Prerequisite: permission of the instructor.

**GEOG 5330. UNDERSTANDING GEOGRAPHIC INFORMATION SYSTEMS. 3 Hours.**

A practical introduction to GIS and methods of creating, maintaining and displaying spatial data using the ArcGIS software. This course is offered as GEOL 5330 and GEOG 5330; credit will not be granted for both.

**GEOG 5331. ANALYSIS OF SPATIAL DATA. 3 Hours.**

Analyzing spatial data using ArcGIS, Spatial Analyst, and 3-D Analyst, topological surface analysis and modeling; 3-D visualization and viewscales; spatial statistics and data quality management. Course taught as GEOL 5331 and GEOG 5331. Credit will be granted in only one department.

**GEOG 5334. GEOGRAPHIC DATA ANALYSIS PROJECT. 3 Hours.**

Acquisition, processing and analysis of a set of spatial data selected by the student with the approval of the instructor. A written report of the results is required. Offered as GEOL 5324 and GEOG 5334. Credit will not be given for both. Prerequisite: GEOL 5320, or GEOL 4330 or GEOG 4330, or cons. inst.

## COURSES

**GEOL 1101. SUCCESS IN EARTH AND ENVIRONMENTAL SCIENCES. 1 Hour.**

A first-year experience course for new students and new transfer students interested in a career in Earth and Environmental Sciences. Provides the necessary foundation for success in a college environment while balancing personal and work obligations. Orients students to life on campus, demonstrates how to leverage campus resources to achieve career and academic goals, and emphasizes engagement outside the classroom through collaborative and co-curricular opportunities. This course is reserved exclusively for students planning to major in Earth and Environmental Sciences who are in their first semester at UTA. Fulfills the University requirement for either UNIV 1101 or UNIV 1131. Offered as GEOL 1101 and ENVR 1101. Credit will not be given for both.

**GEOL 1301. EARTH SYSTEMS. 3 Hours. (TCCN = GEOL 1303)**

An integrated study of the earth, emphasizing interactions between plate tectonics, the atmosphere, the oceans, the biosphere, and human activity. Formerly listed as GEOL 1425, credit will not be given for both.

**GEOL 1302. EARTH HISTORY. 3 Hours. (TCCN = GEOL 1304)**

History of the earth and evolution of life emphasizing the co-evolution of the atmosphere, oceans, and biosphere. Formerly listed as GEOL 1426, credit will not be given for both.

**GEOL 1330. GLOBAL WARMING. 3 Hours.**

Global environmental challenges confronting humanity such as pollution, depletion of natural resources, ecosystem deterioration, food production, and population growth. Offered as ENVR 1330 and GEOL 1330. Credit will not be given for both.

**GEOL 1340. WEATHER AND CLIMATE. 3 Hours. (TCCN = GEOL 1347)**

Nature and variability of weather and climate, including wind, temperature, clouds and precipitation, droughts and flooding. Storm systems, fronts, thunderstorms, tornadoes, hurricanes. Atmospheric chemistry and air pollution. Mean climate, seasonal variations and climatic change. Formerly listed as GEOL 2401, credit will not be given for both.

**GEOL 1350. INTRODUCTION TO OCEANOGRAPHY. 3 Hours. (TCCN = GEOL 1345)**

The study of ocean basins and their origin, ocean currents, waves and tides, properties of sea water, and marine ecosystems, emphasizing the role of the ocean in the Earth system. Discussion of weekly ocean news, and incorporation of web-delivered current oceanographic data into the course material. Formerly offered as GEOL 3301 and GEOL 3184 and GEOL 2412; credit will be granted only once. Formerly listed as GEOL 1450, credit will not be given for both.

**GEOL 1360. GEOLOGIC HAZARDS. 3 Hours.**

Processes producing earthquakes, floods, eruptions and landslides, and their effect on people. Formerly listed as GEOL 2404, credit will not be given for both.

**GEOL 2406. NATURAL RESOURCES & SUSTAINABILITY. 4 Hours.**

Energy, construction, agricultural, and hydrological resources are evaluated in terms of their production and use, including storage and disposal of waste. Emphasis is placed on the importance of preserving clean water, air and soils. The course will concentrate on what humans take from the Earth, the impacts it has on their environment, and what it takes to make the planet sustainable for human habitation.

**GEOL 2445. MINERALOGY. 4 Hours.**

Lectures discuss the physical and chemical principles governing the properties and formation of minerals. There are three major divisions of the subject matter: (a) geometric and optical crystallography; (b) crystal chemistry and properties of minerals, and (c) occurrence, origins, and pressure-temperature stabilities of the major rock-forming minerals. Laboratories are devoted to exercises in crystallography, X-ray diffraction, optical mineralogy and hand-specimen mineral identification. Prerequisite: GEOL 1301 or GEOL 3340, and CHEM 1442, or permission from instructor.

**GEOL 3100. GEOSCIENCE PROFESSIONAL ORIENTATION. 1 Hour.**

Review of various careers in the Geosciences, and how to prepare a resume, network, and interview. Principles to follow for on-the-job success. Class will involve field trips and guest lectures.

**GEOL 3305. METEOROLOGY AND CLIMATOLOGY. 3 Hours.**

A quantitative approach to the study of the structure, energy, and motions of the atmosphere. Prerequisite: MATH 1426 and PHYS 1441, or PHYS 1443, or permission of instructor.

**GEOL 3316. ASTROBIOLOGY I. 3 Hours.**

This is an interdisciplinary course between astrophysics, biology and geology. Topics include properties of life, origin and evolution of life on Earth, terrestrial geology and habitability, environmental forcings, extremophiles, mass extinctions, meteorites, searches for life in the solar system. Offered as BIOL 3316, GEOL 3316 and PHYS 3316; credit will be granted only once. Prerequisite: PHYS 1441 & PHYS 1442 or equivalent and PHYS 2315 or PHYS 3315, or permission from instructor. Prerequisites for Biology majors: PHYS 1441 & PHYS 1442 or equivalent.

**GEOL 3340. GEOLOGY FOR ENGINEERS. 3 Hours.**

Introduction to geological materials and processes important to engineering. Includes processes forming minerals and rocks; mechanics and deformation of rocks, weathering, erosion and soils; soil hazards, land subsidence and mass movements; groundwater hydrology, geochemistry and contamination; and rivers. Labs will include introduction to geologic materials and use of GIS software to store, analyze and display geologic and engineering data. Prerequisites: PHYS 1443 and CHEM 1465 or CHEM 1442.

**GEOL 3358. ASTROBIOLOGY II. 3 Hours.**

This is an interdisciplinary course between astrophysics, biology and geology. Topics include basic properties of life, habitability of Earth, studies of possible life regarding Mars, Europa & Titan, space missions, exoplanets and exomoons, stellar habitable zones, multistellar systems, exoEarths, biomarkers, SETI, Fermi paradox, Drake equation, cosmology. Offered as BIOL 3358, GEOL 3358, and PHYS 3358; credit will be granted only once. Prerequisite: PHYS 1441 & PHYS 1442 or equivalent and PHYS 2315 or PHYS 3315, or permission from instructor. Prerequisites for Biology majors: PHYS 1441 & PHYS 1442 or equivalent. Note that Astrobiology I is strongly recommended to students to be taken prior to Astrobiology II, but is not a prerequisite.

**GEOL 3387. FIELD GEOLOGY I. 3 Hours.**

Stratigraphic and structural mapping and analysis of data collected in the field. Taught for three weeks only in the summer session. Special fee covers cost of transportation, room, and board while in the field. Prerequisite: GEOL 2445, GEOL 3442, GEOL 3443, and GEOL 3446.

**GEOL 3388. FIELD GEOLOGY II. 3 Hours.**

Mapping and analysis of igneous and metamorphic rock data as well as hydrologic, geochemical and mass wasting data collected in the field. Taught for three weeks after GEOL 3387 only in the summer session. Special fee covers cost of transportation, room, and board while in the field. Prerequisite: GEOL 2445, GEOL 3442, GEOL 3443, and GEOL 3387.

**GEOL 3441. BIOSTRATIGRAPHY AND LIFE THROUGH TIME. 4 Hours.**

Basic principles of bio- and chronostratigraphy including the classification of fossil groups, how index fossils are used to construct the geologic timescale and correlate strata. Prerequisite: GEOL 1302.

**GEOL 3442. SEDIMENTOLOGY AND STRATIGRAPHY. 4 Hours.**

An introduction to the description, origin, and historical interpretation of stratified rocks. Prerequisite: GEOL 2445.

**GEOL 3443. STRUCTURAL GEOLOGY. 4 Hours.**

The genesis, classification, and description of structural features resulting from deformation of the earth's crust. Prerequisite: GEOL 2445 and PHYS 1441 or PHYS 1443, or permission of instructor.

**GEOL 3446. PETROLOGY AND GEOCHEMISTRY. 4 Hours.**

Distribution, description, classification, plate-tectonic setting and origins of igneous and metamorphic rocks in the light of theoretical-experimental multicomponent phase equilibria studies; use of trace elements and radiogenic and stable isotopes as tracers in rock genesis; hand specimen and microscopic examinations of the major igneous-metamorphic rock types in the laboratory. Prerequisite: GEOL 2445.

**GEOL 3454. STATISTICS FOR EARTH AND ENVIRONMENTAL SCIENTISTS. 4 Hours.**

This course provides students with basic principles of statistics and helps students apply statistics to analyze data and interpret results from the perspective of Earth and environmental scientists. The course will first introduce basic concepts and then focus on applications to various examples in Earth and environmental sciences. Offered as ENVR 3454 and GEOL 3454, credit will not be given for both. Prerequisite: MATH 1426 or HONR-SC 1426.

**GEOL 4081. RESEARCH IN EARTH & ENVIRONMENTAL SCIENCES. 0 Hours.**

Research problems on an individual or group basis, conducted on a selected topic under the direction of a member of the Earth & Environmental Sciences faculty. May be repeated. This is a non-credit course so cannot be used to meet degree requirements. Prerequisite: Permission of the instructor.

**GEOL 4181. TOPICS IN ENERGY AND EARTH RESOURCES. 1 Hour.**

Lectures will discuss the historical evolution and current status of major research thrusts in the environment, energy, and resources studies, including Superfund and groundwater remediation, carbon sequestration, tight sands and coalbed methane, petroleum production in shale gas and oil reservoirs, geological repository of high-level nuclear waste, geothermal energy exploitation, mining of critical minerals, and gas (methane) hydrate. Prerequisite: GEOL 1301 or GEOL 3340 or equivalent.

**GEOL 4189. RESEARCH IN GEOLOGY. 1 Hour.**

Supervised undergraduate research in any one of the various fields of geology. May be repeated but will not meet Geology degree requirements. Prerequisite: permission from instructor.

**GEOL 4190. GEOSCIENCE INTERNSHIP. 1 Hour.**

Work in geoscience for a commercial concern at least 20 hours per week for three months. Requirements include: writing a resume, learning how to interview and function on the job, and a report describing the work. Prerequisite: 16 hours of Geology coursework.

**GEOL 4199. TECHNICAL SESSIONS. 1 Hour.**

Forum for presentation of results of undergraduate and graduate students and faculty research. Offered as ENVR 4199 and GEOL 4199. Credit will not be given for both. Prerequisite: For ENVR: ENVR 1301 or equivalent. For GEOL: GEOL 1301 or equivalent.

**GEOL 4289. RESEARCH IN GEOLOGY. 2 Hours.**

Supervised undergraduate research in any one of the various fields of geology. May be repeated but will not meet Geology degree requirements. Prerequisite: permission from instructor.

**GEOL 4302. GEODYNAMICS. 3 Hours.**

A comprehensive and quantitative study of fundamental aspects of plate tectonics. Introduction to heat flow, elasticity and flexure, fluid mechanics, faulting, gravity, and flow in porous media, with a wide range of geological applications. Includes collaborative problem solving. Prerequisite: GEOL 3443 and MATH 2425.

**GEOL 4304. SOLID EARTH GEOMECHANICS. 3 Hours.**

Application of continuum mechanics to understanding deformation in the earth, including mechanical analysis of natural geologic structures such as faults, folds, lava flows, and dikes, as well as practical problems related to reservoir geomechanics and mining applications. Prerequisites: GEOL 3443, MATH 2425, and PHYS 1444.

**GEOL 4305. SELECTED TOPICS IN GEOLOGY. 3 Hours.**

Geological topics not treated in the regular curriculum. Topic, format, and prerequisites to be determined by the instructor. May be repeated for Geology elective credit as different topics are offered.

**GEOL 4307. SEQUENCE STRATIGRAPHY. 3 Hours.**

This course introduces sequence stratigraphy within context of all stratigraphy and history of sequence stratigraphy. Includes overview of sequence stratigraphy principles. Review of basic fundamental concepts of surface- and facies-based physical stratigraphy. Review of architectural element analysis, sequence stratigraphic in seismic, borehole expression of sequences and overview of subsurface stratigraphic techniques. Prerequisite: GEOL 3442.

**GEOL 4308. ENVIRONMENTAL GEOCHEMISTRY. 3 Hours.**

The geochemistry of natural waters with emphasis on processes that control solute concentrations including complexation reactions, oxidation and reduction reactions, biogeochemistry, and chemical weathering reactions. Offered as ENVR 4308 and GEOL 4308. Credit will not be given for both. Prerequisite: CHEM 1442 or GEOL 2445.

**GEOL 4323. ISSUES IN ENVIRONMENTAL HEALTH. 3 Hours.**

An introduction to health issues of current concern resulting from environmental exposures. Topics include: environmental asthma, endocrine disruptors, climate change and health, emerging contaminants, nanotechnology and health, airborne particles and pediatric health. Offered as ENVR 4323 and GEOL 4323. Credit will not be given for both.

**GEOL 4330. UNDERSTANDING GEOGRAPHIC INFORMATION SYSTEMS. 3 Hours.**

A practical introduction to GIS and methods of creating, maintaining and displaying spatial data using the ArcGIS software. This course replaces GEOL 4352; credit will not be granted for both. This course is offered as GEOL 4330 and GEOG 4330. Prerequisite: Junior standing.

**GEOL 4331. ANALYSIS OF SPATIAL DATA. 3 Hours.**

Analyzing spatial data using ArcGIS, Spatial Analyst, and 3-D Analyst, topological surface analysis and modeling; 3-D visualization and viewscales; spatial statistics and data quality management. Course taught as GEOL 4331 and GEOG 4331. Credit will be granted in only one department. Prerequisite: GEOL 4330 or GEOG 4330.

**GEOL 4332. GLOBAL POSITIONING SYSTEM. 3 Hours.**

Review of the NAVSTAR Global Positioning System and its segments: space, operational control, and GPS receivers. Mechanics of the satellite constellation; GPS signal structure; datums and coordinate systems; precision and accuracy; error factors; absolute (point) versus relative (differential) positioning. Various positioning techniques using several types of GPS receivers; field data collection and input into GIS programs for data analysis and presentation. Course taught as GEOL 4332 and GEOG 4332. Credit will be granted in only one department. Prerequisite: GEOL 4330 or GEOG 4330.



**GEOL 4333. REMOTE SENSING FUNDAMENTALS. 3 Hours.**

The electromagnetic spectrum and the interaction of EM waves with matter; various types of sensing devices; spectral and spatial resolution parameters; airborne and satellite sensor platforms; aerial photographs and false-color images. The sequence of data acquisition, computer processing, and interpretation; sources of data; the integration of remote sensing data with other data types in GIS. Course taught as GEOL 4333 and GEOG 4333. Credit will be granted in only one department. Prerequisite: GEOL 4330 or GEOG 4330.

**GEOL 4334. GEOGRAPHIC DATA ANALYSIS. 3 Hours.**

Acquisition, processing and analysis of a set of spatial data selected by the student with approval of the instructor. A written report of the results is required. Course taught as GEOL 4334 and GEOG 4334. Credit will be granted in only one department. Prerequisite: GEOL 4330 or GEOG 4330; or cons. inst.

**GEOL 4335. TECTONICS AND ISOTOPES. 3 Hours.**

Fundamentals of global tectonics, and the application of isotope geochemistry in sedimentary rocks to understanding tectonic questions. Emphasis will be given to the mechanisms of mountain formation, isotope paleoaltimetry, detrital geochronology, and thermochronology. Prerequisite: GEOL 3442, GEOL 3446.

**GEOL 4342. MICROFOSSILS AND CARBONATE ROCKS. 3 Hours.**

Half of this course consists of an introduction to microfossil groups occurring in sedimentary rocks: foraminifers, conodonts, coccolithophorids and others, and their usefulness in regional and global correlation of Phanerozoic strata. The biostratigraphy of these groups will be discussed along with the principles used in the correlation of sedimentary rocks. The other half of the course consists of the analysis of the lithofacies and biofacies of carbonate rocks, their genesis, depositional environments, and diagenesis. Prerequisite: GEOL 1302, or cons. inst.

**GEOL 4343. RESEARCH METHODS - UTEACH. 3 Hours.**

The purpose of this course is to present UTeach students with the tools scientists use to solve scientific problems. These tools enable scientists to develop new knowledge and insights, the most important of which are eventually presented in textbooks and taught in more conventional science classes. These tools include: design of experiments to answer scientific questions; use of statistics to interpret experimental results and deal with sampling errors; mathematical modeling of scientific phenomena; finding and reading articles in the current scientific literature; applying scientific arguments in matters of social importance; writing scientific papers; reviewing scientific papers; oral presentation of scientific work; use of probes and computers to gather and analyze data; ethical treatment of human subjects; laboratory safety. Research Methods is primarily a laboratory course, and most of these topics are developed in connection with four independent inquiries UTeach students design and carry out. Written inquiries will be evaluated as examples of scientific writing. Prerequisite: C or better in SCIE 1201 or SCIE 1334, or concurrent enrollment; and junior or senior standing.

**GEOL 4346. BASIN ANALYSIS. 3 Hours.**

The classification and characteristics of sedimentary basins and the mechanisms forming them; and the tectonic, climatic, and eustatic controls on basin subsidence and the basin fill. Applications include the influence of basin evolution on petroleum generation, migration, and accumulation. Prerequisite: GEOL 3442 and MATH 1426.

**GEOL 4350. STABLE ISOTOPE GEOCHEMISTRY. 3 Hours.**

Principles governing the fractionation and distribution of stable isotopes (C, H, N, O, S) in nature, and application of stable isotope geochemistry to environmental problems and global climate change. Prerequisite: GEOL 2445 and CHEM 1442, or permission from instructor.

**GEOL 4351. SUSTAINABLE ENERGY RESOURCES. 3 Hours.**

The seminar will review literature of sustainable energy resources including critical minerals, subsurface storage and generation of hydrogen and hydrocarbons, geothermal energy, carbon capture and CO<sub>2</sub> sequestration, waste management, and green energies. Prerequisite: GEOL 1301, or ENVR 1301, or GEOL 3340, or cons. inst.

**GEOL 4352. ANALYTICAL METHODS IN GEOCHEMISTRY. 3 Hours.**

Principles of geochemical analysis of waters, rocks and soils, and gases. Methods to be covered include x-ray fluorescence and diffraction, mass spectrometry, coulometry, inductively-coupled plasma, and gas/ion chromatography with various detection methods. Prerequisite: CHEM 1442.

**GEOL 4353. DATA ANALYSIS FOR EARTH AND ENVIRONMENTAL SCIENTISTS. 3 Hours.**

This course is an introduction to data analysis and data science by means of mathematics and statistics. We analyze real-world data to find patterns, detect trends and better forecast complex systems in nature. This course provides quantitative methods and deep understanding of applications of data analysis in earth and environmental sciences. It covers analyzing a broad type of data related to geology, earth sciences and environmental engineering. Offered as ENVR 4353 and GEOL 4353; credit will not be given for both. Prerequisite: ENVR 3454, or GEOL 3454, or STATS 1301.

**GEOL 4356. ENVIRONMENTAL RISK ASSESSMENT. 3 Hours.**

This course introduces the basic scientific components of environmental and occupational health risk assessment and describes the policy context in which decisions to manage environmental health risks are made. The course presents the quantitative methods used to assess the human health risks associated with exposure to toxic chemicals, focusing on the four major components of risk assessment-hazard identification, dose-response assessment, exposure assessment, and risk characterization.

**GEOL 4357. MEDICAL GEOLOGY. 3 Hours.**

Introduction to geoscience and health. Students will learn how the geologic and geochemical environment can impact health. The historic background to geoscience and health will be presented followed by discussions on the natural abundance of elements in the earth, and the nature of essential and toxic elements (dose-response). Students will then learn about health responses following exposures in specific geologic/geochemical situations. Prerequisite: GEOL 1301 or ENVR 1301, or equivalent.

**GEOL 4360. GEOLOGICAL PROCESSES OF OCEANS. 3 Hours.**

Sedimentation in the oceans, chemistry of seawater, geochemical cycles in the oceans, and physical and biological processes that relate to sediment production, origin of seafloor topography, and seafloor spreading. Prerequisite: GEOL 3442.

**GEOL 4367. PALEO EARTH SYSTEMS. 3 Hours.**

This course discusses the evolution of Earth's complex dynamic system that is controlled by feedback processes that are both non-linear and stochastic in nature. Prerequisite: GEOL 1301.

**GEOL 4368. GEOLOGY OF THE PERMIAN BASIN. 3 Hours.**

Overview of the geologic evolution of the Permian Basin of W Texas and SE New Mexico and its petroleum resources. Emphasis on student presentations and term paper. Prerequisite: GEOL 1301 or equivalent.

**GEOL 4389. RESEARCH IN GEOLOGY. 3 Hours.**

Supervised undergraduate research in any one of the various fields of geology. May be repeated but will not meet Geology degree requirements. Prerequisite: permission from instructor.

**GEOL 4393. HONORS THESIS/SENIOR PROJECT. 3 Hours.**

Required of all students in the University Honors College. During the senior year, the student must complete a thesis or project under the direction of a faculty member in the Earth and Environmental Sciences Department.

**GEOL 4402. COMPUTER MODELING IN EARTH SCIENCE. 4 Hours.**

An introduction to basic programming and computation in the earth sciences using Matlab®, with emphasis on development of univariate and bivariate statistical models, spatial and image analysis, time series analysis, and the development of basic deterministic physics-based models of geological processes. Prerequisite: MATH 2425.

**GEOL 4405. METEOROLOGY AND CLIMATOLOGY. 4 Hours.**

A quantitative approach to the study of the structure, energy, and motions of the atmosphere. Prerequisite: MATH 1426, and PHYS 1441 or PHYS 1443, or permission of instructor.

**GEOL 4420. HYDROGEOLOGY. 4 Hours.**

This course is a comprehensive presentation of groundwater and subsurface hydrology that integrates chemistry, physics, geology, and calculus while applying theories to real-world geology and environmental science. It provides quantitative methods of calculation in groundwater and deep understanding of fundamental basics and concepts in subsurface hydrology. This course covers a broad range of topics related to transport processes, flow in porous media, groundwater contamination, well hydraulics, and aquifer yield. Prerequisite: PHYS 1441, or PHYS 1443, or cons. inst.

**GEOL 4421. GEOCHRONOLOGY. 4 Hours.**

Introduction to dating techniques, applied to understand past climate and tectonics. Prerequisite: GEOL 1301 or equivalent.

**GEOL 4422. CONTAMINANT HYDROGEOLOGY. 4 Hours.**

Sources and types of organic and inorganic contaminants; the physical, chemical, and biological factors and processes that affect the transport and fate of contaminants in the subsurface; non-aqueous phase liquids and multiphase flow; and various remedial techniques of contaminated sites. Prerequisite: GEOL 1301, ENVR 1301, or equivalent.

**GEOL 4425. PALEOCLIMATE & CLIMATE CHANGE. 4 Hours.**

Climate change throughout geologic time, especially the last 100 million years: models of the climate system, reconstruction and modeling of past climates, abrupt climate change, warm climates, paleoclimatology, climate change and mass extinctions. Prerequisite: GEOL 1301 or ENVR 1330 or GEOL 1330, or permission from instructor.

**GEOL 4443. SEDIMENTARY SYSTEMS. 4 Hours.**

Focuses on the processes transporting and archiving siliciclastic sediment, and the approaches using siliciclastic sedimentary rocks to reconstruct earth surface processes. This course includes a heavy component of student-led presentation and discussion. Prerequisite: GEOL 3442.

**GEOL 4455. ENVIRONMENTAL DATA SCIENCE. 4 Hours.**

This course focuses on acquisition, analysis, interpretation, and presentation of environmental data. Available datasets will be utilized to explore different models and case studies of the fate and transport of contaminants in multimedia environments, climate and health, toxicology prediction, water quality, environmental epidemiology, etc. The course includes practical exercises with Python and R. Offered as ENVR 4455 and GEOL 4455. Credit will not be given for both.

**GEOL 4456. ENVIRONMENTAL RISK ASSESSMENT. 4 Hours.**

This course introduces the basic scientific components of environmental and occupational health risk assessment and describes the policy context in which decisions to manage environmental health risks are made. The course presents the quantitative methods used to assess the human health risks associated with exposure to toxic chemicals, focusing on the four major components of risk assessment-hazard identification, dose-response assessment, exposure assessment, and risk characterization. Offered as ENVR 4456 and GEOL 4456. Credit will not be given for both.

**GEOL 4458. MACHINE LEARNING FOR EARTH AND ENVIRONMENTAL SCIENTISTS. 4 Hours.**

This course provides students with basic principles of machine learning and helps students apply machine learning to analyze data, predict outcomes and interpret results from the perspective of earth and environmental scientists. The course will first introduce basic concepts and then focus on applications to various examples in earth and environmental sciences. Offered as GEOL 4458 and ENVR 4458. Credit will not be given for both. Prerequisite: GEOL 3454 or ENVR 3454 or equivalent.

**GEOL 4465. PHYSICAL OCEANOGRAPHY AND LIMNOLOGY. 4 Hours.**

An introduction to physical processes in lakes and oceans. Changes in lakes and oceans influence heat, and momentum fluxes at the aquatic/oceanic and atmospheric interface. Topics include ocean/lake structure and circulation, and the impact of global climate change on lakes and oceans. Field excursions to nearby lakes combine theoretical knowledge and field measurements. Prerequisite: MATH 1426 and PHYS 1441 or PHYS 1443.

**GEOL 5151. TOPICS IN ENERGY AND EARTH RESOURCES. 1 Hour.**

This course will discuss the historical evolution and current status of major research thrusts in the environment, energy, and resources studies, including Superfund and groundwater remediation, carbon sequestration, tight sands and coalbed methane, petroleum production in shale gas and oil reservoirs, geological repository of high-level nuclear waste, geothermal energy exploitation, mining of critical minerals, and gas (methane) hydrate. Prerequisite: GEOL 1301 or GEOL 3340 or EVSE 5311 or equivalent.

**GEOL 5180. PROFESSIONAL ORIENTATION AND BUSINESS ETHICS. 1 Hour.**

A mentoring program using working professionals selected by the Earth and Environmental Sciences Department. Each participant meets at least once a month with a mentor who provides information on practices and skills necessary to succeed in the workplace. Course participants review business ethics statements provided by the mentor's company or other companies and write a critique based on materials from professional business ethics organizations such as the International Business Ethics Institute. Prerequisite: Prerequisite or concurrent enrollment GEOL 5345.

**GEOL 5181. RESEARCH IN GEOLOGY. 1 Hour.**

Independent study in various areas of research including paleontology, stratigraphy, tectonics, structural geology, sedimentology, geochemistry, petrology, geophysics, and volcanology. May be repeated for credit. Graded P/F/R/W.

**GEOL 5190. GEOSCIENCE INTERNSHIP. 1 Hour.**

Work in geoscience for a commercial concern at least 20 hrs/wk for 3 months. Requirements include writing a resume, learning how to interview and function on the job, and a report describing the work. Prerequisite: Cons. inst.

**GEOL 5199. TECHNICAL SESSIONS. 1 Hour.**

Forum for presentation of results of graduate students and faculty research. Required each semester of all graduate students.

**GEOL 5265. TOPICS IN GEOL. 2 Hours.****GEOL 5281. RESEARCH IN GEOLOGY. 2 Hours.**

Independent study in various areas of research including paleontology, stratigraphy, tectonics, structural geology, sedimentology, geochemistry, petrology, geophysics, and volcanology. May be repeated for credit. Graded P/F/R/W.

**GEOL 5301. ENVIRONMENTAL GEOCHEMISTRY. 3 Hours.**

Fundamentals of low-temperature aqueous geochemistry, and anthropogenic impacts on natural water systems. Topics include equilibrium thermodynamics, kinetics, aqueous complexation, and oxidation/reduction processes that affect metals and organic matter in natural waters.

**GEOL 5302. GEODYNAMICS. 3 Hours.**

A comprehensive and quantitative study of fundamental aspects of plate tectonics. Introduction to heat flow, elasticity and flexure, fluid mechanics, faulting, gravity, and flow in porous media, with a wide range of geological applications. Includes collaborative problem solving. Prerequisite: GEOL 3443 and MATH 2425.

**GEOL 5303. ROCK FRACTURE MECHANICS. 3 Hours.**

Principles and tools of fracture mechanics are applied to the origins and physical behaviors of faults, dikes, joints, veins, and other natural structures in rock. Special emphasis will be given to combining field observations of fractures in rock with the elastic theory of cracks in order to explore the role of natural fractures in brittle rock deformation in the earth's crust with applications to crustal deformation, structural geology, engineering geology, and induced hydraulic fracture, i.e. Fracking. Prerequisite: GEOL 3443 and MATH 2425; or GEOL 3340 and CE 2313.

**GEOL 5304. SOLID EARTH GEOMECHANICS. 3 Hours.**

Application of continuum mechanics to understanding deformation in the earth, including mechanical analysis of natural geologic structures such as faults, folds, lava flows, and dikes, as well as practical problems related to reservoir geomechanics and mining applications. Prerequisite: GEOL 3443, MATH 2325, PHYS 1441 or PHYS 1443.

**GEOL 5305. METEOROLOGY AND CLIMATOLOGY. 3 Hours.**

A quantitative approach to the study of the structure, energy, and motions of the atmosphere. Prerequisite: MATH 1426 and PHYS 1441, or PHYS 1443, or permission of instructor.

**GEOL 5309. GEOMORPHOLOGY & QUATERNARY STRATIGRAPHY OF SEDIMENTARY SYSTEMS. 3 Hours.**

This course examines those physical processes that sculpt the surface of the Earth and result in deposition of sediments. Surface systems covered include weathering, mass wasting, rivers, shorelines, eolian processes, and glaciers. The course also examines the stratigraphic techniques used to decode the recent (2 million to present) stratigraphic record of these systems. Course is designed for geologists, biologists, and other fields concerned with interpreting and/or managing modern environments.

**GEOL 5320. UNDERSTANDING GEOGRAPHIC INFORMATION SYSTEMS. 3 Hours.**

A practical introduction to GIS and methods of creating, maintaining and displaying spatial data using the ArcGIS software.

**GEOL 5321. ANALYSIS OF SPATIAL DATA. 3 Hours.**

Analyzing spatial data using ArcGIS, Spatial Analyst, and 3D Analyst, topological surface analysis and modeling; 3D visualization and viewscales; spatial statistics and data quality management. Prerequisite: GEOL 4330 or GEOL 5320.

**GEOL 5322. GLOBAL POSITIONING SYSTEM. 3 Hours.**

Review of the NAVSTAR Global Positioning System and its segments: space, operational control, and GPS receivers. Mechanics of the satellite constellation; GPS signal structure; data and coordinate systems; precision and accuracy; error factors; absolute (point) versus relative (differential) positioning. Various positioning techniques using several types of GPS receivers; field data collection and input into GIS programs for data analysis and presentation. Prerequisite: GEOL 4330 or GEOL 5320.

**GEOL 5323. REMOTE SENSING FUNDAMENTALS. 3 Hours.**

The electromagnetic spectrum and the interaction of EM waves with matter; various types of sensing devices; spectral and spatial resolution parameters; airborne and satellite sensor platforms; aerial photographs and false-color images. The sequence of data acquisition, computer processing and interpretation; sources of data; the integration of remote sensing data with other data types in GIS. Prerequisite: GEOL 4330 or GEOL 5320.

**GEOL 5324. GEOGRAPHIC DATA ANALYSIS PROJECT. 3 Hours.**

Acquisition, processing and analysis of a set of spatial data selected by the student with the approval of the instructor. A written report of the results is required. Offered as GEOL 5324 and GEOG 5334. Credit will not be given for both. Prerequisite: GEOL 5320, or GEOL 4330 or GEOG 4330, or cons. inst.

**GEOL 5332. STABLE ISOTOPE GEOCHEMISTRY. 3 Hours.**

Principals governing the fractionation and distribution of stable isotopes (C, H, N, O, S) in nature, and application of stable isotope geochemistry to environmental problems and global climate change.

**GEOL 5333. FIELD METHODS. 3 Hours.****GEOL 5334. ANALYTICAL METHODS IN ENVIRONMENTAL SCIENCE. 3 Hours.**

Principals of geochemical analysis of waters, rocks and soils, and gases. Methods to be covered include x-ray fluorescence and diffraction, mass spectrometry, coulometry, inductively-coupled plasma, and gas/ion chromatography with various detection methods.

**GEOL 5335. ISOTOPES AND TECTONICS. 3 Hours.**

An Introduction to the fundamentals of clumped isotopes, and major radiogenic and cosmogenic isotope systems and their applications to the study of earth system processes and Earth history; emphasis will be placed on applications to tectonics, geochronology, and thermochronology. Prerequisite: CHEM 1442 or GEOL 4302.

**GEOL 5342. MICROFOSSILS AND CARBONATE ROCKS. 3 Hours.**

Half of this course consists of an introduction to microfossil groups occurring in sedimentary rocks: foraminifers, conodonts, coccolithophorids and others, and their usefulness in regional and global correlation of Phanerozoic strata. The biostratigraphy of these groups will be discussed along with the principles used in the correlation of sedimentary rocks. The other half of the course consists of the analysis of the lithofacies and biofacies of carbonate rocks, their genesis, depositional environments, and diagenesis. Prerequisite: GEOL 1302 or permission of the instructor.

**GEOL 5345. PETROLEUM GEOLOGY. 3 Hours.**

Origin, generation and migration of petroleum; reservoirs, seals and traps; the subsurface environment; properties of petroleum; exploration and production methods; use of seismic lines and well logs; types of petroleum basins; reserves and resources. Prerequisite: GEOL 3442 and GEOL 3443.

**GEOL 5351. SUSTAINABLE ENERGY RESOURCES. 3 Hours.**

The seminar will review literature of sustainable energy resources including critical minerals, subsurface storage and generation of hydrogen and hydrocarbons, geothermal energy, carbon capture and CO<sub>2</sub> sequestration, waste management, and green energies. Prerequisite: GEOL 1301, or ENVR1301, or GEOL 3340, or cons. inst.

**GEOL 5365. TOPICS IN GEOLOGY. 3 Hours.**

Topics offered depend on student and faculty interest. Such topics might include identification of fossil fragments in thin section; magmatic processes; plate tectonics and sedimentary basin evolution; stratigraphic paleontology; sedimentary or volcanogenic ore deposition; geostatistics; geophysical archeology; and various advanced subjects in sedimentology, stratigraphy, paleontology, geophysics, geochemistry, volcanology and petrology. May be repeated for credit when topic changes.

**GEOL 5367. PALEO EARTH SYSTEMS. 3 Hours.**

This course discusses the evolution of Earth's complex dynamic system that is controlled by feedback processes that are both non-linear and stochastic in nature. Prerequisite: GEOL 1301.

**GEOL 5368. GEOLOGY OF THE PERMIAN BASIN. 3 Hours.**

Overview of the geologic evolution of the Permian Basin of W Texas and SE New Mexico and its petroleum resources. Emphasis on student presentations and term paper.

**GEOL 5369. SEQUENCE STRATIGRAPHY. 3 Hours.**

This course introduces sequence stratigraphy within context of all stratigraphy and history of sequence stratigraphy. Includes overview of sequence stratigraphy principles. Review of basic fundamental concepts of surface- and facies-based physical stratigraphy. Review of architectural element analysis, sequence stratigraphic in seismic, borehole expression of sequences and overview of subsurface stratigraphic techniques. Prerequisite: GEOL 3442.

**GEOL 5370. SEDIMENTARY SYSTEMS. 3 Hours.**

Carbonate and clastic depositional systems, recognition of facies, systems tracts, diagenetic overprint, shelf to basin profiling, and sequence stratigraphic analysis.

**GEOL 5371. BASIN ANALYSIS. 3 Hours.**

Topics include: the classification and characteristics of sedimentary basins and the mechanisms forming them; and the tectonic, climatic, and eustatic controls on basin subsidence and the basin fill. Applications include the influence of basin evolution on petroleum generation, migration, and accumulation. Prerequisite: GEOL 3442 (Sedimentology and Stratigraphy).

**GEOL 5372. STRUCTURAL GEOMETRY AND TECTONICS OF PETROLEUM FIELDS. 3 Hours.**

Structural styles of thin-skinned, basement involved and reactivated systems in shortening, extensional and strike-slip deformation. Use of structural modeling and restoration methods to test the reliability of structural interpretations. Prerequisite: GEOL 3443.

**GEOL 5373. RESERVOIR CHARACTERIZATION. 3 Hours.**

Principles, protocols, analysis and measurement of petrophysical properties (e.g., fluid content, porosity, permeability, pore size distribution, water retention curve, imbibition) of petroleum reservoir rocks.

**GEOL 5374. SEISMIC INTERPRETATION. 3 Hours.**

Introduction to the methods of acquisition and processing as they relate to the interpretation of seismic records. Structural and stratigraphic interpretation methods and pitfalls using two and three dimensional seismic data. Introduction to Seismic Interpretation Software such as the Kingdom Suite from Seismic Micro Technology, Inc. Prerequisite: GEOL 3442 and GEOL 3443.

**GEOL 5375. INTRODUCTION TO WELL LOG INTERPRETATION AND MAPPING. 3 Hours.**

Introduction to the various types of well logs used in the petroleum industry and their petrophysical interpretations, including evaluations of porosity, water saturation, shale volume, permeability, and lithology. Introduction to techniques of contouring data and use of mapping software such as PETRA. Prerequisite: GEOL 3442.

**GEOL 5381. RESEARCH IN GEOLOGY. 3 Hours.**

Independent study in various areas of research including paleontology, stratigraphy, tectonics, structural geology, sedimentology, geochemistry, petrology, geophysics, and volcanology. May be repeated for credit. Graded R.

**GEOL 5395. MASTER'S PROJECT. 3 Hours.**

May be used as elective for students in non-thesis program. Graded F,P,R,W. Prerequisite: GEOL 1301 or equivalent course.

**GEOL 5398. THESIS. 3 Hours.**

Graded F, R.

**GEOL 5405. METEOROLOGY AND CLIMATOLOGY. 4 Hours.**

A quantitative approach to the study of the structure, energy, and motions of the atmosphere. Prerequisite: MATH 1426 and PHYS 1441, or cons. inst.

**GEOL 5421. GEOCHRONOLOGY. 4 Hours.**

Introduction to dating techniques, applied to understand past climate and tectonics. Prerequisite: GEOL 1301 or equivalent.

**GEOL 5425. PALEOCLIMATE AND CLIMATE CHANGE. 4 Hours.**

Climate change throughout geologic time, especially the last 100 million years: models of the climate system, reconstruction and modeling of past climates, abrupt climate change, warm climates, paleoclimatology, climate change and mass extinctions. Prerequisite: GEOL 1301 or ENVR 1330 or GEOL 1330, or cons. inst.

**GEOL 5428. HYDROGEOLOGY. 4 Hours.**

This course is a comprehensive presentation of groundwater and subsurface hydrology that integrates chemistry, physics, geology, and calculus while applying theories to real-world geology and environmental science. It provides quantitative methods of calculation in groundwater and deep understanding of fundamental basics and concepts in subsurface hydrology. This course covers a broad range of topics related to transport processes, flow in porous media, groundwater contamination, well hydraulics, and aquifer yield. Prerequisite: PHYS 1441, or PHYS 1443, or cons. inst.

**GEOL 5450. CONTAMINANT HYDROGEOLOGY. 4 Hours.**

Sources and types of organic and inorganic contaminants; the physical, chemical, and biological factors and processes that affect the transport and fate of contaminants in the subsurface; non-aqueous phase liquids and multiphase flow; and various remedial techniques of contaminated sites.

**GEOL 5454. STATISTICS FOR EARTH AND ENVIRONMENTAL SCIENTISTS. 4 Hours.**

This course provides students with basic principles of statistics and helps students apply statistics to analyze data and interpret results from the perspective of Earth and environmental scientists. The course will first introduce basic concepts and then focus on applications to various examples in Earth and environmental sciences. Offered as EVSE 5454 and GEOL 5454. Credit will not be given for both.

**GEOL 5456. ENVIRONMENTAL RISK ASSESSMENT. 4 Hours.**

This course introduces the basic scientific components of environmental and occupational health risk assessment and describes the policy context in which decisions to manage environmental health risks are made. The course presents the quantitative methods used to assess the human health risks associated with exposure to toxic chemicals, focusing on the four major components of risk assessment-hazard identification, dose-response assessment, exposure assessment, and risk characterization. Offered as EVSE 5456 and GEOL 5456, credit will not be given for both.

**GEOL 5458. MACHINE LEARNING FOR EARTH AND ENVIRONMENTAL SCIENTISTS. 4 Hours.**

This course provides students with basic principles of machine learning and helps students apply machine learning to analyze data, predict outcomes and interpret results from the perspective of earth and environmental scientists. The course will first introduce basic concepts and then focus on applications to various examples in earth and environmental sciences. Offered as GEOL 5458 and EVSE 5458. Credit will not be given for both. Prerequisite: ENVR 3454 or GEOL 3454 or EVSE 5454 or GEOL 5454 or equivalent.



**GEOL 5465. PHYSICAL OCEANOGRAPHY AND LIMNOLOGY. 4 Hours.**

An introduction to physical processes in lakes and oceans. Changes in lakes and oceans influence heat, and momentum fluxes at the aquatic/oceanic and atmospheric interface. Topics include ocean/lake structure and circulation, and the impact of global climate change on lakes and oceans. Field excursions to nearby lakes combine theoretical knowledge and field measurements. Prerequisite: PHYS 1441 or PHYS 1443; and MATH 1426.

**GEOL 5698. THESIS. 6 Hours.**

Graded F, P, R.

**COURSES****GERM 1441. BEGINNING GERMAN I. 4 Hours. (TCCN = GERM 1411)**

Multimedia immersion in the culture and language of German-speaking countries. Designed to enable students to understand and communicate effectively in German at the beginning level.

**GERM 1442. BEGINNING GERMAN II. 4 Hours. (TCCN = GERM 1412)**

Continuation of beginning German. Prerequisite: GERM 1441 with a grade of C or better.

**GERM 1491. CONFERENCE COURSE. 4 Hours.**

Independent study; consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: Permission of the instructor.

**GERM 2310. GERMAN CULTURE IN THE WORLD. 3 Hours.**

An overview of the cultures of the German-speaking world in a global context, examining cultural products such as food, art, music, popular culture, literature, and/or film. Taught in English.

**GERM 2313. INTERMEDIATE GERMAN I. 3 Hours. (TCCN = GERM 2311)**

Continued immersion in the culture and language of German-speaking countries. Application of strategies and technology in mastering listening, speaking, reading, and writing at the intermediate level. Prerequisite: GERM 1442 with a grade of C or better.

**GERM 2314. INTERMEDIATE GERMAN II. 3 Hours. (TCCN = GERM 2312)**

Continuation of intermediate German. Prerequisite: GERM 2313 with a grade of C or better.

**GERM 2391. CONFERENCE COURSE. 3 Hours.**

Independent study; consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: Permission of the instructor.

**GERM 3310. LOCALIZATION AND TRANSLATION I. 3 Hours.**

Introduction to cultural and linguistic issues in the translation of German language texts. Students will explore current technologies used in various real-world translation contexts and how to adapt texts, products, and services to the locale for which they are intended. May be repeated once. Prerequisite: GERM 2314 with a grade of B or better.

**GERM 3311. LOCALIZATION AND TRANSLATION II. 3 Hours.**

Continued study of cultural and linguistic issues in the translation of German and English language texts. Systematic development of advanced skills in localization and computer-aided translation and in using TMX/TBX (international standards for translation memory and terminology exchange) tools. Translation practice, individually and in translation teams, with increasingly longer and more specialized texts. Prepares localization and translation specialists for real-world careers in the language-services industry. May not be repeated for credit. Prerequisite: GERM 3310 with a grade of B or better.

**GERM 3313. TOPICS IN GERMAN CULTURE & CONVERSATION. 3 Hours.**

Topics in German culture with emphasis on conversation and reading skills in German with grammar review. Course may be repeated for credit with departmental permission as topic varies. Credit will not be given to native speakers of German, except with permission of the department. Prerequisite: GERM 2314 with a grade of C or better, or concurrent enrollment in GERM 2314.

**GERM 3316. GERMAN COMPOSITION & GRAMMAR. 3 Hours.**

Introduction to the analysis of texts with emphasis on reading comprehension, grammar, writing skills and compositional techniques. Prerequisite: GERM 2314, or the equivalent, with a grade of C or better.

**GERM 3318. SPECIAL TOPICS IN GERMAN STUDIES I. 3 Hours.**

German courses that may be cross-period or thematically oriented like Kinderliteratur or Film but also those courses targeted at specific groups (e.g. Business, Science, etc.). Course may be repeated for credit with departmental permission as topic varies.

**GERM 3345. INTRODUCTION TO COMPUTER-ASSISTED TRANSLATION. 3 Hours.**

Introduction to computer-assisted translation (CAT), machine translation (MT), translation memory (TM), and terminology management tools in modern translation and localization workflows. Prepares students for real-world careers in the language services industry. Exclusively for students pursuing a minor in Localization and Translation-German. GERM 3310 or GERM 4334 is strongly recommended before GERM 3345.

**GERM 3391. CONFERENCE COURSE. 3 Hours.**

Independent study; consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: consent of the department.

**GERM 3393. GERMAN INTERNSHIP. 3 Hours.**

A combination of field-related experience in the business or service sector with an academic component. Coursework may include journal writing, outside readings, reflection papers, and formal presentations. Prerequisite: Permission of Instructor.

**GERM 4321. TOPICS IN LITERATURE & CULTURE. 3 Hours.**

Literary periods, genres, authors, and research themes from German speaking countries. May include literature and thought from the Enlightenment and Classical period; Romanticism; the German Novelle and drama; German opera; banned books and postwar works from modern Germany. May be repeated as topics and texts vary. Prerequisite: Germ 2314 with a grade of B or better.

**GERM 4322. SPECIAL TOPICS IN GERMAN STUDIES II. 3 Hours.**

German courses that may be cross-period or thematically oriented, such as Culture of Obedience, Classical Tradition, or Women Writers, as well as specific time periods. Course may be repeated for credit with departmental permission as topic varies. Prerequisite: GERM 2314 with a grade of C or better.

**GERM 4334. THE CULTURE OF BUSINESS. 3 Hours.**

The relationship of culture, language, and meaning to issues affecting business and e-commerce in the German-speaking world, with emphasis on intercultural communication in an international business environment. Web-based media segments about international business in German-speaking Europe and the United States are used as an aid in the acquisition of pertinent cultural knowledge, as well as vocabulary. Prerequisite: GERM 2314 with a grade of B or better.

**GERM 4335. BUSINESS GERMAN. 3 Hours.**

Students learn to function in business environments, with emphasis on the skills needed for conducting e-commerce. Web-based media segments from the United States and German-speaking Europe are used to reinforce vocabulary and other linguistic knowledge. Prerequisite: GERM 4334 with a grade of B or better.

**GERM 4339. THE ACQUISITION OF GERMAN. 3 Hours.**

Theory and practice of acquisition of German. Techniques needed to understand and analyze the sounds, vocabulary, and grammar of the German language. Introduction to reading strategies, the development of oral communication skills, and writing strategies.

**GERM 4391. CONFERENCE COURSE. 3 Hours.**

Independent study in the preparation of a paper on a research topic; consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: Permission.

**GERM 4393. GERMAN INTERNSHIP. 3 Hours.**

This course is a combination of field-related experience in the business or service sector with an academic component. Coursework may include journal writing in German, outside readings, and formal presentations. Prerequisite: Two GERM 3000 level courses and permission of the instructor.

**GERM 4394. HONORS THESIS / SENIOR PROJECT. 3 Hours.**

Required of all students in the University Honors College. During the senior year, the student must complete a thesis or a project under the direction of a faculty member in the major department. May not be repeated for credit.

## COURSES

**GLOBAL 2301. INTRODUCTION TO GLOBAL ISSUES. 3 Hours.**

Comparative perspectives on a broad range of cultural, linguistic, economic, political, and social issues confronting a globalized world today. Designed to draw attention to the multifaceted connections among nation-states, nongovernmental organizations, diverse ethnic, cultural and religious groups, and populations around the world.

**GLOBAL 2315. INTRODUCTION TO LOCALIZATION AND LANGUAGE TECHNOLOGY. 3 Hours.**

An introduction to localization and computational approaches to language and culture. Topics will include: computer-aided translation, machine translation, natural language processing, mining and semantic analysis of language data, machine learning/AI with natural language.

**GLOBAL 3301. TOPICS IN INTERNATIONAL CULTURES AND CIVILIZATIONS I. 3 Hours.**

Intensive study of a particular world region and/or culture including, but not limited to, its language, geography, history, arts, commerce, politics, and government. Focus on its uniqueness as a culture and its integral place in global society. Repeatable for credit as topic varies. No prerequisite. Recommend enrollment in GLOBAL 2301 concurrently or previously.

**GLOBAL 3302. TOPICS IN INTERNATIONAL CULTURES AND CIVILIZATIONS II. 3 Hours.**

Advanced study of a particular world region and/or culture including, but not limited to, its language, geography, history, arts, commerce, politics, and government. Emphasis on film, media, international communication, or other subjects of global study. Repeatable for credit as topic changes. No prerequisite. Strongly recommended: GLOBAL 2301 and GLOBAL 3301, concurrently or previously.

**GLOBAL 3303. PUTINISM AND THE CULTURE OF RUSSIAN POLITICS. 3 Hours.**

A course on Putinism as a governing system and incipient ideology in Russia. The course focuses on the cultural, historical, and biographical roots of Putinism as well as its sociological, institutional, and ideological foundations. The course also examines aspects of Putinism in practice, with a specific focus on the role of the Russian security services and organized crime. Offered as GLOBAL 3303 and HIST 3373. Credit will only be given in one department. Prerequisite: ENGL 1301 with a grade of C or better.

**GLOBAL 3310. LOCALIZATION AND TRANSLATION. 3 Hours.**

Introduction to cultural and linguistic issues in the translation of language texts. Students will explore current technologies used in various real-world translation contexts and how to adapt texts, products, and services to the locale for which they are intended. Prerequisite: GLOBAL 3301 in the language under study or permission of the instructor.

**GLOBAL 3370. THE MAKING OF MODERN UKRAINE. 3 Hours.**

This course introduces students to the forces that shaped modern Ukraine. Students will learn how Ukraine came into being and evaluate this post-imperial state and civic nation as an example of anti-colonial rebellion. Offered as HIST 3370 and GLOBAL 3370; credit will be given in only one department.

**GLOBAL 4301. RESEARCH IN GLOBAL STUDIES. 3 Hours.**

This course examines multidisciplinary problems that fall within the scope of human rights and the UN's Sustainable Development Goals (SDGs). Students complete coursework which culminates in an original research project on a topic of their choice, which might involve novel approaches toward sustainability, food security, infrastructure, health, water conservation, sanitation, ecosystem resilience, urbanization, recycling, or other issues related to globalization. Students will investigate and propose solutions in the form of a proposal to carry out active field work in partnership with a non-governmental agency or non-profit organization working to promote sustainable global development. For students pursuing a minor or certificate in Global Studies, this course serves as their Capstone. Prerequisite: ANTH 2322, GLOBAL 2301, GLOBAL 3310, POLS 3302, or POLS 3304.

**GLOBAL 4312. INTERCULTURAL COMPETENCE FOR GLOBAL COMMUNICATION. 3 Hours.**

A study of the differences between the U.S. and other cultures of the world with a focus on the development of intercultural competence: verbal and non-verbal communication, interpersonal skills, effective management strategies, and professional etiquette in multicultural settings.

**GLOBAL 4393. INTERNSHIP. 3 Hours.**

This course is a combination of field-related experience in the business or service sector with an academic component. Coursework may include journal writing, outside readings, and formal presentations. Prerequisite: Two GLOBAL 3000 level courses and/or permission of the instructor.

**COURSES****GREK 1441. GREEK LEVEL I. 4 Hours.****GREK 1442. GREEK LEVEL II. 4 Hours.**

Prerequisite: GREK 1441 or equivalent.

**GREK 2313. GREEK LEVEL III. 3 Hours.**

Prerequisite: GREK 1442 or equivalent.

**GREK 2314. GREEK LEVEL IV. 3 Hours.**

Prerequisite: GREK 2313 or equivalent.

**GREK 4335. TOPICS IN GREEK LITERATURE. 3 Hours.**

Close reading of one or more Greek texts, with attention both to grammatical precision and to interpretation. Students should be able to read unaltered Greek.

**GREK 4391. CONFERENCE COURSE. 3 Hours.**

Advanced independent study in Greek literature. May be repeated for credit with departmental permission.

**GREK 5391. CONFERENCE COURSE IN GREEK. 3 Hours.**

May be taken only with the permission of the instructor and the Graduate Advisor.

**COURSES****GWSS 2301. TOPICS IN GENDER, WOMEN & SEXUALITY STUDIES. 3 Hours.**

Special topics of interest in the disciplines of Gender, Women & Sexuality Studies. May be repeated for credit when the topic changes.

**GWSS 2307. WOMEN IN THE ANCIENT WORLD. 3 Hours.**

Exploration of roles and images of women in ancient Greece and Rome, using a variety of primary (ancient) sources: literature, legal and medical texts, visual art, and inscriptions. Offered as CLAS 2307 and GWSS 2307. Credit will be granted only once.

**GWSS 2310. INTRO TO WOMEN'S & GENDER STUDIES. 3 Hours.**

Provides an introduction to Gender, Women & Sexuality Studies as fields that place women and gender at the center of inquiry. Examines topics such as work, family, reproduction, sexuality, politics, art, literature, and contemporary media. Explains the diversity of methods and theories employed in Gender, Women & Sexuality Studies scholarship, emphasizing the intersection of gender, sexuality, race, ethnicity, and class. Satisfies the University of Texas at Arlington core curriculum requirement in Language, Philosophy, and Culture.

**GWSS 2315. INTRODUCTION TO LGBTQ+ STUDIES. 3 Hours.**

Provides an introduction to Gay and Lesbian Studies, including the study of transsexual, transgender, and queer identities. May address topics such as LGBTQ history; sexuality and civil rights; the representation of LGBTQ in art, literature, and popular culture; and/or feminist analysis of sex, gender, and sexuality. Explains the methods and theories employed in gay and lesbian studies, emphasizing the intersection of gender, sexuality, race, ethnicity, class, and ability/disability. Satisfies the University of Texas at Arlington core curriculum requirement in Language, Philosophy, and Culture. This course is offered as GWSS 2315 and DIVR 2315. Credit will be granted in only one department.

**GWSS 2317. BASIC CONCEPTS IN HUMAN SEXUALITY. 3 Hours.**

The physiological, psychological, and sociological aspects of human sexuality. Offered as BIOL 2317, HEED 2317, PSYC 2317, and GWSS 2317. Credit will be granted for one of these courses only. Students seeking certification in Health Education must enroll in HEED 2317. Students seeking credit toward their science requirement must enroll in BIOL 2317. May not be used for biology grade point calculation or biology credit toward a BS degree in biology, microbiology, medical technology, psychology, or sociology.

**GWSS 3300. TOPICS IN GENDER, WOMEN & SEXUALITY STUDIES. 3 Hours.**

Special topics of interest in the disciplines of Gender, Women & Sexuality Studies. May be repeated for credit when the topic changes. Offered as GWSS 3300 and AAST 3300; credit will be granted in only one department.

**GWSS 3301. INTRODUCTION TO LATINA/HISPANIC FEMINISM. 3 Hours.**

This interdisciplinary course explores Latina/Hispanic feminism through the intersection of race, class, gender, and sexuality. This course is organized around the following issues: colonization, immigration, globalization, sexism, health, and violence. Through an analysis of cultural production, politics, socio-economics, literary texts, and feminist methodology, the goal of this course is to develop a robust understanding of how Latina/Hispanic feminist methodologies can be used as tools for social change and social justice. Offered as GWSS 3301, MAS 3301, and DIVR 3301. Credit will only be granted in one department.

**GWSS 3305. WOMEN'S HEALTH ISSUES. 3 Hours.**

Will address specific issues of importance to women and their health, including growth and development, nutrition, reproductive health, pregnancy, chronic diseases, and relationship/family issues. Offered as DIVR 3305, HEED 3305 and GWSS 3305. Credit will be granted only once.

**GWSS 3314. THE LATINA EXPERIENCE. 3 Hours.**

A course on the social, cultural, and economic experiences of Latina and Latin American origin women in the United States. Offered as MAS 3314, SOCI 3314, SOCW 3314, GWSS 3314, and AAST 3321. Credit will be granted in only one department.

**GWSS 3315. TOPICS IN LGBTQIA+ STUDIES. 3 Hours.**

Special topics related to LGBTQIA+ Studies. May be repeated for credit when the topic changes.

**GWSS 3324. U.S. WOMEN'S HISTORY. 3 Hours.**

An examination of women in US politics, work and society from the colonial era to the present. Offered as HIST 3324 and GWSS 3324; credit will be granted only once.

**GWSS 3328. MARITAL AND SEXUAL LIFESTYLES. 3 Hours.**

Contemporary American lifestyles selected from: singles, traditional marriage, homosexuals, single-parent families, open marriage, non-marital sexuality, cohabitation, dual-career marriage, childless couples, egalitarian marriage, families in later life. Offered as DIVR 3328, SOCI 3328 and GWSS 3328; credit will be granted only once.

**GWSS 3331. SOCIOLOGY OF THE FAMILY. 3 Hours.**

The family's role in American society and in other cultures past, present, and future. Family research methods, comparative family systems, child development/parenting, culture and personality, minority families, social class variation in families, work and family. Offered as SOCI 3331 and GWSS 3331; credit will be granted only once. Prerequisite: sophomore standing or permission of the instructor.

**GWSS 3334. SOCIOLOGY OF GENDER. 3 Hours.**

Examination of theoretical and empirical approaches to understanding the formation of gender. Assesses individual and structural dimensions of gender in various social institutions including work, education, and families. Offered as SOCI 3334 and GWSS 3334; credit will be granted only once.

**GWSS 3338. COMPARATIVE KINSHIP AND FAMILY SYSTEMS. 3 Hours.**

Variation in kinship and family systems from crosscultural and evolutionary perspectives. Structure, function, and dynamics of kinship and family systems as adaptations to diverse ecological, social, and historical circumstances. Implications of this approach for understanding kinship and family in American society also addressed. Formerly listed as ANTH 4338. Credit cannot be given for both ANTH 3338 and ANTH 4338. Also offered as GWSS 3338; credit will be granted only once. Offered as AAST 3332 and ANTH 3338; credit will be granted in only one department.

**GWSS 3356. WOMEN, WORK AND SOCIAL CHANGE. 3 Hours.**

Women's work experiences, how these experiences are changing, and relationship between paid employment and non-wage household labor. Paid and unpaid work experiences are empirically examined in terms of a variety of theoretical perspectives. Offered as DIVR 3356, SOCI 3356 and GWSS 3356; credit will be granted only once.

**GWSS 3360. GENDER AND THE PERFORMING ARTS. 3 Hours.**

Examines the role of gender in the performing arts, including theory and practice focused on gender. Additional topics may include female pioneers in the performing arts, the image of gender in different media, the way gender affects actors and artists, and the effect of cultural definitions of gender on audience reception. Offered as THEA 3360 and GWSS 3360. Credit will be granted only once.

**GWSS 3361. WOMEN IN THEATRE. 3 Hours.**

Examines the history, theory, and practice of women in theatre. Pioneering female writers, directors, producers, actors, designers, and activists will be explored as will their influence upon drama in its historical, social, and cultural contexts. Students will also be introduced to theory that examines female characters in plays and their impact on the artist and audience. Offered as THEA 3361 and GWSS 3361. Credit will be granted only once.

**GWSS 3364. TOPICS IN LGBTQIA+ LITERATURE AND THEORY. 3 Hours.**

Studies representations of the sexual and/or gender identities of LGBTQIA+ people and the intersectionality among them through a variety of texts. Specific topics may include the history of marginalized sexualities, crossdressing in literature, or transvestite saints; the texts may be philosophical, political, literary, and/or scientific. May be repeated for credit as course content changes. Offered as ENGL 3364 and GWSS 3364; credit will be granted in only one department. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**GWSS 3366. SEX, GENDER, AND CULTURE. 3 Hours.**

The ways gender and sexuality are culturally constructed. Readings include ethnographies, life histories, and fiction. Debates within anthropology and within specific cultures over maleness and femaleness. Offered as ANTH 3366 and GWSS 3366; credit will be granted only once.

**GWSS 3368. TOPICS IN FEMINIST THEORY, GENDER, AND SEXUALITY. 3 Hours.**

Examines issues of gender and sexuality through literary, theoretical, and philosophical texts that foreground questions feminist theory raises about desire, sexual identity, and gender asymmetry. Considers how gender and sexuality shape and are shaped by race, ethnicity, class, ability/disability, religion, and age. May be repeated for credit as course content changes. Offered as ENGL 3368 and GWSS 3368; credit will be granted in only one department. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**GWSS 3370. HISTORY OF WOMEN'S WRITING. 3 Hours.**

Examines women's writing in English from the Medieval period to the present. Offered as ENGL 3370 and GWSS 3370; credit will be granted in only one department. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**GWSS 3385. WOMEN AND CRIME. 3 Hours.**

This course examines criminology and criminal justice issues as they relate specifically to women. The three major areas of coverage include (1) women and girls as victims of crime, (2) women and girls as criminal offenders; and (3) women working in the criminal justice system. Offered as DIVR 3385, CRCJ 3385 and GWSS 3385; credit will be granted only once.

**GWSS 3393. ART AND GENDER. 3 Hours.**

Approaches to the interpretation of art from the stance of gender and feminism. Emphasis is placed on the work of significant female artists and on the gendered representations of art. Offered as ART 3393 and GWSS 3393; credit will be granted only once. Fulfills the Social/Cultural Studies requirement. Prerequisite: Any two of the three courses ART 1309, ART 1310, and ART 1317; or permission from the instructor.

**GWSS 4190. CONFERENCE COURSE. 1 Hour.**

Independent study for the advanced undergraduate. A close examination of a chosen topic through research and/or reading; format designed by instructor and student. May be repeated for credit when the subject matter varies, but only with permission of the director of Gender, Women & Sexuality Studies Program.

**GWSS 4290. CONFERENCE COURSE. 2 Hours.**

Independent study for the advanced undergraduate. A close examination of a chosen topic through research and/or reading; format designed by instructor and student. May be repeated for credit when the subject matter varies, but only with permission of director of Gender, Women & Sexuality Studies Program.

**GWSS 4302. WOMEN AND WORK IN TRANSATLANTIC PERSPECTIVE. 3 Hours.**

Examines the history of women and work, both waged and nonwaged, in Europe and the Americas, including the United States. Highlights differences within women's work cultures as well as variation in women's employment opportunities and their efforts to achieve equality with men in the workplace, by ethnicity, region, and nation. Offered as HIST 4302 and GWSS 4302; credit will be granted only once.

**GWSS 4303. WOMEN IN SOCIETY. 3 Hours.**

Women's status in contemporary American society, including the family, workplace, and politics. Women's status will also be examined in historical and crosscultural perspectives. Offered as SOCI 4303 and GWSS 4303; credit will be granted only once.

**GWSS 4305. TRANSNATIONAL FEMINISMS. 3 Hours.**

Explores transnational feminist frameworks and the heterogeneous processes used in the cultural construction of gender in a global context. Centering non-Western perspectives, the class analyzes the intersectional inequalities experienced by women in different cultural contexts and explores the workings of power and gender that shape the lives of women around the world. Topics may include reproductive rights, poverty, education, and religious, economic, political, and legal mechanisms of women's subordination and inequality.

**GWSS 4307. 'EVIL' WOMEN: WITCHES, HARLOTS & 'MADWOMEN'. 3 Hours.**

Examines the definition of "evil" women as a mechanism for the control of women and the maintenance of patriarchal gender relations in Western societies. Will address the philosophical and religious ideologies that underpin manifestations of misogyny and the extreme, narrow boundaries Western societies historically used in defining female gender roles. Topics include witch hunts, policing of women's sexual behavior, and using labels of mental illness to punish women for social transgressions.

**GWSS 4316. WOMEN IN THE POLITICAL PROCESS. 3 Hours.**

This course introduces students to the unique experiences of women in the political process, the impact of these experiences on the political system, and theories of gender and politics. Offered as POLS 4316 and GWSS 4316; credit will be granted only once.

**GWSS 4318. LANGUAGE AND GENDER. 3 Hours.**

The role of language in the expression and creation of gender identities. Gender differences in language structure and use, women's and men's language in other cultures, the acquisition of gendered ways of speaking, and sexism in language. Offered as LING 4318 and GWSS 4318; credit will be granted only once. Prerequisite: LING 3311.



**GWSS 4323. FEMINIST POLITICAL THOUGHT. 3 Hours.**

Issues raised by the feminist critique of political theory; the exclusion of women from the political sphere until the 20th century; Marxist, liberal, and radical feminist political thought; alternative feminist conceptions of the political. Offered as POLS 4323 and GWSS 4323; credit will be granted only once. Prerequisite: POLS 2311 and POLS 2312.

**GWSS 4325. WOMEN IN SCIENCE. 3 Hours.**

Explores the role of women in science. Emphasis on gender and science, the history of women in science, gender equity in the classroom, strategies for the retention of women scientists, the current culture/climate for women in science, and contemporary women in science. Offered as EDUC 4325, SCIE 4325, and GWSS 4325. Credit will be granted only once.

**GWSS 4326. DIVERSITY IN ORGANIZATIONS. 3 Hours.**

This course examines the implications of employee diversity in organizations, an issue of increasing importance. It includes study of the changing demographics of workers, including multiple demographic groups and areas of difference important to organizational treatment and outcomes. This course examines research on treatment, access, and customer discrimination. Legislation related to diversity is also reviewed. This course also provides suggestions for individuals and organizations to increase opportunities and outcomes for workers of all backgrounds. Offered as MANA 4326, AAST 4326 and GWSS 4326; credit will be granted in only one department. Prerequisite: Junior standing.

**GWSS 4327. WOMEN IN HISPANIC LITERATURE. 3 Hours.**

Considers women as characters in and writers of Hispanic literature. Includes the analysis of themes, language, and how the writings of women often give voice to lesser known aspects of culture. Offered as SPAN 4327, MAS 4327, and GWSS 4327; credit will be granted only once. Prerequisite: SPAN 3315 with a grade of C or better.

**GWSS 4340. TOPICS IN WOMEN'S WRITING. 3 Hours.**

Focuses on women's writing in a particular genre or historical period or on a concept or issue of importance to women writers. May be repeated for credit as course content changes. Offered as ENGL 4340 and GWSS 4340; credit will be granted in only one department. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**GWSS 4390. CONFERENCE COURSE. 3 Hours.**

Independent study for the advanced undergraduate. A close examination of a chosen topic through research and/or reading; format designed by instructor and student. May be repeated for credit when the subject matter varies, but only with permission of the director of the Gender, Women & Sexuality Studies Program.

**GWSS 4392. TOPICS IN GENDER, WOMEN & SEXUALITY STUDIES. 3 Hours.**

Special topics related to Gender, Women & Sexuality Studies. May be repeated for credit when the topic changes, with permission of the director of the Gender, Women & Sexuality Studies Program.

**GWSS 4393. GENDER, WOMEN & SEXUALITY STUDIES INTERNSHIP. 3 Hours.**

Supervised internship through which students apply the academic skills they have acquired in Gender, Women & Sexuality Studies courses by working in a related business or non-profit environment. Required coursework will be determined by instructor. Prerequisite: GWSS 2310 and permission of Director of Gender, Women & Sexuality Studies.

**GWSS 5301. TOPICS GENDER, WOMEN & SEXUALITY STUDIES. 3 Hours.**

Special topics of interest in the discipline of Gender, Women & Sexuality Studies. May be repeated for credit when the topic changes.

**GWSS 5310. FEMINIST THEORY. 3 Hours.**

The foundational course for the Gender, Women, and Sexuality Studies graduate certificate. Covers a wide range of feminist theoretical approaches to prepare students for graduate-level work in gender, women, and sexuality studies.

## COURSES

**HCAD 5192. SPECIAL TOPICS IN HEALTH CARE ADMINISTRATION. 1 Hour.**

In-depth study of selected topics in health care administration.

**HCAD 5199. GRADUATE HEALTH CARE ADMINISTRATION INTERNSHIP. 1 Hour.**

Practical training in health care administration. Analysis of theory applied to real life situations. Course counts as an elective and has a pass/fail grade. No credit will be given for previous experience or activities. Prerequisite: Minimum nine graduate semester hours completed.

**HCAD 5292. SPECIAL TOPICS IN HEALTH CARE ADMINISTRATION. 2 Hours.**

In-depth study of selected topics in health care administration.

**HCAD 5299. GRADUATE HEALTH CARE ADMINISTRATION INTERNSHIP. 2 Hours.**

Practical training in health care administration. Analysis of theory applied to real life situations. Course counts as an elective and has a pass/fail grade. No credit will be given for previous experience or activities. Prerequisite: Minimum nine graduate semester hours completed.

**HCAD 5301. HEALTH CARE ADMINISTRATION I. 3 Hours.**

Introduction to health care; legislation; reimbursement systems; characteristic administrative and clinical roles responsibilities and education; public health care structures; regulatory agencies; health industry trends; and advances in research and technologies.

**HCAD 5302. HEALTH CARE ADMINISTRATION II. 3 Hours.**

Managed care; types of health care delivery systems; national health care policy; teamwork in primary care; management of cost and quality of care; legal issues; ethical issues, including bioethics and business ethics; changing roles of health care professionals; varieties of domestic, public and international health care delivery systems.

**HCAD 5305. FINANCIAL ACCOUNTING FOR HEALTH CARE INDUSTRY. 3 Hours.**

Introduction to concepts, purposes, problems, methodology, and terminology of financial accounting for health care industry.

**HCAD 5306. MANAGERIAL ACCOUNTING FOR HEALTH CARE INDUSTRY. 3 Hours.**

Introduction to concepts, purposes, problems, methodology, and terminology of managerial accounting for health care industry. Prerequisite: HCAD 5305.

**HCAD 5310. HEALTH CARE LAW. 3 Hours.**

Coverage of statutory and case law of the health care industry. Topics include patient rights and malpractice, employment and compensation matters, insurance and claims, and government agencies that regulate aspects of health services delivery.

**HCAD 5315. STATISTICAL METHODS FOR HEALTH CARE ADMINISTRATORS. 3 Hours.**

Statistical methods designed to prepare graduate students to become competent producers and consumers of data analyses and to use statistical thinking to approach managerial decision making. Students should be familiar with the effectiveness and limitations of various applicable techniques and should be able to recognize when additional statistical expertise is required. Topics include an introduction to evidenced based medicine, probability with an emphasis on the poor predictive value of imperfect diagnostics for rare conditions, standardizing and trending data, graphic and numeric descriptions of data, concepts of inference such as margins of error and significance of results, concepts of quality control including time series analysis and forecasting, and health care applications of discrete random variables with Poisson or binomial probability mass functions. It is recommended that students who have no recent courses in statistics take BSTAT 5301 prior to HCAD 5315.

**HCAD 5316. HEALTH CARE FINANCE. 3 Hours.**

Analysis of financial problems with an emphasis on the application of financial management principles and concepts to health care organizations.

**HCAD 5330. SERVICE MARKETING MANAGEMENT. 3 Hours.**

Examines conceptual frameworks and management practices particularly relevant to the health care industry. The course examines many concepts and theories from the service marketing industry and analyzes their values in crafting marketing strategies. Emphasis is on problem solving unique to the health care industry.

**HCAD 5333. ECONOMICS OF HEALTH. 3 Hours.**

Economic analysis applied to current health policy issues, including health expenditures, public and private insurance, incentives, provider education and labor markets, hospitals, prescription drugs, malpractice, long-term care, the Internet, and various proposals for reform. For HCAD majors only.

**HCAD 5337. ETHICS, LEADERSHIP, AND TEAMWORK. 3 Hours.**

Examines the leadership process, change management, and high-performance team-building strategies. Emphasis will be placed on the development of self-awareness and skills necessary to lead. Identification of values and ethical issues in health care administration will also be stressed through the application of ethical principles and theories of decision making in the analysis of ethical dilemmas.

**HCAD 5340. HEALTH CARE STRATEGIC HUMAN CAPITAL. 3 Hours.**

A high-performing workforce, developed through effective people practices, is the lifeblood of a health care organization. This course presents a strategic perspective on contemporary human resource management theory and practice. Key topics covered include workforce planning, staffing, diversity, development, performance measurement and management, and compensation; labor and employee relations, regulations, and legislation; as well as key concepts in team and organizational behavior.

**HCAD 5350. HEALTH CARE INFORMATION SYSTEMS. 3 Hours.**

Addresses issues in the development, integration, and management of health care information systems. Specifically, topics in financial information systems, patient care systems, and health care delivery applications will be discussed. Both case studies and real life applications will be studied.

**HCAD 5377. HEALTH CARE QUALITY ASSESSMENT. 3 Hours.**

Covers an integrated case study approach to organizational performance management resulting in the delivery of ever-improving value to patients, improved health care quality and organizational sustainability, improvement of overall organizational effectiveness as a health care provider, and organizational learning.

**HCAD 5380. HEALTH CARE DATA ANALYTICS. 3 Hours.**

Digitization of patient records and widespread use of digital technologies in healthcare organizations have created large repositories of data that can be analyzed to improve care delivery quality, lower cost, and increase patient satisfaction. This course introduces concepts, techniques, and tools for collecting and analyzing healthcare data to gain insight and support decision making by managers and policymakers in healthcare organizations. Data visualization techniques to effectively communicate results are also covered. The course will consist of lectures, case studies, hands-on exercises, and projects.

**HCAD 5390. STRATEGIC MANAGEMENT FOR HEALTH CARE ORGANIZATIONS. 3 Hours.**

Development of skills necessary for managing health care organizations from a strategic perspective. Particular emphasis is given to the use of systematic assessment of the environment and the organization, as well as the development and implementation of business strategies to meet the needs of stakeholders. Prerequisite: Must be taken in the last semester of the HCAD program.

**HCAD 5392. SPECIAL TOPICS IN HEALTH CARE ADMINISTRATION. 3 Hours.**

In-depth study of selected topics in health care administration.

**HCAD 5398. RESEARCH IN HEALTH CARE ADMINISTRATION. 3 Hours.**

Independent research under the supervision of a faculty member.

**HCAD 5399. GRADUATE HEALTH CARE ADMINISTRATION INTERNSHIP. 3 Hours.**

Practical training in health care administration. Analysis of theory applied to real life situations. Course counts as an elective and has a pass/fail grade. No credit will be given for previous experience or activities. Prerequisite: Last semester of the program and permission granted by Graduate Advisor.

## COURSES

**HEED 1230. FIRST AID / CPR / AED TRAINING. 2 Hours.**

This course is designed to cover the components of Standard First Aid, Cardio-Pulmonary Resuscitation (CPR) for the Professional Rescuer, and Automated External Defibrillator (AED) training. Certification is possible upon successful course completion. Offered as HEED 1230 and KINE 1230. Students seeking credit in HEED should enroll in HEED 1230 and students seeking credit in KINE should enroll in KINE 1230. Credit will not be granted for both courses.

**HEED 1301. NUTRITION. 3 Hours.**

This course offers a foundation in nutrition science and explores how food relates to the overall health of an individual. The curriculum includes functions of nutrients, food sources, digestion, absorption, and metabolism. Food labels and nationally established nutrition guidelines are addressed. By understanding classes of nutrients and their respective guidelines, students will gain the skills to make informed dietary choices that promote a healthy lifestyle. May not be used for biology grade point calculation or biology credit toward a degree in biology, microbiology, or medical technology. Credit will be granted in only one department.

**HEED 1316. FOUNDATIONS OF HEALTH. 3 Hours. (TCCN = PHED 1338)**

Emphasis on interrelationship of physical, emotional, mental, social, and spiritual dimensions of health. Involves the analysis of personal health status and development of strategies for improving quality of life.

**HEED 1340. HEALTHY LIFESTYLES. 3 Hours. (TCCN = PHED 1304)**

This course will present theoretical content related to a healthy lifestyle. Students will apply these concepts in laboratory sessions where they evaluate current health habits and develop a nutrition, exercise, and stress management plan to promote a healthy lifestyle. The laboratory section will also provide instruction with regards to proper technique and form for resistance training, flexibility and aerobic conditioning. Lifestyle related diseases and addictions such as cardiovascular disease, cancer, diabetes, substance abuse, sexually transmitted diseases and achievement and maintenance of optimal body composition will also be addressed. These problems will be discussed relative to social, cultural and ethnic concerns.

**HEED 2300. STUDENT HEALTH PEER TRAINING. 3 Hours.**

Train students to be peer counselors who will work as group leaders both on campus and in the community in the Fall and Spring Semesters. Students learn about alcohol and other drugs and their relationship to health and sex issues which prepare them for group presentations and in making referrals when necessary. Topics of training include alcohol and other drug use/abuse, sexually transmitted diseases (STDs), HIV/AIDS, acquaintance rape, smoking/tobacco cessation, eating disorders, suicide, and self-esteem. Prerequisite: permission of instructor.

**HEED 2317. BASIC CONCEPTS IN HUMAN SEXUALITY. 3 Hours.**

The physiological, psychological, and sociological aspects of human sexuality. Offered as BIOL 2317, HEED 2317, PSYC 2317, and GWSS 2317. Credit will be granted for one of these courses only. Students seeking certification in Health Education must enroll in HEED 2317. Students seeking credit toward their science requirement must enroll in BIOL 2317. May not be used for biology grade point calculation or biology credit toward a BS degree in biology, microbiology, medical technology, psychology, or sociology.

**HEED 2330. CARE AND PREVENTION OF ATHLETIC INJURIES. 3 Hours.**

An introduction to the profession of Athletic Training. Common sports-related injuries and illnesses will be discussed with an emphasis on the proper methods for prevention, recognition, and immediate care. Offered as HEED 2330 and KINE 2330. Kinesiology majors must take KINE 2330.

**HEED 3301. SPORTS NUTRITION. 3 Hours.**

Overview of nutrients necessary for healthful living and nutritional impact on reducing risk factors of lifestyle diseases. Application of nutrient recommendations for sports and exercise activities, including fluid replacement, sports supplements, and ergogenic aids.

**HEED 3303. DRUGS AND BEHAVIOR. 3 Hours.**

A survey of the psychoactive agents, their therapeutic uses, and social abuses. Alcohol, nicotine, caffeine, narcotics, hallucinogens, stimulants, and tranquilizers. Offered as BIOL 3303, HEED 3303, and PSYC 3303; credit will be granted only once. May not be used for biology grade point calculation or biology credit toward a B.S. degree in biology, microbiology, or medical technology. Students seeking certification in health education must enroll in HEED 3303.

**HEED 3305. WOMEN'S HEALTH ISSUES. 3 Hours.**

Will address specific issues of importance to women and their health, including growth and development, nutrition, reproductive health, pregnancy, chronic diseases, and relationship/family issues. Offered as DIVR 3305, HEED 3305 and GWSS 3305. Credit will be granted only once.

**HEED 3330. CONSUMER HEALTH AND PUBLIC HEALTH SYSTEMS. 3 Hours.**

Analysis of personal, social, cultural, economic, and political aspects of health. Topics covered include managed health care, health insurance, health services/products, doctor-patient communication, traditional vs. non-traditional medicine, diagnosis and treatment of chronic diseases, and health legislation. Prerequisite: KINE 2350 and KINE 3350.

**HEED 4191. CONFERENCE COURSE. 1 Hour.**

Topics assigned on an individual basis covering personal research or study in the designated area.

**HEED 4192. SPECIAL TOPICS IN HEALTH. 1 Hour.**

Designed to present topics in health not currently offered in existing curriculum. May be repeated for credit when the topic changes.

**HEED 4291. CONFERENCE COURSE. 2 Hours.**

Topics assigned on an individual basis covering personal research or study in the designated area. Prerequisite: permission of department chairperson.

**HEED 4292. SPECIAL TOPICS IN HEALTH. 2 Hours.**

Designed to present topics in health not currently offered in existing curriculum. May be repeated for credit when the topic changes.

**HEED 4310. STRESS MANAGEMENT. 3 Hours.**

Analysis of the psychophysiology of stress and the role of stress in the development of acute and chronic diseases. Examine personal and medical uses of stress management techniques.

**HEED 4311. THE ENVIRONMENT AND PUBLIC HEALTH SYSTEMS. 3 Hours.**

This course is a study of the basic principles of ecology as they relate to the general health of society. Topics including conditions of soil, water, and air - nationally and globally - will be discussed. The successful student will acquire a level of proficiency in appropriate health care techniques specific to environmental health concerns. Prerequisite: KINE 2350, KINE 3350, KINE 3353, CHEM 1441 or CHEM 1451 and BIOL 1345 or BIOL 1441.

**HEED 4312. HEALTH & HUMAN DISEASE. 3 Hours.**

Basic principles of human diseases including cardiovascular disease, cancer, AIDS, influenza, and Alzheimer's. The role of infectious and communicable diseases in human history will also be discussed.

**HEED 4320. STUDIES IN HEALTHY AGING. 3 Hours.**

Emphasis on complex issues associated with aging and death. Topics include changes/losses related to specific stages of life; care-giving to the dying; pertinent legal issues; medical gerontology; other salient issues and problems concerning aging and death. This course is especially helpful to those students who plan careers in the medical profession.

**HEED 4330. COMPREHENSIVE SEXUALITY EDUCATION. 3 Hours.**

Explores contemporary issues in human sexuality (i.e., physiological, psychological, and sociological) and prepares those interested in teaching health education to teach sexuality education with diverse populations in a variety of settings (i.e., school or community agency). Students will increase their knowledge of sexuality and enhance their ability to educate about and promote sexual health. Students seeking certification in health must enroll in HEED 4330.

**HEED 4340. PRINCIPLES OF HEALTH APPLICATIONS. 3 Hours.**

Designed to integrate the information base of health studies into action plans for developing health education and promotion programs for organizations, agencies, and schools. Designed to integrate the information base of health studies into action plans for developing health education and promotion programs for organizations, agencies and communities. Includes planning and evaluation components recommended for students who plan to sit for ACSM/NPASP certificate exam. Prerequisite: Junior standing and completion of KINE 2350.

**HEED 4357. HEALTH PSYCHOLOGY. 3 Hours.**

This course provides a broad introduction to health psychology and its interface with the medical world. The course provides a balanced presentation of the important issues in the field, as well as specific content topics that are especially relevant today to better understand health and illness. Offered as BIOL 4357, HEED 4357, and PSYC 4357. Students seeking science requirement credit must enroll in BIOL 4357; students seeking Certification in Health must enroll in HEED 4357. Prerequisite: PSYC 1315 or BIOL 1333 or BIOL 1441 or BIOL 2457; junior standing recommended.

**HEED 4391. CONFERENCE COURSE. 3 Hours.**

Topics assigned on an individual basis covering personal research or study in the designated area. Prerequisite: permission of department chairperson.

**HEED 4392. SPECIAL TOPICS IN HEALTH. 3 Hours.**

Designed to present topics in health not currently offered in existing curriculum. May be repeated for credit when the topic changes.

## COURSES

**HIST 1301. HISTORY OF THE UNITED STATES TO 1865. 3 Hours. (TCCN = HIST 1301)**

An introduction to the political, social, economic, and cultural history of the United States prior to 1865. This course is designed to help students understand and evaluate their society, comprehend the historical experience, and further develop reading and writing competencies and critical skills.

**HIST 1302. HISTORY OF THE UNITED STATES, 1865 TO PRESENT. 3 Hours. (TCCN = HIST 1302)**

An introduction to the political, social, economic, and cultural history of the United States since 1865. This course is designed to help students understand and evaluate their society, comprehend the historical experience, and further develop reading and writing competencies and critical skills.

**HIST 1331. TECHNOLOGY AND SCIENCE IN AMERICAN SOCIETY, I. 3 Hours.**

An introduction to the major scientific discoveries and technological innovations that influenced the development of American society and culture from the pre-colonial period to the Civil War era. This course satisfies the University of Texas at Arlington core curriculum requirement in U.S. History.

**HIST 1332. TECHNOLOGY AND SCIENCE IN AMERICAN SOCIETY, II. 3 Hours.**

An introduction to the major scientific discoveries and technological innovations that have influenced American society and culture from the era of the Civil War to the present. This course satisfies the University of Texas at Arlington core curriculum requirement in U.S. History.

**HIST 2310. RUSSIAN CULTURE IN THE WORLD. 3 Hours.**

An overview of the cultures of the Russian-speaking world in a global context, examining cultural products such as food, art, music, popular culture, literature, and/or film. Taught in English. Offered as RUSS 2310 and HIST 2310; credit will be given in only one department.

**HIST 2311. WESTERN CIVILIZATION TO 1500. 3 Hours. (TCCN = HIST 2311)**

An introductory survey of the ideas, beliefs, cultures, and institutions that have influenced the development of Western civilization from the ancient world to the early sixteenth century. Examines achievements and experiences of great civilizations, emphasizing major historical figures and epochs, important ideas and religions, and factors of continuity and change.

**HIST 2312. WESTERN CIVILIZATION, 1500 TO THE PRESENT. 3 Hours. (TCCN = HIST 2312)**

An introductory survey of the ideas, beliefs, cultures, and institutions that have influenced the development of Western civilization from the early sixteenth century to the present day with a particular focus on major trends such as exploration, industrialization, nationalism, the rise of political ideologies, and the process of globalization.

**HIST 2313. HISTORY OF ENGLAND. 3 Hours.**

The history of Britain from prehistoric times to 1688. The development of English laws and institutions. Required of all pre-law majors.

**HIST 2314. HISTORY OF ENGLAND. 3 Hours.**

British history from 1688 to the present. The growth of English laws and institutions. Required of all pre-law majors. HIST 2313 is not a prerequisite for this course.

**HIST 2321. WORLD HISTORY TO 1400. 3 Hours.**

An introduction to World History from the first human settlements to the late fifteenth-century Age of Exploration and Encounters. Introduces students to the historical forces that shaped the pre-modern world.

**HIST 2322. WORLD HISTORY, 1400 TO THE PRESENT. 3 Hours.**

An introduction to World History from the late fifteenth century to the present with a particular focus on major trends such as industrialism, nationalism, imperialism, socialism, and the more complex problems and conflicts of the present. Introduces students to the historical forces that have shaped the modern world.

**HIST 2371. HISTORY OF ASTRONOMY. 3 Hours.**

This course explores the relationship between the observation of the skies and human society through a historical lens. Students will analyze how the celestial sphere influenced religious and philosophical beliefs, societal development, political actions, and technological and scientific advancements. The course traces key astronomical developments and evolving understandings of the heavens, from ancient civilizations to modern space exploration.

**HIST 2377. FLIGHT CULTURE AND THE HUMAN EXPERIENCE. 3 Hours.**

An interdisciplinary, cross-cultural survey of the origins, development, and representation of human flight from the ancient world to the present.

**HIST 3300. INTRODUCTION TO HISTORICAL RESEARCH. 3 Hours.**

Introduction to the methods that historians use to conduct research and present their findings in written and oral form. Required for history majors. This course also satisfies the requirements for UNIV 1101.

**HIST 3301. TECHNOLOGY, CULTURE, & SOCIETY. 3 Hours.**

An investigation of the interaction between technological development, social and cultural change between the eighteenth-century Industrial Revolution and the unfolding Information Revolution of the present day. History majors may use the course to meet either their US or non-US course requirements.

**HIST 3303. HISTORY OF VIDEO GAMES. 3 Hours.**

A wide-ranging investigation of the development and growth of video games and the gaming industry from the origins of electronic computing to the present day. Students will be expected to play classic games (in emulation) as part of their weekly course preparations.

**HIST 3305. MAPS AND MAPMAKERS. 3 Hours.**

A history of geography and cartography with an emphasis on the development of geographical ideas and mapmaking from antiquity to the modern era. Offered as GEOG 3305 and HIST 3305; credit will be granted only once.

**HIST 3306. HISTORY AND FILM. 3 Hours.**

Using historically-themed films, this course explores the ways in which the dramatic design of film can contribute to an understanding of history. Specific topic varies. May be repeated twice if topics differ.

**HIST 3307. U.S. DISABILITY HISTORY. 3 Hours.**

Examines the history of ideas about disability, the historical lives of people with disabilities, and the history of disability policy. The growth of asylums, the rise of the eugenics movement, a historical look at freak shows, the impact of industrialization on experiences of disability, the evolution of special education, the role of ideas about disability in colonialism, the historical treatment of disabled veterans, and the development of the disability rights movement. Offered as HIST 3307 and DS 3307; credit will only be granted once. Prerequisite: One of HIST 1301 or HIST 1331 and one of HIST 1302 or HIST 1332.

**HIST 3308. HISTORY OF MADNESS. 3 Hours.**

Examines insanity in its social and historical contexts through the prisms of class, race, gender, and disability from the birth of the asylum in the eighteenth century to contemporary debates about depression and psychopharmacology. Focuses on madness and psychiatry in the Global North, with comparisons to the Global South.



**HIST 3309. HEALTH AND INCARCERATION. 3 Hours.**

Examines how health issues, broadly defined, have pervaded carceral institutions and experiences from the birth of the prison and rise of the modern penitentiary in the eighteenth and nineteenth centuries to contemporary debates about penal reforms and prison abolition. Focuses on incarceration in the Americas, and to a lesser extent Europe, with comparisons to Africa and Asia.

**HIST 3310. AMERICAN COLONIAL ERA TO 1763. 3 Hours.**

Considers early American history within a continental and an international perspective that emphasizes conflicts between colonists and Indian peoples, the relationship between American freedom and slavery, and the growth of the British Empire in North America. Topics include religion and culture, immigration and ethnicity, and government and politics. Students will read both recent historians' works and examine primary documents from the colonial era.

**HIST 3311. THE AMERICAN REVOLUTION AND THE CONSTITUTION, 1763-1789. 3 Hours.**

The origins of the American Revolution, the transformation of American politics and society during the Revolutionary era, and the establishment of the new national government under the Constitution. Special topics include the development of law, civilian-military relations, slavery and race relations, and women's social experience.

**HIST 3312. DEMOCRACY IN AMERICA. 3 Hours.**

Over the past two hundred years, the United States has experienced a steady increase in the democratization of its politics, society and culture. This course will trace the origins and development of the democratic movement, and examine the extent to which it has empowered American citizens from the Jacksonian Era to the 21st century's Information Age.

**HIST 3314. CIVIL WAR AND RECONSTRUCTION. 3 Hours.**

The background and causes of secession and the Civil War, the organization of the Confederate States of America, the progress of the war, and the attempts to solve the racial, social, political, and economic problems of the post-war period. Offered as AAST 3314 and HIST 3314; credit will be granted in only one department.

**HIST 3316. TECHNOLOGY AND INNOVATION IN MODERN AMERICA. 3 Hours.**

The technological revolutions of World War I, the 1920s, the Great Depression, and World War II.

**HIST 3317. CONTEMPORARY AMERICA, 1945-PRESENT. 3 Hours.**

An examination of American society, politics, and culture since the end of World War II. The origins, life, and legacy of the Cold War, the Vietnam conflict, the Civil Rights Movement, student unrest and the growth of the New Left, the impact of Richard Nixon and subsequent presidents on American politics, the rise and consequence of the internet, and America entering the 21st century.

**HIST 3320. AMERICAN INDIAN HISTORY. 3 Hours.**

Representative Indian tribes within the continental limits of the United States from pre-history to the contemporary period. Special topics: tribal cultures, the impact of European contact, and the colonial and United States Indian policies.

**HIST 3321. MEXICAN-AMERICAN HISTORY. 3 Hours.**

The role of the Mexican American in the cultural and historical development of the United States with special emphasis on the Southwest. Offered as HIST 3321 & MAS 3321; credit will be granted only once.

**HIST 3322. AFRICAN AMERICAN HISTORY TO 1863. 3 Hours.**

History of blacks in America from their African origins to 1863. Emphasis on early African society, American slavery, and the development of black institutions and culture in the U.S. Offered as AAST 3322 and HIST 3322; credit will be granted in only one department.

**HIST 3323. AFRICAN AMERICAN HISTORY SINCE EMANCIPATION. 3 Hours.**

Emphasis on the transition from slavery to freedom and the political, social, and economic status of blacks in the late 19th century, 20th century black institutions and culture, and the evolution of the civil rights movements. Offered as AAST 3323 and HIST 3323; credit will be granted in only one department.

**HIST 3324. U.S. WOMEN'S HISTORY. 3 Hours.**

An examination of women in US politics, work and society from the colonial era to the present. Offered as HIST 3324 and GWSS 3324; credit will be granted only once.

**HIST 3325. IMMIGRATION IN UNITED STATES HISTORY. 3 Hours.**

Immigration to the United States from the arrival of European colonists to the present. An examination of different forms of migration--voluntary and involuntary, temporary and permanent, legal and illegal. Explores the similarities and differences between the experiences of various immigrant groups. Particular attention to the shifting definitions of race, ethnicity, and citizenship, and the impact of immigrants on society and politics in the United States. Prerequisites: HIST 1301 and HIST 1302.

**HIST 3326. TWENTIETH-CENTURY AMERICAN CULTURAL HISTORY. 3 Hours.**

The development of mass culture in 20th century America. The rise and social effects of popular culture, especially radio, film, television, advertising, and popular music.

**HIST 3327. CITIES AND SUBURBS IN THE UNITED STATES. 3 Hours.**

Explores the urban and suburban development of the United States from pre-colonial indigenous settlements to the present with an emphasis on the transformation of urban and suburban spaces over time and across regions. Attention to population, migration, land use, economics, politics, social and cultural identities, nature, and sustainability as factors in urban growth and change. Course taught as HIST 3327 and GEOG 3327. Credit will be granted only once.

**HIST 3328. RACE, REPRESENTATION, AND THE MOVIES. 3 Hours.**

This course examines the history of race and representation among black Americans in the United States through films, short clips, and documentaries. Offered as HIST 3328 and AAST 3328; credit will be granted only once.

**HIST 3330. U.S. LEGAL AND CONSTITUTIONAL HISTORY, COLONIAL TO 1877. 3 Hours.**

Traces the adaptation of laws to changing social and economic needs with emphasis on the interrelations of law, public opinion, the legal profession, judiciary, and the political process. Topics include the transatlantic origins of American law, slavery and indentured servitude, poor laws and dependency, family law and gender, developments in criminal and civil law, and the failure of Reconstruction.

**HIST 3331. U.S. LEGAL AND CONSTITUTIONAL HISTORY, 1877 TO PRESENT. 3 Hours.**

Traces the adaptation of laws to changing social and economic needs with emphasis on the interrelations of law, public opinion, the legal profession, judiciary, and the political process. Topics include civil rights, disability and the law, education, abortion, the death penalty, healthcare and social welfare, gun rights, eugenics, family law, and the impact of personality on judicial decision-making.

**HIST 3334. HISTORICAL GEOGRAPHY OF NORTH AMERICA. 3 Hours.**

Examines the intersection of the disciplines of geography and history including the creation of cultural landscapes, the spatial organization of human activities over time, and the interaction of humans with their environment over time with an emphasis on North America. Course taught as HIST 3334 and GEOG 3334. Credit will be granted only once.

**HIST 3335. HISTORY OF NATURAL DISASTERS. 3 Hours.**

This course introduces students to key concepts of sustainability through the analysis of four major historical disasters: the 1900 Galveston Hurricane, the 1906 San Francisco Earthquake, the 1910 Paris Flood, and the 1918 Influenza Pandemic. It examines the causes, responses, and consequences of these catastrophes across environmental, social, political, economic, and scientific dimensions, comparing them to present-day disasters. Particular attention is given to exploring sustainability through the evolution of policy, politics, and science, with a critical assessment of how "sustainable" is defined and applied in various contexts.

**HIST 3336. ENVIRONMENTAL HISTORY OF THE UNITED STATES. 3 Hours.**

People and the natural environment from the colonial period to the present. Ecological change, conservation movements, and artistic and literary interpretations of landscape and nature. Listed as GEOG 3336 and HIST 3336; credit will be granted only once.

**HIST 3337. MILITARY HISTORY OF THE UNITED STATES. 3 Hours.**

U.S. military history from the colonial period to the present. The role of the military establishment in the nation, the historical evolution of its organization, and the basic strategic and tactical concepts which it has employed.

**HIST 3338. HISTORY OF AMERICAN CAPITALISM, 1607-PRESENT. 3 Hours.**

Covers business and economic history in the North American colonies and the United States from 1607 to the present. Topics include slavery, trade, agriculture, industry, government actions and legislation, and the experiences of people from all walks of life. The course will also explore financial downturns and the causes of those so that students develop an understanding of what causes our economy to be "good" or "bad." Previously offered as HIST 3372 and HIST 3373; credit will only be granted once.

**HIST 3340. HISTORY OF THE NORTH AMERICAN WEST. 3 Hours.**

An introduction to the history of the North American West and the unique migration patterns, cross-cultural interactions and conflicts, and human-environmental relationships that have defined life in this region over time.

**HIST 3342. THE OLD SOUTH, 1607-1863. 3 Hours.**

Colonial origins of plantation agriculture, slavery, economics, King Cotton, politics and secession. Other topics include slave cultures, religion, slave insurrections, plantation lifestyle, honor, dueling and southern belles. Offered as AAST 3341 and HIST 3342; credit will be granted in only one department.

**HIST 3343. THE NEW SOUTH, 1863-PRESENT. 3 Hours.**

From military defeat to Sun Belt growth. Topics include Reconstruction, segregation, migration of Southerners to the North and West, depressions, reforms, Civil Rights, Moral Majority, cultural expressions in literature and music. Offered as AAST 3343 and HIST 3343; credit will be granted in only one department.

**HIST 3345. TEXAS TO 1850. 3 Hours.**

Multicultural heritage of Texas from pre-Colombian period to early statehood. Cultural contact; social, economic, and political change. Completion of either HIST 3345 or HIST 3346 is recommended for those planning to teach in Texas schools. Offered as HIST 3345 and MAS 3363; credit will be granted in only one department.

**HIST 3346. TEXAS SINCE 1845. 3 Hours.**

Texas in the Mexican-American and Civil Wars. Political events and ethnic relations since annexation. Rise of cotton, cattle, and oil industries. Literature and music in the 20th century. Completion of either HIST 3345 or HIST 3346 is recommended for those planning to teach history in Texas secondary schools. Offered as HIST 3346 and MAS 3364; credit will be granted in only one department.

**HIST 3347. AMERICA'S BORDERS AND BORDERLANDS. 3 Hours.**

Covers the historical evolution of U.S. borders from independence to the present, and of the hybrid societies that have emerged along with them. Examines how borders have changed over time, and the people, commodities, ideas, and cultures, etc. that have crossed or straddled them. Particular attention is given to changing patterns of migration, border enforcement, and cultural hybridization, and the impact these have had on American society and politics. Offered as GEOG 3347 and HIST 3347; credit will be granted only once.

**HIST 3348. HISTORY OF THE DALLAS-FORT WORTH METROPLEX. 3 Hours.**

The growth and development of Dallas and Fort Worth from competitive 19th-century trade centers in a rural setting to cooperative high-tech cities in a rapidly urbanizing metropolis. Political, economic, cultural, and spatial changes of this area are explored within a national urban context.

**HIST 3350. ANCIENT GREECE. 3 Hours.**

The origins, development and diversity, successes and failures of Ancient Greece from around 1500 to 31 B.C. Near Eastern and Bronze Age background; Archaic Age and the City State; Sparta and Athens; war and imperialism; democracy and culture; Alexander the Great and the Hellenistic Era.

**HIST 3351. ANCIENT ROME. 3 Hours.**

The origin, development, expansion, problems, and achievements of the Roman Republic and Empire. Roots and rise of Rome; Roman Imperialism; Republic and Revolution; Roman Empire, Emperors, and Peace; Paganism and Christianity; Late Empire.

**HIST 3352. MEDIEVAL EUROPE I. 3 Hours.**

The rise of new states and cultures in western Europe and Byzantium after the Roman Empire's breakdown; institutional Christianity and the medieval papacy; foundation of the Holy Roman Empire; Islam at Europe's borders.

**HIST 3353. MEDIEVAL EUROPE II. 3 Hours.**

The formation of national, religious, and ethnic identities in Europe; intellectual developments associated with universities and new religious movements; the expansion of Europe's borders; and the confrontation of Western Christianity with Islam.

**HIST 3354. THE RENAISSANCE. 3 Hours.**

The political, social, and intellectual events of the Renaissance period. The rise of the modern state, the emergence of individualism, and the incipient secularization of politics, arts, and letters.

**HIST 3355. EUROPE: THE REFORMATION AND COUNTER-REFORMATION. 3 Hours.**

The religious reawakening and reform that swept Europe in the 16th century with its consequent religious wars. The political effects of religious reform in the remaking of European attitudes in regard to politics, society, and religion.

**HIST 3356. EARLY MODERN EUROPE, 1560-1715. 3 Hours.**

The major social, economic, cultural, and political developments that occurred in the major European countries from the end of the Counter-Reformation to the early eighteenth century.

**HIST 3357. MILITARY REVOLUTION. 3 Hours.**

Changes in European art of war from advent of gunpowder to American rebellion. Effects of these changes upon demography, political institutions, industrial production, social structure, and taxation patterns.

**HIST 3360. NINETEENTH-CENTURY EUROPE, 1789-1914. 3 Hours.**

This course focuses on the political, cultural, social, and intellectual developments that shaped the European continent's "long" nineteenth century. Beginning with the dawn of modern politics in the salons and streets of revolutionary Paris and concluding with cultural crises that prefigured War in the summer of 1914, it examines in detail how European political and cultural forms came to dominate the globe during the nineteenth century while setting the stage for European decline in the first decades of the twentieth.

**HIST 3361. TWENTIETH-CENTURY EUROPE, 1914-1991. 3 Hours.**

This course introduces students to major developments in continental European history from the outbreak of World War I to the present time. Topics include: the First and Second World Wars and the ensuing Cold War confrontation between Communism and Democracy; the mechanisms of differing forms of dictatorial rule including Fascism, Nazism, and Stalinism; recurrent waves of democratization; and more recent efforts toward European integration.

**HIST 3362. TUDOR-STUART ENGLAND, 1485-1714. 3 Hours.**

The legacy of the Wars of the Roses: the so called new monarchy of the Tudors; The Protestant Reformation in England; constitutional implications of the controversy between crown and Parliament; changes in family and social structures; the emergence of England as a world power.

**HIST 3363. EARLY MODERN BRITAIN. 3 Hours.**

Survey of early modern British history from the rise of the Tudor dynasty in 1485 until the Glorious Revolution of 1688. Topics include the War of the Roses, the Tudor and Stuart eras, the Protestant Reformation, the English Renaissance, the age of exploration, the origins of the British Empire, the English Civil War, the Glorious Revolution, the social history of Britain, the history of gender and sexuality, as well as the ways in which the histories of England, Ireland, Scotland, and Wales were interconnected in the early modern period.

**HIST 3364. MODERN BRITAIN. 3 Hours.**

Survey of modern British history from the Glorious Revolution of 1688 until the present. Includes the Georgian era, the industrial revolution, the history of slavery and abolition, the Victorian period, the history of gender and sexuality, the expansion of the British Empire, the history of race and ethnicity, the history of Ireland, the outbreak and legacies of World War One and World War Two, the rise of the welfare state, decolonization, Thatcherism, as well as Brexit and the history of Britain's relationship with Europe.

**HIST 3365. EARLY FRANCE: OLD REGIME AND REVOLUTION, 1610-1799. 3 Hours.**

Society and politics from the assassination of Henry IV to Napoleon. The traditions of the French people and their kings, the splendor and misery of the Age of Louis XIV, the Enlightenment of Voltaire and Rousseau, the coming of the Revolution, the Reign of Terror, and the rise of Napoleon.

**HIST 3366. MODERN FRANCE, 1799-PRESENT. 3 Hours.**

From Napoleon to the emergence of a modern democratic state. Social and cultural trends together with the politics of two monarchies, two empires, five republics, and two German occupations. The acceleration of change in recent decades in contrast with earlier social patterns.

**HIST 3367. GERMANY IN THE WORLD, 1815-1918. 3 Hours.**

Prussian, German, and Hapsburg empires. Feudal society, absolutism, German romanticism, democratization, industrialization. The challenges of nationalism, colonialism, and the collapse of the empires.

**HIST 3368. GERMANY AND THE WORLD, 1918-PRESENT. 3 Hours.**

Social, political, and cultural history of Germany through World War I and II, division of Germany into East and West, and ultimate unification.

**HIST 3369. HISTORY OF SPAIN AND PORTUGAL. 3 Hours.**

Survey of the history of the Iberian peninsula from ancient times through the great upheavals of the 20th Century. Topics include paleolithic settlement, the arrival of new groups (Celts, Greeks, Phoenicians), the Roman imperium, Visigothic rule, Islamic conquest and Christian reconquest, the birth and death of religious toleration, medieval kingdoms and their unification, the rise and fall of Portuguese and Spanish global empires, and the troubled 20th Century (Portugal's authoritarian regime, Franco and fascism, the Spanish Civil War), and finally, the emergence of stable democratic societies.

**HIST 3370. THE MAKING OF MODERN UKRAINE. 3 Hours.**

This course introduces students to the forces that shaped modern Ukraine. Students will learn how Ukraine came into being and evaluate this post-imperial state and civic nation as an example of anti-colonial rebellion. Offered as HIST 3370 and GLOBAL 3370; credit will be given in only one department.

**HIST 3371. THE RUSSIAN EMPIRE 1552-1917. 3 Hours.**

The political, social, and cultural impact of Russian imperial rule between the sixteenth and twentieth centuries; interactions between the Russian state and non-Russian nationalities during the successive stages of the Russian expansion: the Siberian frontier in the 16th and 17th centuries; the "Western Borderlands" (Eastern Europe) from the 18th century on; the Russian presence in the Caucasus and Central Asia in the 19th century. Special focus on the structure and functioning of Russian imperial institutions; types of contact between Russians and non-Russians (strategies of conquest, resistance, forms of collaboration); and the production of culture and knowledge in the service of the Russian empire.

**HIST 3372. THE SOVIET UNION, 1917-1991. 3 Hours.**

The history of the Soviet Union from its birth as a utopian experiment in October 1917 to its final collapse, under the weight of institutionalized corruption, bureaucratic inertia, and political repression, in December 1991. Incorporating original documents, creative works, and artifacts of popular culture, the course examines the nature and evolution of Soviet political life as well as the social structures and cultural forms that shaped the Soviet experience.

**HIST 3373. PUTINISM AND THE CULTURE OF RUSSIAN POLITICS. 3 Hours.**

A course on Putinism as a governing system and incipient ideology in Russia. The course focuses on the cultural, historical, and biographical roots of Putinism as well as its sociological, institutional, and ideological foundations. The course also examines aspects of Putinism in practice, with a specific focus on the role of the Russian security services and organized crime. Offered as GLOBAL 3303 and HIST 3373. Credit will only be given in one department. Prerequisite: ENGL 1301 with a grade of C or better.

**HIST 3374. EAST CENTRAL EUROPE AND THE MODERN WORLD. 3 Hours.**

An examination of the eastern regions of the European continent and their relationship with the broader world between the eighteenth century and the present. Focus on ideological "making" of Eastern Europe in 18th century; the region's role in globalization; travels and exchanges between Eastern Europe and the rest of the world; imperial experiences and legacies; Eastern Europe's economic "catching up" with the West; the role of Eastern Europe in relations with Western Europe, USSR, US and the "Third World" during the Cold War and experiences behind the iron curtain.

**HIST 3375. LATIN AMERICAN HISTORY: ORIGINS THROUGH INDEPENDENCE. 3 Hours.**

Latin America during the colonial period of Spanish and Portuguese rule. Pre-European civilizations; Iberian backgrounds; conquest of indigenous peoples; development of colonial institutions, economic patterns, social structures, and race relations; independence from Europe. Offered as MAS 3375 and HIST 3375; credit will be granted in only one department.

**HIST 3376. LATIN AMERICAN HISTORY: POST-INDEPENDENCE TO THE PRESENT. 3 Hours.**

The evolution of six Latin American nations during the 19th and 20th centuries. The social, economic, and political development of three social groups in three regions: the Europeanized southern cone area of Argentina, Chile, and Uruguay; the indigenous culture of the Andean mountains in Peru; the African background of Brazil and Cuba. Offered as MAS 3376 and HIST 3376; credit will be granted in only one department.

**HIST 3377. HISTORY OF MEXICO. 3 Hours.**

Mexican history from its pre-Colonial indigenous foundation to the current situation. A social and economic analysis of the major events in Mexican history with emphasis on the 19th and 20th centuries. The major theme in this class is the growth of Mexican nationalism and its relation to region, religion, and ethnicity. Offered as HIST 3377 and MAS 3377; credit will only be granted in one department.

**HIST 3378. HISTORY OF THE CARIBBEAN. 3 Hours.**

A comparative history of the different societies in the Caribbean (including Cuba, Jamaica, and Haiti) with emphasis on the coming of slavery and the consequences of emancipation. Traces the development of emerging new societies from intermingling of Amerindian, African and European elements. Offered as AAST 3378 and HIST 3378; credit will be granted in only one department.

**HIST 3385. AFRICAN HISTORY I. 3 Hours.**

Examines African prehistory, ancient civilizations, religion, gender issues, slavery, and commerce in precolonial Africa. Offered as AAST 3385 and HIST 3385; credit will be granted in only one department.

**HIST 3386. AFRICAN HISTORY II. 3 Hours.**

Africa from the "Scramble for Africa" through the establishment of the various colonial systems, through the beginnings of African nationalism, to the contemporary period. The African Revolution and the development of the independent African states. Offered as AAST 3386 and HIST 3386; credit will be granted in only one department.

**HIST 3388. HISTORY AND LEADERSHIP. 3 Hours.**

An exploration of effective and ineffective global leadership through a historical lens. Students will engage with case studies of leaders such as Cleopatra, Catherine the Great, Napoleon, Abraham Lincoln, Joseph Stalin, Nelson Mandela, and Lech Walesa. Students will identify skills that helped leaders in the past solve complex problems in war and peace.

**HIST 3389. PRACTICAL HISTORY. 3 Hours.**

Students will explore how historical skills and knowledge can be used to pursue a broad range of careers, especially in business, tech, and government. The course will feature readings by contemporary leaders and historians on how history can be used to solve organizational problems. The course will also feature a hands-on project in which students will apply historical knowledge and skills to make an impact on an organization or community.

**HIST 3390. HONORS COLLOQUIUM. 3 Hours.**

A multidisciplinary course designed to meet the needs of advanced undergraduates in the Honors College.

**HIST 3391. MOOT COURT. 3 Hours.**

Students will develop an understanding of legal debate and legal history through the study of constitutional law and legal research methods in preparation for simulated oral arguments before the Supreme Court of the United States. Attendance at statewide competitions required. May be repeated for total of 6 hours credit. This course does not satisfy distribution requirements.

**HIST 3392. ARCHIVES AND THE ARCHIVES PROFESSION. 3 Hours.**

This course provides an overview of the archival profession and the work that archivists do. Students develop an understanding of the historical development of the field of archives and learn about current issues, trends, and theories that are shaping the profession. Students also study the role of the archivist and the use of archives and historical collections by a range of users and become familiar with the theoretical considerations that underlie the core functions of archival administration. The course explores the legal and ethical responsibilities of archivists, as well as the codes of conduct and ethics that have been developed and debated within the profession. Students gain an understanding of how new technologies and digital records are shaping the way that archivists do their work and the skills they must develop to perform core archival functions with digital records.

**HIST 3393. PUBLIC HISTORY. 3 Hours.**

This course introduces students to the history, theory, ethics, and practice of public history. Students will explore a variety of applications of public history, including in archives, museums, historic sites, monuments, memorials, cemeteries, national parks, and digital projects. Students will visit local history sites and hear from guest speakers who are professionals in the field. Throughout the semester, students will apply their knowledge and engage in the best practices of public history by working with a community or institution on a project.

**HIST 3395. SELECTED TOPICS IN HISTORY. 3 Hours.**

Subjects of immediate interest in the various fields of history. May be repeated for credit when the topic changes.

**HIST 4191. UNDERGRADUATE CONFERENCE COURSE. 1 Hour.**

Topics assigned on an individual basis covering personal research or study in designated areas with tenure-track/tenured faculty. Course may be repeated for credit once with a change in faculty. Prerequisite: Prior completion of an organized course with the intended conference faculty member, plus prior approval of the instructor and the undergraduate advisor. The faculty member may petition for the student's exemption from these prerequisites.

**HIST 4291. UNDERGRADUATE CONFERENCE COURSE. 2 Hours.**

Topics assigned on an individual basis covering personal research or study in designated areas with tenure-track/tenured faculty. Course may be repeated for credit once with a change in faculty. Prerequisite: Prior completion of an organized course with the intended conference faculty member, plus prior approval of the instructor and the undergraduate advisor. The faculty member may petition for the student's exemption from these prerequisites.

**HIST 4302. WOMEN AND WORK IN TRANSATLANTIC PERSPECTIVE. 3 Hours.**

Examines the history of women and work, both waged and nonwaged, in Europe and the Americas, including the United States. Highlights differences within women's work cultures as well as variation in women's employment opportunities and their efforts to achieve equality with men in the workplace, by ethnicity, region, and nation. Offered as HIST 4302 and GWSS 4302; credit will be granted only once.

**HIST 4303. HISTORY OF ENGINEERING. 3 Hours.**

The history of engineering from the ancient world to the present including: ancient and medieval technology and machines, experimentation and machine building in the era of the Scientific Revolution and Enlightenment, revolutions in industry and the Age of Synergy, World War II and the Cold War, engineering the modern consumer society, and engineering in the age of Big Science. Particular focus is paid to the political and social contexts of the rise and development of professional engineering, the role of engineers and engineering in shaping the modern world, engineering ethics, and cultural representations of engineers and engineering projects.

**HIST 4304. REVOLUTIONS AND REVOLUTIONARIES IN HISTORY. 3 Hours.**

A historical examination of the world's major revolutions, from the 16th through the 20th centuries.

**HIST 4306. INTERCULTURAL TRANSFERS IN HISTORY. 3 Hours.**

Recognizing the interconnectedness of the human experience in history, this class focuses on the transfers that occurred between cultures and societies during the last three centuries. Transfers occurred in all spheres of public life and contributed to the formation of modern societies and states.



**HIST 4307. HISTORY OF MEDICINE. 3 Hours.**

The history of medicine from the eighteenth century to the present including: pre-scientific medical beliefs and practices, the germ theory of disease, medical institutions, and the rise of the modern health care industry.

**HIST 4308. GLOBAL HISTORY OF PHILANTHROPY. 3 Hours.**

An examination of the historical development and dominant institutional forms of philanthropy and non-profits across the globe including foundations, endowments, voluntary associations, limited dividend companies, and cooperatives.

**HIST 4309. SOCIAL DARWINISM AND EUGENICS. 3 Hours.**

Examines the history of Social Darwinism, global spread of eugenic theory and practice, and history of genetics and gene manipulation. Topics may include debates over assisted suicide as well as links to disability, race, and gender.

**HIST 4311. CRIME, PUNISHMENT, AND EXILE. 3 Hours.**

Examines the relationships among crime, punishment, and exile from cross-cultural and global perspectives from the eighteenth through the twentieth century. Focuses on penal colonies, the rise of the human sciences, prisons as sites of expulsion within countries, and interdisciplinary narratives in the Americas, Europe, Africa, Asia, and Australia.

**HIST 4312. WAR & SOCIETY. 3 Hours.**

Examination of the relationship between wars and the societies that fight them. Focuses on three elements: how societies mobilize for, fight, and remember wars. Course subject varies and could focus on specific wars, time periods and nations.

**HIST 4313. SMALL WARS & INSURGENCIES. 3 Hours.**

An investigation of the nature, evolution, execution, and consequences of small wars and insurgencies from the ancient world to modern day, this course utilizes historical case studies from global and US contexts to examine differing doctrinal approaches and strategic concepts regarding "special warfare".

**HIST 4314. GEOGRAPHY OF WAR. 3 Hours.**

This course investigates the complex relationships between war, the environment, and geography. It explores how landscapes, resources, and ecosystems are both tools and casualties of conflict. The course synthesizes perspectives from geography, history, literature, and geospatial technologies to analyze how the environment is weaponized, manipulated, transformed by war, and how resources, climate and human-physical geographies have been imbricated in the nature of warfare over the course of history.

**HIST 4319. NATIVE AMERICANS, SCIENCE AND TECHNOLOGY. 3 Hours.**

This course examines the relationship between Indigenous peoples, science, and technology from the pre-colonial period to the present. Case studies drawn from the Americas and Pacific Islands explore Native innovations and adaptations in agricultural engineering, transportation, weaponry, healing and medicine, and communication.

**HIST 4320. RADICALISM IN MODERN AMERICA. 3 Hours.**

An examination of the various movements that sought to radically alter the political and economic structure of the United States in the decades since the Civil War. This course examines the development of and differences between revolutionary movements such as anarchism, socialism, communism, and the New Left. Particular attention is given to the circumstances that gave rise to radical movements, the goals of these movements, how they attempted to achieve their goals, and the impact that they had on American society. Prerequisites: HIST 1301 and HIST 1302.

**HIST 4321. WORK AND PLAY IN THE USA. 3 Hours.**

Examines changing ideas and practices of work and leisure from colonial America to post-industrial society. Discusses how work and leisure rights developed according to social lines of class, gender, and race, and examines the impact of shifts in capitalist, industrial and consumer economies on those rights.

**HIST 4324. NATIVE AMERICAN WOMEN. 3 Hours.**

This course explores how settler colonialism affected Native women in particular ways from the late eighteenth century to the present. Topics include gender roles, kinship organization, women's work and economic activities, political and diplomatic roles, and everyday lives and relationships.

**HIST 4325. HISTORY OF HIP HOP. 3 Hours.**

Focused study of the origins and development of Hip Hop as an artistic genre and political and cultural movement. Topics include deejaying, emceeing, sampling and other musical techniques as well as issues of ethnic and other identities, commercialism, capitalism, cultural appropriation, and authenticity. Offered as HIST 4325 and AAST 4325; credit will be granted only once.

**HIST 4326. TOPICS IN DISABILITY HISTORY. 3 Hours.**

Special topics of interest in disability history, such as disability history in global perspective; hard-of-hearing histories, deaf histories, and Deaf History; or disability in the global South. May be repeated for credit when the topic changes. Offered as DS 4326 and HIST 4326; credit will be granted in only one department. Prerequisite: HIST 1301, HIST 1302.

**HIST 4327. CYBORGS AND PROSTHETICS. 3 Hours.**

Explores the history, theories, and evolving representations of prosthetics, bionics, cyborgism, and the post-human. Investigates the origins and development of the prosthetics industry, historical experiences of prosthetics users, and cultural depictions and debates about human-technology interactions. Offered as DS 3327 and HIST 4327 and previously as DS 3321 and HIST 4388; credit will only be granted once.

**HIST 4328. NATIVE AMERICANS IN POPULAR CULTURE. 3 Hours.**

An examination of popular stereotypes of Native Americans and the manner in which these images and portrayals have effected US policy and changing perceptions of Native Americans over time. The course explores a range of visual and written media including art, film, social media, comics, hip hop, super heroes, and sports mascots.

**HIST 4330. GREAT ANGLO-AMERICAN TRIALS. 3 Hours.**

The historical development of criminal trial procedure in Britain and the United States: arrest and detention procedures; the roles of judge and jury; press coverage; political implications of celebrated and notorious cases.

**HIST 4331. U.S. CIVIL LIBERTIES. 3 Hours.**

The historical origins of individual liberties in the United States. Topics include Bill of Rights freedoms and histories of case law relating to speech, privacy, and religion.

**HIST 4332. PRESIDENTIAL PERSONALITY. 3 Hours.**

This course will examine in their historical contexts the dynamics of presidential behavior, personality and leadership. A select number of chief executives will be reviewed, whose backgrounds, careers, and management styles will enable students to understand the extent and limits of presidential power.

**HIST 4333. COMPARATIVE CIVIL RIGHTS HISTORY. 3 Hours.**

Explores the U.S. civil rights movement from a comparative perspective, exploring the African American civil rights movement, Chicano movement, women's liberation movement, gay liberation, and disability rights movement. Offered as AAST 4333 and HIST 4333; credit will be granted in only one department.

**HIST 4340. HOLLYWOOD AND THE WEST. 3 Hours.**

The way the American West has been portrayed and the part the Western myth has played in search for a national identity. First impressions of the new world; the West in colonial literature; fiction in the 19th and 20th centuries; art, music and film; Western themes in politics; recent variations of the Western myth; the way such developments have reflected changes in popular values and a sense of national purpose.

**HIST 4341. IMAGES OF THE SOUTHWEST BORDERLANDS. 3 Hours.**

Examines the changing culture, architecture, and landscapes of the American Southwest as depicted in literature, art, film, television, and advertising, including the role of popular culture and commerce in creating and marketing a regional "Southwestern style." Offered as GEOG 4341 and HIST 4341; credit will be granted only once.

**HIST 4342. HISTORY OF THE NORTH AMERICAN FUR TRADE. 3 Hours.**

This course examines the social, cultural, economic, and environmental history of the fur trade between 1500 and 1800. The goal of the course is to consider one of the earliest global businesses as historical precedent for many global businesses of the present-day. The following themes will be addressed: local/global intersections, cultural conflict and collaboration, capitalism and empire, people and nature.

**HIST 4350. HISTORY OF ANCIENT SPORT. 3 Hours.**

The nature, variety, and role of sports in ancient history. The origin and development of sport in Greece and Rome, the Olympic Games, religious and political implications, the nature of events and contests, intellectual and popular attitudes, and sport in art and society.

**HIST 4351. MEDIEVAL TECHNOLOGY AND SCIENTIFIC THOUGHT. 3 Hours.**

An examination of medieval technology and scientific thought (c. 500 - c. 1500), with particular regard to cross-cultural influences, social context, and material culture.

**HIST 4352. MEDIEVAL CRUSADE AND JIHAD. 3 Hours.**

A history of the crusading movement of Western Europe, and the counter-crusades. This course will consider the events, ideas, and peoples involved, and their impacts on the civilizations of medieval Christendom, North Africa, and the Middle East.

**HIST 4353. MEDIEVAL TRAVELERS. 3 Hours.**

Medieval people traveled for a wide variety of reasons: exploration, survival, profit, belief. Students will study medieval travel accounts to understand how voyages and other travels illustrate cultural contact, communication, exchange, and diffusion of ideas.

**HIST 4355. THE SCIENTIFIC REVOLUTION. 3 Hours.**

An examination of the principal ideas, individuals, and institutions that contributed to the birth of "scientific" thinking between the mid-sixteenth and early eighteenth centuries.

**HIST 4359. BRITISH CONSTITUTIONAL HISTORY. 3 Hours.**

The development of the British constitution from its earliest beginnings to the present day, with special emphasis on the Anglo-Saxon institutions, the Norman constitutional development, the evolution of the major offices of the government, the development of Parliament, constitutional developments of the Stuarts, the Hanoverian constitution, the growth of democracy in the 19th and 20th centuries, and the imperial and commonwealth institutions.

**HIST 4360. BRITISH EMPIRE. 3 Hours.**

Examines the major parts of the empire--Ireland, Canada, West Indies, India, Australia/New Zealand, and South Africa--from 1600 to present. Also considers English attitudes and policies, and changing ideas of imperialism.

**HIST 4361. THE GREAT WAR, 1914-1918. 3 Hours.**

Beginning with a survey of the international Imperial order c. 1900 and concluding with an in-depth account of the human and economic costs of industrialized conflict, the course examines the fundamental global transformations wrought by history's first total war.

**HIST 4362. WORLD WAR II, 1939-1945. 3 Hours.**

Various aspects of the Second World War from American, European, and Asian perspectives. Origins of the conflict, national mobilization, the Holocaust, the Soviet-German confrontation, and the legacy of the most devastating conflict in modern history.

**HIST 4363. THE SOVIET UNION AT WAR, 1941-1945. 3 Hours.**

This course offers students an in-depth look at the largest and most destructive war in world history: the existential conflict between the USSR and Nazi Germany fought from June 1941 to May 1945. In addition to examining the major military encounters that culminated in the Red Army's decisive defeat of the German Wehrmacht, the course draws attention to the consequential ways in which the epochal events of 1941-1945 radically re-shaped Soviet society and culture and laid the foundation for the Soviet Union's emergence as one of the twentieth-century's two superpowers. It also investigates how the conflict's contested memory has served as a historical, cultural, and spiritual touchstone for post-Soviet citizens and as an ideological weapon for contemporary state agents.

**HIST 4366. HITLER'S GERMANY. 3 Hours.**

A pivotal event in the history of the twentieth century, Hitler's Germany continues to elicit fascination, revulsion, and controversy. Dealing with this extraordinary and deeply disturbing historical phenomenon, the course explores the origin, nature, and demise of the Third Reich. Beginning with the rise of the National Socialism in Weimar Germany, it goes on to examine the Nazi seizure of power, the centrality of Hitler, the ideology and racial agenda of Nazism, and the destruction of the Reich in five years of war and genocide. These and other topics, such as popular opinion and everyday life, will be discussed from a variety of perspectives - cultural, political, and socioeconomic - to provide a broad interpretative framework for understanding the genesis, consolidation, and criminality of the Nazi State.

**HIST 4367. HITLER: HISTORY AND IMAGE. 3 Hours.**

Hitler has been vilified, ridiculed, idolized, and mythologized. This course examines Hitler, the historical figure, as well as the image of Hitler created through literature, theatre, and cinema.

**HIST 4368. HISTORICAL MEMORIES OF RESISTANCE. 3 Hours.**

This course focuses on the ways and methods in which Europeans chose to remember and to forget about those who resisted dictatorial rule. Students will be introduced to the processes and mechanisms that create and shape public memory.

**HIST 4371. STALINISM: CULTURE & CIVILIZATION. 3 Hours.**

This course examines the efforts of the Soviet state and society to build a civilization of a new type based upon the principles of Marxist-Leninist-Stalinist ideology. Emphasis on the period from 1924 through 1956.

**HIST 4372. SOVIET UNION IN GLOBAL COLD WAR. 3 Hours.**

The Cold War from Joseph Stalin to Mikhail Gorbachev. Themes may include: origins and end of the Cold War; roots and consequences of Soviet decision-making; relationships between the USSR, its satellite states and competing great powers; culture and ideas in the Cold War; Soviet citizens' experiences of the Cold War; legacies of the Cold War.

**HIST 4373. PERESTROIKA AND THE COLLAPSE OF THE USSR. 3 Hours.**

This course examines Mikhail Gorbachev's valiant yet unsuccessful efforts to "reconstruct" and modernize communism in the USSR by launching a sweeping series of reforms that unintentionally destroyed the Soviet Union, gave birth to fifteen independent countries, and ended the Cold War. In addition to covering these historic events, the course encourages students to explore critical subjects including the image and reality of socialism, the relationship between democracy and capitalism, and the manner in which imperial collapse altered national identities while transforming society, politics, culture, along with the daily life of ordinary men and women.

**HIST 4374. EAST CENTRAL EUROPE IN THE AGE OF EXTREMES. 3 Hours.**

Examination of political and social upheavals in East-Central Europe during the "short" twentieth century (1914-1991): Russian revolutions, left- and right-wing dictatorships and mass murder; the two world wars, communist takeover and half-century-long struggle between societies and the party-states culminating in the revolutions of 1989 and the breakup of the Soviet empire.

**HIST 4376. AFRICAN DIASPORA I. 3 Hours.**

The major developments which have shaped the history of Africans and their descendants in the Atlantic, Mediterranean, and Indian Ocean areas from the earliest times to 1800. Emphasis on the comparative history of Black Diasporic communities; linkages between Africans and their descendants in the Diaspora. Offered as AAST 4376 and HIST 4376; credit will be granted in only one department.

**HIST 4377. AFRICAN DIASPORA II. 3 Hours.**

The major developments which have shaped the history of Africans and their descendants in Latin America, the Caribbean, and North America since 1800. Emphasis on the comparative history of Black Diasporic communities; linkages between Africans and their descendants in the Atlantic Diaspora. Offered as AAST 4377 and HIST 4377; credit will be granted in only one department.

**HIST 4378. WEST AFRICA AND THE ATLANTIC DIASPORA. 3 Hours.**

This course examines the history of West Africa and how this region was integrated into the Atlantic world through the Atlantic slave trade. The course adopts an interdisciplinary approach that integrates traditional classroom instruction with field-based learning in West Africa. This learning method, combined with cultural immersion, challenges students to develop their academic and cross-cultural knowledge and skills. Offered as AAST 4378 and HIST 4378; credit will be granted in only one department.

**HIST 4379. HISTORY OF MODERN CHINA. 3 Hours.**

An overview of modern Chinese history focusing on late-imperial China, the emergence of the republican Chinese nation-state, and the rise of the Chinese Communist Party. The course examines topics including imperialism and war, commercialization and urbanization, political and social revolutions, and the contested and debated place of China in the world.

**HIST 4380. AMERICA AND THE VIETNAM WARS. 3 Hours.**

American involvement in the Indochinese conflict; the causes, outcome, and consequences of the war.

**HIST 4383. FROM PHONOGRAPHS TO K-POP: A SONIC HISTORY OF EAST ASIA. 3 Hours.**

This course examines East Asian media from the period shortly after World War I to the present day, through a particular channel: sound. How people spoke, what they sang, what they listened to, and the auditory technologies they used are all questions that can bring us closer to everyday histories of Asia. In addition, through our readings and primary sources, we will use sound analysis as our tool to explore major watershed events over the last century including nationalist language movements in the 1920s, popular culture during World War II, the Cold War and political contestations over music and listeners, cultural and technological innovations such as the Walkman in the 1980s, and consumer markets for K-Pop in the twenty-first century.

**HIST 4385. DIGITAL HISTORY. 3 Hours.**

This course offers a survey of how scholars can utilize digital tools and technologies to ask new questions and offer fresh insights within the discipline of history. Potential topics covered in the course include websites, blogs, social media, Public History, search engines and keyword searching, Wikipedia, open source and copyright, online digital databases, the digitization of archives, spatial history and digital mapping, podcasts, Big Data, virtual and augmented reality, video games, and artificial intelligence, among other subjects. Prerequisite: HIST 3300 Historical Methods.

**HIST 4389. ORAL HISTORY: METHODOLOGY AND PRACTICE. 3 Hours.**

This course equips students with a solid foundation in planning and completing oral history interviews. It covers the principles of preparation, performance, and recording oral histories, with a focus on ethics, archival techniques, and emerging technologies. The course teaches the essential elements of oral history practice, from interviewing and researching to transcription, interpretation, and publication. By the end of the course, students will be well-prepared to conduct professional oral histories for scholarly, public, and archival purposes. Prerequisite: HIST 3300 with grade of C or better; permission of instructor.

**HIST 4390. INTERNSHIP I. 3 Hours.**

Supervised internship providing hands-on experience working in archives, records centers, museums, or other history-oriented agencies or organizations in the local community. Prerequisite: HIST 3300 with grade of C or better; permission of instructor.

**HIST 4391. UNDERGRADUATE CONFERENCE COURSE. 3 Hours.**

Topics assigned on an individual basis covering personal research or study in designated areas with tenure-track/tenured faculty. Course may be repeated for credit once with a change in faculty. Prerequisite: Prior completion of an organized course with the intended conference faculty member, plus prior approval of the instructor and the undergraduate advisor. The faculty member may petition for the student's exemption from these prerequisites.

**HIST 4392. INTERNSHIP II. 3 Hours.**

Additional supervised internship providing hands-on experience working in archives, records centers, museums, or other history-oriented agencies or organizations in the local community. Prerequisite: HIST 4390; permission of internship director.

**HIST 4394. HONORS THESIS/SENIOR PROJECT. 3 Hours.**

Required of all students in the University Honors College. During the senior year, the student must complete a thesis or a project under the direction of a faculty member in the major department.

**HIST 4395. HISTORY SEMINAR. 3 Hours.**

Topic varies. A reading and research course focusing on a specific subject, theme, or era in history. May be used to fulfill the History major research requirement. Prerequisite: HIST 3300 with grade of C or higher.

**HIST 5191. INDEPENDENT STUDY. 1 Hour.**

For masters students pursuing independent research or study under the supervision of a faculty member.

**HIST 5291. INDEPENDENT STUDY. 2 Hours.**

For masters students pursuing independent research or study under the supervision of a faculty member.

**HIST 5339. HISTORICAL THEORY AND METHODOLOGY. 3 Hours.**

An examination of theories of historical knowledge, the history of the discipline, various historical methodologies, and research techniques. Required for all history M.A. and Ph.D. students.

**HIST 5340. ISSUES AND INTERPRETATIONS IN U.S. HISTORY. 3 Hours.**

A critical survey of U.S. historical scholarship from colonial times to the present. Required for all history M.A. students who are emphasizing U.S. history.

**HIST 5341. APPROACHES TO WORLD HISTORY. 3 Hours.**

A critical survey of approaches to the study of global and comparative history.

**HIST 5342. PRINCIPLES OF ARCHIVES AND MUSEUMS I. 3 Hours.**

The historical evolution of archival science, emphasizing the development of the archives profession, archival principles and theories, appraisal and acquisition techniques, the laws affecting archives, programming and outreach, automation, conservation and preservation, and administration of collections.

**HIST 5343. PRINCIPLES OF ARCHIVES AND MUSEUMS II. 3 Hours.**

Training in the methods and techniques of processing archives and historical manuscripts. Focuses on the day-to-day responsibilities of archivists and curators, such as appraising, accessioning, arranging, and describing collections.

**HIST 5345. INTRODUCTION TO PUBLIC HISTORY. 3 Hours.**

An overview of the field of public history focusing on public historians, their work, their relationship to academic historians, their accomplishments, and the ethical principles under which they operate.

**HIST 5347. INTRODUCTION TO TEACHING COLLEGE HISTORY. 3 Hours.**

Course discusses teaching philosophies, techniques and technologies in order to help students become more effective college instructors.

**HIST 5348. TOPICS IN PUBLIC HISTORY. 3 Hours.**

A detailed examination of some aspect of public history (e.g. historical editing, oral history, historic preservation). The particular topic will vary with the instructor.

**HIST 5349. INTRODUCTION TO TRANSATLANTIC HISTORY. 3 Hours.**

Provides overview of the field of Transatlantic history and introduction to historiographical debates.

**HIST 5350. HISTORY OF CARTOGRAPHY. 3 Hours.**

A history of maps and their making and cartographic documentation as a source for understanding historical development. An aspect of the history of science and technology and the history of discovery and exploration.

**HIST 5360. READING COLLOQUIUM IN EARLY TRANSATLANTIC HISTORY. 3 Hours.**

Course topic varies; focuses on topics in transatlantic history prior to 1850.

**HIST 5361. READING COLLOQUIUM IN LATE TRANSATLANTIC HISTORY. 3 Hours.**

Course topic varies; focuses on topics in transatlantic history after 1850.

**HIST 5363. READING COLLOQUIUM IN NATIONAL HISTORIES. 3 Hours.**

Course topic varies; focuses on a chronological period or theme within the history of a single nation-state.

**HIST 5364. READING COLLOQUIUM IN TRANSNATIONAL HISTORY. 3 Hours.**

Course topic varies; focuses on topics in transnational history.

**HIST 5365. READING COLLOQUIUM: TOPICS. 3 Hours.**

Course topic varies; focuses on themes and topics in history.

**HIST 5390. DIRECTED STUDIES FOR MASTERS STUDENTS. 3 Hours.**

Directed study for masters students who have arranged to pursue specific topics of historical inquiry.

**HIST 5391. INDEPENDENT STUDY. 3 Hours.**

For masters students pursuing independent research or study under the supervision of a faculty member.

**HIST 5392. HISTORICAL PERSPECTIVES ON THE HUMANITIES. 3 Hours.**

An historical inquiry into problems and issues of contemporary relevance in the humanistic disciplines. The particular problems and issues investigated will vary with the instructor.

**HIST 5395. NON-THESIS CAPSTONE. 3 Hours.**

Readings in the non-thesis student's final semester, directed by the three-person faculty committee supervising the student's program of work. Required of all non-thesis history M.A. students.

**HIST 5398. THESIS. 3 Hours.**

For thesis history M.A. students.

**HIST 5644. ARCHIVAL/PUBLIC HISTORY INTERNSHIP. 6 Hours.**

Work experience for either Archival or Public History students. Archival Certification: Hands-on experience in archives, records centers, or historical manuscripts repositories. Public History: Placement in a history-oriented position in a private or public agency or organization in the community.

**HIST 5655. PUBLIC HISTORY INTERNSHIP. 6 Hours.****HIST 5691. INDEPENDENT STUDY. 6 Hours.**

For masters students pursuing independent research or study under the supervision of a faculty member.

**HIST 5698. THESIS. 6 Hours.**

For thesis history M.A. students.

**HIST 5998. THESIS. 9 Hours.****HIST 6100. HISTORY AS A PROFESSION. 1 Hour.**

This course introduces new PhD students in History to skills and information needed to succeed in both graduate school and as professional historians both within and outside of academia.

**HIST 6190. DIRECTED STUDIES FOR PhD STUDENTS. 1 Hour.**

Directed study for Ph.D. students who have arranged to pursue specific topics of historical inquiry.

**HIST 6191. INDEPENDENT STUDY. 1 Hour.****HIST 6290. DIRECTED STUDIES FOR PhD STUDENTS. 2 Hours.**

Directed study for PhD students who have arranged to pursue specific topics of historical inquiry.

**HIST 6291. INDEPENDENT STUDY. 2 Hours.**

For history PhD students.

**HIST 6360. RESEARCH SEMINAR IN EARLY TRANSATLANTIC HISTORY. 3 Hours.**

Research seminar focuses on primary source research on topics in transatlantic history prior to 1850.



**HIST 6361. RESEARCH SEMINAR IN LATE TRANSATLANTIC HISTORY. 3 Hours.**

Research course focuses on primary source research on topics in transatlantic history after 1850.

**HIST 6363. SEMINAR IN NATIONAL HISTORIES. 3 Hours.**

Topic varies; this is a research seminar that focuses on the history of a given nation-state.

**HIST 6364. SEMINAR IN TRANSNATIONAL HISTORY. 3 Hours.**

Topics vary; this is a research seminar focusing on some aspect of transnational history.

**HIST 6365. SEMINAR: TOPICS. 3 Hours.**

Topics vary; this is a research seminar that will focus on an historical theme or topic.

**HIST 6390. DIRECTED STUDIES FOR PhD STUDENTS. 3 Hours.**

Directed study for Ph.D. students who have arranged to pursue specific topics of historical inquiry.

**HIST 6391. INDEPENDENT STUDY. 3 Hours.**

For history Ph.D. students.

**HIST 6399. DISSERTATION. 3 Hours.**

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**HIST 6690. DIRECTED STUDIES FOR PhD STUDENTS. 6 Hours.**

Directed study for Ph.D. students who have arranged to pursue specific topics of historical inquiry.

**HIST 6691. INDEPENDENT STUDY. 6 Hours.**

For history Ph.D. students.

**HIST 6699. DISSERTATION. 6 Hours.**

Dissertation research.

**HIST 6990. DIRECTED STUDIES FOR PhD STUDENTS. 9 Hours.**

Directed study for Ph.D. students who have arranged to pursue specific topics of historical inquiry.

**HIST 6991. INDEPENDENT STUDY. 9 Hours.**

For history Ph.D. students.

**HIST 6999. DISSERTATION. 9 Hours.****HIST 7399. DOCTORAL DEGREE COMPLETION. 3 Hours.**

This course may be taken during the semester in which a student expects to complete all requirements for the doctoral degree and graduate. Enrolling in this course meets minimum enrollment requirements for graduation, for holding fellowships awarded by The Office of Graduate Studies and for full-time GTA or GRA positions. Students should verify that enrollment in this course meets other applicable enrollment requirements. To remain eligible in their final semester of study for grants, loans or other forms of financial aid administered by the Financial Aid Office must enroll in a minimum of 5 hours as required by the Office of Financial Aid. Other funding sources may also require more than 3-hours of enrollment. Additional hours may also be required to meet to requirements set by immigration law or by the policies of the student's degree program. Students should contact the Financial Aid Office, other sources of funding, Office of International Education and/or their graduate advisor to verify enrollment requirements before registering for this course. This course may only be taken twice. Students who do not complete all graduation requirements while enrolled in this course must enroll in a minimum of 6 dissertation hours (6699 or 6999) in their graduation term. Graded P/F/R.

## COURSES

**HONR 1100. ENRICHMENT SERIES. 1 Hour.**

Provides an introduction and orientation to the Honors College. Designed to assist students in acquiring skills for academic survival, individual success, and pursuit of their Honors degree and career possibilities. Format varies; instruction by both faculty and Honors College student peer counselors.

**HONR 1304. HONORS INDEPENDENT STUDY. 3 Hours.**

Independent study courses are arranged on an individual basis with permission of an instructor. Performance may be assessed by oral or written examination, research or review paper as arranged.

**HONR 2104. HONORS INDEPENDENT STUDY. 1 Hour.**

Independent study topics are arranged on an individual basis. Performance may be assessed by oral or written examination, research or review paper as arranged.

**HONR 2106. HONORS SEMINAR. 1 Hour.**

The Honors Seminar will cover topics of general interdisciplinary interest to students from a wide variety of academic disciplines. Active learning will be stressed with all students expected to both moderate and participate in classroom discussions of seminar topics. Instructors and topics offered will vary. The course may be repeated for credit as topics change.

**HONR 2111. HONORS COMMUNITY SERVICE LEARNING. 1 Hour.**

Intensive course in the history and practice of community service learning (CSL). Readings will include general accounts of active learning, the institutional history of CSL in higher education, and a comparative study of CSL programs across the country. Students will design and implement a CSL project based on their major, and in conjunction with an area non-profit organization. Evaluation will be based on written work on both the readings and the CSL project.

**HONR 2203. HONORS SPECIAL TOPICS. 2 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change.

**HONR 2204. HONORS INDEPENDENT STUDY. 2 Hours.**

Independent study topics are arranged on an individual basis with permission of an instructor. Performance may be assessed by oral or written examination, research or review paper as arranged.

**HONR 2300. SEMINAR. 3 Hours.**

Team-taught interdisciplinary course that introduces knowledge and perspectives from the arts, sciences, and humanities. Designed around a theme of current or historical significance. Writing-intensive. Depending on topic, may meet the literature, fine arts/humanities or social/cultural studies requirement of the core curriculum (consult departmental advisor for details).

**HONR 2304. HONORS INDEPENDENT STUDY. 3 Hours.**

Independent study topics are arranged on an individual basis with permission of an instructor. Performance may be assessed by oral or written examination, research or review paper as arranged.

**HONR 2403. SPECIAL TOPICS. 4 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change.

**HONR 2404. HONORS INDEPENDENT STUDY. 4 Hours.**

Independent study topics are arranged on an individual basis with permission of an instructor. Performance may be assessed by oral or written examination, research or review paper as arranged.

**HONR 2435. HONORS SPECIAL TOPICS. 4 Hours.**

Topics, format and prerequisites to be determined by faculty offering the course. May be repeated for credit as topics change.

**HONR 3103. INDEPENDENT STUDY. 1 Hour.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change.

**HONR 3104. SPECIAL TOPICS. 1 Hour.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change.

**HONR 3203. HONORS INDEPENDENT STUDY. 2 Hours.**

Independent study topics are arranged on an individual basis. Performance may be assessed by oral or written examination, research or review paper as arranged.

**HONR 3204. SPECIAL TOPICS. 2 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change.

**HONR 3303. INDEPENDENT STUDY. 3 Hours.**

Independent study topics are arranged on an individual basis. Performance may be assessed by oral or written examination, research or review paper as arranged.

**HONR 3403. HONORS INDEPENDENT STUDY. 4 Hours.**

Independent study topics are arranged on an individual basis with permission of an instructor. Performance may be assessed by oral or written examination, research or review paper as arranged.

**HONR 3404. HONORS SPECIAL TOPICS. 4 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change.

**HONR 3435. HONORS SPECIAL TOPICS. 4 Hours.**

Topics, format and prerequisites to be determined by faculty offering the course. May be repeated for credit as topics change.

**HONR 3504. HONORS SPECIAL TOPICS. 5 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change.

**HONR 3535. HONORS SPECIAL TOPICS. 4 Hours.**

Topics, format and prerequisites to be determined by faculty offering the course. May be repeated for credit as topics change.

**HONR 4000. HONORS INDEPENDENT RESEARCH. 0 Hours.**

Individualized research conducted under the supervision of a faculty member. This is a zero-credit course. May be repeated. Prerequisite: membership in the Honors College, permission of the supervising faculty member, and approval by the Dean of Honors.

**HONR 4103. ADVANCED SPECIAL TOPICS. 1 Hour.**

Advanced special topics in Honors. May be repeated for credit as topics change.

**HONR 4104. HONORS INDEPENDENT STUDY. 1 Hour.**

Independent study topics are arranged on an individual basis with permission of an instructor. Performance may be assessed by oral or written examination, research or review paper as arranged.

**HONR 4106. HONORS ADVANCED SEMINAR. 1 Hour.**

The Honors Advanced Seminar will cover topics of general interdisciplinary interest to students from a wide variety of academic disciplines. Active learning will be stressed with all students expected to research and prepare seminar presentations and moderate class discussions on assigned seminar topics. Instructors and topics offered will vary. The course may be repeated for credit as topics change. Prerequisite: Junior or Senior status or permission of the instructor.

**HONR 4144. HONORS SERVICE LEARNING OPPORTUNITIES. 1 Hour.**

Credit will be given for supervised service to a community agency. The service must be related to formal coursework and approved by a faculty mentor and a degree plan advisor. Prerequisite: Junior standing or permission of the Honors College Dean. Graded Pass/Fail.

**HONR 4203. ADVANCED SPECIAL TOPICS. 2 Hours.**

Advanced special topics in Honors. May be repeated for credit as topics change.

**HONR 4204. HONORS INDEPENDENT STUDY. 2 Hours.**

Independent study topics are arranged on an individual basis with permission of an instructor. Performance may be assessed by oral or written examination, research or review paper as arranged.

**HONR 4244. HONORS SERVICE LEARNING OPPORTUNITIES. 2 Hours.**

Credit will be given for supervised service to a community agency. The service must be related to formal coursework and approved by a faculty mentor and a degree plan advisor. Graded Pass/Fail.

**HONR 4300. ADVANCED SEMINAR. 3 Hours.**

Integrates substantive knowledge in the arts, sciences, and humanities around a theme of current or historical significance. May meet the Social/Cultural Studies requirement of the core curriculum.

**HONR 4303. ADVANCED SPECIAL TOPICS. 3 Hours.**

Advanced special topics in Honors. May be repeated for credit as topics change.

**HONR 4304. HONORS INDEPENDENT STUDY. 3 Hours.**

Independent study topics are arranged on an individual basis with permission of an instructor. Performance may be assessed by oral or written examination, research or review paper as arranged.

**HONR 4310. HONORS STUDY ABROAD. 3 Hours.**

Interdisciplinary course in an out-of-country location around a theme or topic appropriate to the location. Journal, term papers, and/or examinations may be required. Meets the Social/Cultural Studies requirement of the core curriculum.

**HONR 4320. HONORS INTERNSHIP. 3 Hours.**

Supervised employment in student's area(s) of interest. Journal and term paper required. Reserved for students whose major department does not offer an Internship course.

**HONR 4344. HONORS SERVICE LEARNING OPPORTUNITIES. 3 Hours.**

Credit will be given for supervised service to a community agency. The service must be related to formal coursework and approved by a faculty mentor and a degree plan advisor. Graded Pass/Fail.

**HONR 4394. HONORS SENIOR RESEARCH THESIS/CREATIVE PROJECT. 3 Hours.**

A research thesis or creative project and oral presentation are required for the Honors degree. In consultation with the faculty thesis supervisor and the Honors Dean, a program of research and writing will be arranged. Planning for the Honors Thesis/Creative Project should begin early in the student's junior year. For more extensive projects additional credit may be earned. Full details for completing the Honors Research Thesis/Creative Project are provided on the Honors website, <https://www.uta.edu/academics/schools-colleges/honors/academics/capstone-project>. This course is reserved for departments and programs that do not list dedicated thesis courses in their inventories.

**HONR 4403. HONORS SPECIAL TOPICS. 4 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change.

**HONR 4404. HONORS INDEPENDENT STUDY. 4 Hours.**

Independent study topics are arranged on an individual basis with permission of an instructor. Performance may be assessed by oral or written examination, research or review paper as arranged.

**HONR 4435. HONORS SPECIAL TOPICS. 4 Hours.**

Topics, format and prerequisites to be determined by faculty offering the course. May be repeated for credit as topics change.

**HONR 4503. HONORS SPECIAL TOPICS. 5 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change.

**HONR 4504. HONORS INDEPENDENT STUDY. 5 Hours.**

Independent study topics are arranged on an individual basis with permission of an instructor. Performance may be assessed by oral or written examination, research or review paper as arranged.

**HONR 4535. HONORS SPECIAL TOPICS. 5 Hours.**

Topics, format and prerequisites to be determined by faculty offering the course. May be repeated for credit as topics change.

## COURSES

### **HONR-AR 2303. HONORS SPECIAL TOPICS. 3 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change.

### **HONR-AR 4303. ADVANCED SPECIAL TOPICS. 3 Hours.**

Advanced special topics in Honors. May be repeated for credit as topics change.

### **HONR-AR 4604. HONOR INDEPENDENT STUDY. 6 Hours.**

Independent study topics are arranged on an individual basis with permission of an instructor. Performance may be assessed by oral or written examination, research or review paper as arranged.

## COURSES

### **HONR-BU 2303. HONORS SPECIAL TOPICS. 3 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change.

### **HONR-BU 3304. SPECIAL TOPICS. 3 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change.

### **HONR-BU 4303. ADVANCED SPECIAL TOPICS. 3 Hours.**

Advanced special topics in Honors. May be repeated for credit as topics change.

### **HONR-BU 4311. LEADER AS COMMUNICATOR. 3 Hours.**

Helps students excel in written and oral communication skills. Assignments include writing short papers, making oral presentations, and learning to critique one another. This course provides a perspective on leadership in formal organizations with emphasis on communication, exercising influence, decision-making, and conflict management. Prerequisite: Admission to the Goolsby Leadership Academy.

### **HONR-BU 4312. LEADER ETHICS. 3 Hours.**

Addresses rule-based, consequential, and virtue ethics by examining intentions, actions, and consequences of individual behavior. The course emphasizes the development of character and personal integrity. Prerequisite: Admission to the Goolsby Leadership Academy or permission of the Goolsby Leadership Academy Director.

### **HONR-BU 4313. SENIOR & EXECUTIVE LEADERSHIP. 3 Hours.**

This course introduces and compares the traditional levels of leadership within organizations-front line, middle, senior, and executive. Primary focus is on senior and executive leadership, including a series of lectures by senior leaders and executives who provide insight into their respective roles and unique leadership skills and development. Prerequisite: Admission to the Goolsby Leadership Academy.

### **HONR-BU 4314. GLOBAL MARKETPLACE. 3 Hours.**

Designed to assist Goolsby Scholars become competent in an intercultural world. The heart of the course is aimed at preparing for and participating in a study abroad experience to understand and appreciate cultural, business, and human diversity. Prerequisite: Admission to the Goolsby Leadership Academy or permission of the Goolsby Leadership Academy Director.

### **HONR-BU 4315. EXECUTIVE INTERNSHIP. 3 Hours.**

This internship experience places Goolsby Fellows in field settings with executives from the college's Advisory Council and other executive leaders in specialized areas for students. Prerequisite: Admission to the Goolsby Leadership Academy or permission of the Goolsby Leadership Academy Director.

### **HONR-BU 4394. HONORS SENIOR RESEARCH THESIS/CREATIVE PROJECT. 3 Hours.**

A research thesis or creative project and oral presentation are required for the Honors degree. In consultation with the faculty thesis supervisor and the Honors Dean, a program of research and writing will be arranged. Planning for the Honors Thesis/Creative Project should begin early in the student's junior year. For more extensive projects additional credit may be earned. Full details for completing the Honors Research Thesis/Creative Project are provided on the Honors website, <https://www.uta.edu/academics/schools-colleges/honors/academics/capstone-project>. This course is reserved for departments and programs that do not list dedicated thesis courses in their inventories.

## COURSES

### **HONR-ED 3304. SPECIAL TOPICS. 3 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change.

## COURSES

### **HONR-EN 2303. HONORS SPECIAL TOPICS. 3 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change.

### **HONR-EN 3304. SPECIAL TOPICS. 3 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change.

### **HONR-EN 4303. ADVANCED SPECIAL TOPICS. 3 Hours.**

Advanced special topics in Honors. May be repeated for credit as topics change.

**HONR-EN 4304. HONORS INDEPENDENT STUDY. 3 Hours.**

Independent study topics are arranged on an individual basis with permission of an instructor. Performance may be assessed by oral or written examination, research or review paper as arranged.

**COURSES****HONR-LA 1301. HONORS COMPOSITION I. 3 Hours.**

Introduction to academic writing, with an emphasis research, synthesis of sources, and argumentation.

**HONR-LA 1302. HONORS COMPOSITION II. 3 Hours.**

A course in academic argumentation in which students learn how to conduct and organize research. The course typically focuses on a particular topic, which will vary by section and be interdisciplinary in nature. Successful completion satisfies the second-semester writing requirement. Prerequisite: membership in the Honors College.

**HONR-LA 2300. SEMINAR. 3 Hours.**

Team-taught interdisciplinary course that introduces knowledge and perspectives from the arts, sciences, and humanities. Designed around a theme of current or historical significance. Writing-intensive. Depending on topic, may meet the literature, fine arts/humanities or social/cultural studies requirement of the core curriculum (consult departmental advisor for details).

**HONR-LA 2303. HONORS SPECIAL TOPICS. 3 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change.

**HONR-LA 2407. HONORS SPECIAL TOPICS WITH LAB. 4 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change. Completion of lab required. Prerequisite: Membership in the Honors College; other requirements as determined by faculty teaching the course.

**HONR-LA 3300. LIBERAL ARTS HONORS SEMINAR. 3 Hours.**

Intensive small class lecture or seminar course addressing basic issues in various liberal arts disciplines. Topics will vary.

**HONR-LA 3303. INDEPENDENT STUDY. 3 Hours.**

Independent study topics are arranged on an individual basis. Performance may be assessed by oral or written examination, research or review paper as arranged.

**HONR-LA 3304. SPECIAL TOPICS. 3 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change.

**HONR-LA 3310. POLITICAL & COMMUNITY LEADERSHIP. 3 Hours.**

This course examines theories and concepts of leadership in political and community contexts, and processes by which power and authority are exercised to foster political change in one's community. Emphasis is placed on application to actual leadership situations.

**HONR-LA 3404. HONORS SPECIAL TOPICS. 4 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change.

**HONR-LA 3407. HONORS SPECIAL TOPICS WITH LAB. 4 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change. Completion of lab required. Prerequisite: Membership in the Honors College; other requirements as determined by faculty teaching the course.

**HONR-LA 4303. ADVANCED SPECIAL TOPICS. 3 Hours.**

Advanced special topics in Honors. May be repeated for credit as topics change.

**HONR-LA 4407. HONORS SPECIAL TOPICS WITH LAB. 4 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change. Completion of lab required. Prerequisite: Membership in the Honors College; other requirements as determined by faculty teaching the course.

**COURSES****HONR-NU 2203. HONORS SPECIAL TOPICS. 2 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change.

**HONR-NU 3304. SPECIAL TOPICS. 3 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change.

**HONR-NU 3504. HONORS SPECIAL TOPICS. 5 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change.

**HONR-NU 4203. ADVANCED SPECIAL TOPICS. 2 Hours.**

Advanced special topics in Honors. May be repeated for credit as topics change.

**HONR-NU 4303. ADVANCED SPECIAL TOPICS. 3 Hours.**

Advanced special topics in Honors. May be repeated for credit as topics change.

**HONR-NU 4403. HONORS SPECIAL TOPICS. 4 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change.



**HONR-NU 4503. HONORS SPECIAL TOPICS. 5 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change.

**COURSES****HONR-SC 1313. LIBERAL ARTS HONORS MATHEMATICS. 3 Hours.**

Topics include the development of the real number system, different orders of infinity, the idea of convergence and how this led to the development of calculus, the concept of a mathematical proof, the conceptual foundations of topology, networks, knot theory, and modern applications of mathematics to the sciences. Crosslisted with MATH 1313.

**HONR-SC 1426. HONORS CALCULUS I. 4 Hours.**

A more rigorous introduction to calculus than that provided by MATH 1426. Assignments include essay questions and problems that involve research on the development, meaning, and history of concepts emphasized in the course. Students are challenged to master more difficult material in a broader disciplinary context. Credit will be given for MATH 1426 OR HONR 1426 but not both.

**HONR-SC 1443. HONORS GENERAL TECHNICAL PHYSICS. 4 Hours.**

This course emphasized the methodology of physics, and is closely integrated with calculus. It introduces modern ideas and theories into introductory physics (as opposed to the traditional PHYS 1443, which covers physics before 1900). The Honors course stresses problem-solving skills over the learning of algorithms. Credit will be given for PHYS 1443 or HONR-SC 1443 but not both.

**HONR-SC 1444. HONORS GENERAL TECHNICAL PHYSICS II. 4 Hours.**

This course emphasized the methodology of physics, and is closely integrated with calculus. It introduces modern ideas and theories into introductory physics (as opposed to the traditional PHYS 1444, which covers physics before 1900). The Honors course stresses problem-solving skills over the learning of algorithms. Credit will be given for PHYS 1444 or HONR 1444 but not both.

**HONR-SC 1451. HONORS CELL & MOLECULAR BIOLOGY. 4 Hours.**

This course is designed for students who seek a challenge beyond that of the traditional introductory BIOL 1441. Advanced concepts are presented and their applications in contemporary society are explored. This is a rigorous lecture course supplemented with a variety of research-related reading and writing assignments. Credit will be given for BIOL 1441 or HONR 1451 but not both.

**HONR-SC 1452. HONORS STRUCTURE AND FUNCTION OF ORGANISMS. 4 Hours.**

This course is designed for students who seek a challenge beyond that of the traditional introductory BIOL 1442. Advanced concepts are presented and their applications in contemporary society are explored. This is a rigorous lecture course supplemented with a variety of research-related reading and writing assignments. Credit will be given for BIOL 1442 or HONR 1452 but not both.

**HONR-SC 1461. HONORS GENERAL CHEMISTRY I. 4 Hours.**

This course is designed for students who seek a challenge beyond that of the traditional introductory CHEM 1441. Many key concepts will not be explained in traditional lecture fashion. Rather, they will be probed by the class while working collaborative exercises. Students will also complete a collaborative digital video project. Credit will be given for CHEM 1441 or HONR 1461 but not both.

**HONR-SC 1462. HONORS GENERAL CHEMISTRY II. 4 Hours.**

This course is designed for students who seek a challenge beyond that of the traditional introductory CHEM 1442. Many key concepts will not be explained in traditional lecture fashion. Rather, they will be probed by the class while working collaborative exercises. Students will also complete a collaborative digital video project. Credit will be given for CHEM 1442 or HONOR 1462 but not both.

**HONR-SC 2303. HONORS SPECIAL TOPICS. 3 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change.

**HONR-SC 2407. HONORS SPECIAL TOPICS WITH LAB. 4 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change. Completion of lab required. Prerequisite: Membership in the Honors College; other requirements as determined by faculty teaching the course.

**HONR-SC 2425. HONORS CALCULUS II. 4 Hours.**

A more rigorous introduction to calculus than that provided by MATH 2425. Assignments include essay questions and problems that involve research on the development, meaning, and history of concepts emphasized in the course. Students are challenged to master more difficult material in a broader disciplinary context. Credit will be given for MATH 2425 or HONR 2425 but not both.

**HONR-SC 3304. SPECIAL TOPICS. 3 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change.

**HONR-SC 3305. HONORS SCIENTIFIC AND TECHNICAL WRITING. 3 Hours.**

A more intensive section of BIOL 3305, offering additional reading, writing, and presentation assignments based on classic and influential literature in the biological sciences and greater attention to detail in communicating scientific and technical information efficiently and accurately for specialist audiences. Credit will be given for BIOL 3305 or HONR 3305 but not both.

**HONR-SC 3407. HONORS SPECIAL TOPICS WITH LAB. 4 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change. Completion of lab required. Prerequisite: Membership in the Honors College; other requirements as determined by faculty teaching the course.

**HONR-SC 4103. ADVANCED SPECIAL TOPICS. 1 Hour.**

Advanced special topics in Honors. May be repeated for credit as topics change.

**HONR-SC 4303. ADVANCED SPECIAL TOPICS. 3 Hours.**

Advanced special topics in Honors. May be repeated for credit as topics change.

**HONR-SC 4403. HONORS SPECIAL TOPICS. 4 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change.

**HONR-SC 4407. HONORS SPECIAL TOPICS WITH LAB. 4 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change. Completion of lab required. Prerequisite: Membership in the Honors College; other requirements as determined by faculty teaching the course.

## COURSES

**HONR-SW 2303. HONORS SPECIAL TOPICS. 3 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change.

**HONR-SW 3304. SPECIAL TOPICS. 3 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change.

## COURSES

**HONR-UR 4303. ADVANCED SPECIAL TOPICS. 3 Hours.**

Advanced special topics in Honors. May be repeated for credit as topics change.

## COURSES

**HONR-VP 2103. SPECIAL TOPICS. 1 Hour.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change.

**HONR-VP 2300. SEMINAR. 3 Hours.**

Team-taught interdisciplinary course that introduces knowledge and perspectives from the arts, sciences, and humanities. Designed around a theme of current or historical significance. Writing-intensive. Depending on topic, may meet the literature, fine arts/humanities or social/cultural studies requirement of the core curriculum (consult departmental advisor for details).

**HONR-VP 2303. HONORS SPECIAL TOPICS. 3 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change.

**HONR-VP 3304. SPECIAL TOPICS. 3 Hours.**

Topics, format, and prerequisites to be determined by faculty offering the courses. May be repeated for credit as topics change.

**HONR-VP 4303. ADVANCED SPECIAL TOPICS. 3 Hours.**

Advanced special topics in Honors. May be repeated for credit as topics change.

## COURSES

**HOSP 3350. INTRODUCTION TO TRAVEL AND TOURISM. 3 Hours.**

This course offers students a broad introduction to the dynamic fields of travel and tourism. It explores the interconnections between these sectors and their impact on local and global economies. Students will learn about the operational aspects of travel agencies, tour operations, airlines, and casinos, including regulatory environments, customer service, and strategic management. Prerequisite: 45 credit hours.

**HOSP 3351. HOSPITALITY MANAGEMENT. 3 Hours.**

This course provides students with foundational knowledge in managing restaurant, hotel, theme park and senior living establishments. The curriculum includes an overview of different segments of the industry, demands, expectations and techniques for service management. The course explores the complexities of operations administration, guest services, employee supervision, legal aspects, and property management. Prerequisite: 45 credit hours.

**HOSP 3352. RESTAURANT OPERATIONS. 3 Hours.**

This course is designed to familiarize students with dining room service systems encompassing American, Russian, French and English styles of service. In addition, students will have an understanding of quantity food production principles and technique with some emphasis of global cuisines and cultures. This practical course will expose the experience of handling problems and situations routinely faced in the restaurant industry. Prerequisite: HOSP 3350 or HOSP 3351.

**HOSP 3353. LODGING MANAGEMENT. 3 Hours.**

A comprehensive analysis of the various aspects of management and operations in the global lodging industry. Overview of hotel departments, operations strategies, principles, service management, guest experience; including a strategic planning, revenue management, chain scales, hotel ownership, franchising, problem solving, risk mitigation at the individual and multi-property levels. Prerequisite: HOSP 3350 or HOSP 3351.

**HOSP 3354. CASINO, GAMING AND CLUB MANAGEMENT. 3 Hours.**

Principles and strategies of Gaming and Club Management operations relevant to practical management methods. Overview of gaming industry; growth, Indian gaming, lotteries, pari-mutuel wagering and casino operations. Analysis of operation, marketing, frequency rewards, accounting/controls, security, social/cultural consequences of the gaming industry. Introduction to Club Management, types of clubs, guest interest, value, merchandising, fleet management, industry outlook and career opportunities. Prerequisite: HOSP 3350 or HOSP 3351.

**HOSP 3355. CONVENTION & EVENT MANAGEMENT. 3 Hours.**

Analysis of the factors to be considered in the successful management of corporate and association meetings, conferences, conventions, and special events. Topics studied will include planning, organizing, influencing, controlling, and leadership functions associated with the event (special event), convention, meeting, and festival activities. Key topics include forecasting, budgeting, marketing, venue arrangements, client management, guest considerations, crisis management, social responsibility, and ethics. Prerequisite: HOSP 3350 or HOSP 3351.

**HOSP 4351. LEADERSHIP IN THE HOSPITALITY INDUSTRY. 3 Hours.**

Hospitality leadership philosophies, coaching, teaching, facilitating and motivating a workforce in various hospitality environments. Overview of leadership styles, skills, roles, and functions of leaders of organizations; history and origins of leadership, theoretical approaches to leadership, moral and ethical issues facing contemporary leaders. Topic will include managing employee diversity and human resource management practices. Prerequisite: HOSP 3350 or HOSP 3351, and MANA 3318.

**HOSP 4352. HOSPITALITY SALES & MARKETING. 3 Hours.**

Designed to provide students with an introductory guide to hospitality sales and marketing. This course covers various sales & marketing-related topics including sales leads & revenue generation, types of sales calls, sales process (funnel), and the relationship between sales and marketing. Use of technology, media relations, and promotions, customer behavior, brand positioning, market segmentation, communication, and social marketing to define, analyze, and solve problems from a marketing perspective. The course will introduce sales and marketing strategies that truly reflect the realities of the industry to enable students to apply and utilize them in their career. Prerequisite: HOSP 3350 or HOSP 3351, and MARK 3321.

**HOSP 4353. SERVICE QUALITY & CUSTOMER EXPERIENCE. 3 Hours.**

Key concepts in delivering service and meeting/exceeding guest expectations in a hospitality organization. Focus will be placed on industry service standards, principles and practices necessary to manage and enhance the customer experience in the hospitality industry. Topics include customer service strategies, service recovery techniques, managing capacity and demand, overview of tools and skills to successfully manage customer interactions, and memorable guest experiences. Prerequisite: HOSP 3350 or HOSP 3351, and MARK 3321.

**HOSP 4354. HOSPITALITY REVENUE MANAGEMENT. 3 Hours.**

This course will provide an intensive review into hospitality revenue maximization, generation, forecasting, foundational metrics, definitions, formulas, and methodologies that are used by the hotel industry. The learning process will include interactive lectures, group discussions, research, and guest lecturers focused on industry analytical foundations, hotel math fundamentals, improving property revenue performance and analyzing marketing performance. Prerequisite: HOSP 3350 or HOSP 3351, and ACCT 2302.

**HOSP 4355. HOSPITALITY INDUSTRY FINANCE & ANALYTICS. 3 Hours.**

Students will acquire knowledge and skills necessary to excel in hospitality financial management. This includes an understanding of the main elements of financial statements, working capital management, capital budgeting, financing costs, and leverage. This course also emphasizes the importance of data-driven decision-making in enhancing performance in the hospitality industry. The curriculum includes statistical analysis, predictive modeling, and financial analysis techniques tailored to the needs of hospitality businesses. Prerequisite: HOSP 3350 or HOSP 3351, ACCT 2302, and BSTAT 2305.

**HOSP 4356. HOSPITALITY ENTREPRENEURSHIP, FRANCHISING & BRAND MANAGEMENT. 3 Hours.**

Entrepreneurship as it relates to starting and building a successful business in the hospitality industry. Due to the uniqueness of services, it is vital to secure sustainable competitive advantages in the market based on innovation in service design and delivery. Focus on business trends and opportunities, franchise decisions, choices, selection and brand management. Topics include market and financial feasibility analysis, location and market analysis, tourism and event enterprises, sources of funding for facility development, and business plan development. Prerequisite: HOSP 3350 or HOSP 3351, and MARK 3321.

**HOSP 4359. HOSPITALITY MANAGEMENT STRATEGY. 3 Hours.**

This course is an integrative learning experience for the Hospitality Management program. Students will function as consultants, analyzing and proposing solutions to real-world problems hospitality businesses face. Through this immersive experience, students will refine their analytical, problem-solving, and communication skills, preparing them for successful careers in the hospitality industry. Prerequisite: ACCT 2301 and ACCT 2302, BSTAT 2305, ECON 2305 and ECON 2306, INSY 2303, MANA 3318, and MARK 3321. A minimum of 9 HOSP credit hours including HOSP 3350 and 3351.

**HOSP 4393. HOSPITALITY MANAGEMENT INTERNSHIP. 3 Hours.**

Practical training in hospitality management. Analysis of theory applied to real life situations. May be used as an advanced business elective only; graded on a pass/fail basis. No credit will be given for previous experience or activities. May be repeated for credit.

## COURSES

**HRMN 3320. HUMAN RESOURCE MANAGEMENT. 3 Hours.**

This course is a survey of the human resource management function in organizations. Topics include HR planning, job design, recruitment, selection, training, compensation, performance appraisal, and employee relations. The course focuses on how these practices can be crafted to help support business strategy and develop competitive advantage. Prerequisite: 60 credit hours.

**HRMN 4320. EMPLOYMENT LAW. 3 Hours.**

An introduction to employment law and labor relations for managers and human resource professionals. Topics include: the nature of the employment relationship, fair labor standards, workplace health and safety, collective bargaining, equal employment opportunity and unlawful discrimination, sexual harassment, and workplace privacy. Prerequisite: 60 credit hours.

**HRMN 4328. HUMAN RESOURCE STAFFING AND PERFORMANCE MANAGEMENT. 3 Hours.**

Covers the areas of employee selection and performance management systems. Topics include: recruitment strategies, methods of selection, development and validation of selection and employee appraisal instruments, and implementation of performance management processes. Prerequisite: MANA 3318 and MANA 3320.

**HRMN 4342. COMPENSATION AND BENEFITS MANAGEMENT. 3 Hours.**

This course is an introduction to compensation and benefits administration. Attention will be given to the means by which compensation equity is achieved in organizations. Topics covered include job analysis and design, job evaluation, development, the use of wage and salary surveys, and benefit policies and practices. The benefits part of the course will include a discussion of public and private benefit programs and pension plans. Prerequisite: MANA 3318 and MANA 3320.

**HRMN 4343. TRAINING AND DEVELOPMENT. 3 Hours.**

This course provides students with a practical approach to training and development in contemporary business environments. Components of training design, including needs assessment, objectives, and evaluation and control of the training and development functions. Prerequisite: MANA 3318 or MANA 3319.

**COURSES****HUMA 3300. MEDICAL HUMANITIES. 3 Hours.**

Explores the ethical, historical, literary, philosophical, and religious dimensions of medicine or health. Includes instruction in art, cultural studies, economics, ethics, history, literature, medical anthropology, philosophy, religion and spiritual thought, science and technology, visual art, and writing.

**HUMA 3340. TOPICS IN MEDICAL HUMANITIES. 3 Hours.**

In-depth treatment of an issue or topic in or relevant to the medical humanities. May be repeated for credit with permission of the department.

**HUMA 3350. CLINICAL MEDICINE AND THE HUMAN EXPERIENCE. 3 Hours.**

This is a survey course aimed at exploring the human experience through the lens of the different medical specialties and diverse patient perspectives. The course employs a variety of learning aids, such as videos, narratives, and visits by relevant professionals.

**HUMA 3360. AMERICAN HEALTHCARE THROUGH FILM. 3 Hours.**

This course explores current issues in American healthcare through the lens of film. Each class will include a movie and associated discussion pertaining to that theme. The final project will include a brief, student produced film with written synopsis, created with a home device such as a cell-phone, related to a current health issue.

**HUMA 4191. CONFERENCE COURSE IN MEDICAL HUMANITIES. 1 Hour.**

This course is an independent study offering students an opportunity for in-depth study of a specific topic in the medical humanities. Requires permission of the department chair and the instructor.

**HUMA 4291. CONFERENCE COURSE IN MEDICAL HUMANITIES. 2 Hours.**

This course is an independent study offering students an opportunity for in-depth study of a specific topic in the medical humanities. Requires permission of the department chair and the instructor.

**HUMA 4391. CONFERENCE COURSE IN MEDICAL HUMANITIES. 3 Hours.**

This course is an independent study offering students an opportunity for in-depth study of a specific topic in the medical humanities. Requires permission of the department chair and the instructor.

**HUMA 4395. INTERNSHIP IN MEDICAL HUMANITIES. 3 Hours.**

Supervised internship through which students apply the academic skills they have acquired in medical humanities and bioethics courses. Interns work at an approved business, academic, or non-profit site that focuses on an area of medical humanities or bioethics. This course is intended to be completed as one of the final courses for the minor in Medical Humanities and Bioethics but is not required to earn the minor. Prerequisite: HUMA 3300 and PHIL 3319. Permission of director Medical Humanities and Biomedical Ethics is required.

**COURSES****IE 1110. FIRST SEMESTER INDUSTRIAL AND SYSTEMS ENGINEERING SEMINAR. 1 Hour.**

This class focuses on creating a collaborative and inclusive environment for both freshmen and transfer students to the Industrial Engineering program at UTA. This course uses team building exercises, introduces faculty to students through presentations about their classes and research, and presents the curriculum within the "big picture" of how the courses fit together to prepare students for a successful career. This course is intended to provide students the opportunity to form productive study groups and to meet and interact with their professors.

**IE 1205. INTRODUCTION TO INDUSTRIAL ENGINEERING AND COMPUTING. 2 Hours.**

Introduction to basic industrial engineering concepts and industrial engineering as a field. Microsoft Excel skills are stressed and the software is used to analyze collected data. Some College of Engineering requirements are satisfied by the content of this course.

**IE 1325. INTRODUCTION TO DATA ANALYSIS. 3 Hours.**

This course is an introduction to organizing, manipulating, analyzing, and visualizing data. Students will become proficient in using Microsoft Excel functions, pivot tables, advanced analytics modules, visualization tools and external data sources. This class will prepare students for success in future industrial engineering classes. Prerequisite: IE 1110 or concurrent enrollment.

**IE 2000. UNDERGRADUATE RESEARCH. 0 Hours.**

Sophomore level undergraduate research. May be taken a maximum of three times. Prerequisite: Departmental good standing and permission of instructor.

**IE 2305. COMPUTER APPLICATIONS IN INDUSTRIAL ENGINEERING. 3 Hours.**

An overview of Industrial Engineering concepts and issues important to the design and operation of industrial and service systems. Students will learn the use of software tools developed to enhance the Industrial Engineer's ability such as database management, high level programming languages, electronic spreadsheets, and computer graphics. Prerequisite: IE 1325 (or IE 1205).

**IE 2308. ECONOMICS FOR ENGINEERS. 3 Hours.**

Methods used for determining the comparative financial desirability of engineering alternatives. Provides the student with the basic tools required to analyze engineering alternatives in terms of their worth and cost, an essential element of engineering practice. The student is introduced to the concept of the time value of money and the methodology of basic engineering economy techniques. The course will provide the student with the background to enable them to pass the Engineering Economy portion of the Fundamentals of Engineering exam. Prerequisites: MATH 1426 or concurrent enrollment.

**IE 3000. UNDERGRADUATE RESEARCH. 0 Hours.**

Junior level undergraduate research. May be taken a maximum of three times. Prerequisite: Departmental good standing and permission of instructor.

**IE 3301. ENGINEERING PROBABILITY. 3 Hours.**

Topics in engineering that involve random processes. Applications and backgrounds for topics in reliability, inventory systems, and queuing problems, including absolute and conditional probabilities, discrete and continuous random variables, parameter estimation, hypothesis testing, and an introduction to linear regression, experimental design, and analysis of variance. Prerequisite: MATH 2425.

**IE 3314. ENGINEERING RESEARCH METHODS. 3 Hours.**

A continuation of IE 3301. Simple and multiple linear regression analysis, design of experiments, analysis of variance, and quality control statistics. Emphasis on the application of these methods to engineering data, with computerized data analysis. Prerequisite: IE 3301 and MATH 2326.

**IE 3315. OPERATIONS RESEARCH I. 3 Hours.**

An introduction to the major deterministic quantitative techniques of operations research and their application to decision problems. These techniques include linear programming, integer programming, network analysis, and nonlinear programming. Modeling with these techniques is emphasized. Appropriate solvers are used. Prerequisite: MATH 2326 or concurrent enrollment.

**IE 3343. METRICS AND MEASUREMENT. 3 Hours.**

This course presents methods for determining the most effective utilization of effort in the man-machine environment as well as systems and methods to measure enterprise performance. Prerequisite: MATH 2326, IE 2308 or concurrent enrollment, and IE 3301 or concurrent enrollment.

**IE 3351. FUNDAMENTALS OF SYSTEMS ENGINEERING. 3 Hours.**

This course includes a survey of concepts, principles, and processes required to engineer complex system throughout the life cycle. Topics include systems thinking, technical and technical management processes, life cycle models, engineering ethics, model-based systems engineering and sustainability. Prerequisite: MATH 2425.

**IE 4000. UNDERGRADUATE RESEARCH. 0 Hours.**

Senior level undergraduate research. May be taken a maximum of three times. Prerequisite: Departmental good standing and permission of instructor.

**IE 4191. SPECIAL PROBLEMS IN INDUSTRIAL ENGINEERING. 1 Hour.**

The investigation of special individual problems in industrial engineering under the direction of a faculty member. Prerequisite: Consent of instructor and undergraduate advisor.

**IE 4291. SPECIAL PROBLEMS IN INDUSTRIAL ENGINEERING. 2 Hours.**

The investigation of special individual problems in industrial engineering under the direction of a faculty member. Prerequisite: Consent of instructor and undergraduate advisor.

**IE 4300. TOPICS IN INDUSTRIAL ENGINEERING. 3 Hours.**

A study of selected topics in industrial engineering. May be repeated when topics vary. Prerequisite: consent of instructor and undergraduate advisor.

**IE 4302. ENGINEERING ADMINISTRATION AND ORGANIZATION. 3 Hours.**

A survey of administration, control and organization of engineering and research activities. Strategic planning as well as project planning and control are discussed. Prerequisite: accepted in an UTA engineering professional program.

**IE 4303. PRODUCTION AND INVENTORY CONTROL. 3 Hours.**

Fundamental theory and design of systems for the control of production, inventories and their economic interaction, particularly in cases involving uncertainty of demand, of supply availability, and of production rates. Prerequisite: IE 2305, IE 3301 and IE 3315.

**IE 4304. ENTERPRISE SYSTEMS. 3 Hours.**

An extension of Production and Inventory Control (IE 4303), this course covers enterprise resource planning systems (ERP) in manufacturing, E-Commerce and supply chain environments. ERP software and case studies are reviewed. Prerequisite: IE 4303.

**IE 4305. ENGINEERING DECISION MAKING WITH DATA USING PYTHON. 3 Hours.**

This course utilizes statistical tools using Python to analyze real world data on engineering applications. Students explore file handling, database access, and various case studies using Machine Learning techniques. Machine Learning topics include Regression, Classification, Clustering, Dimensionality Reduction, Ensemble Methods, Neural Networks and Deep Learning. Some programming experience is required. Prerequisite: IE 3301 and accepted into an UTA engineering professional program.



**IE 4308. QUALITY SYSTEMS. 3 Hours.**

A comprehensive coverage of modern quality systems techniques to include the design of statistical process control systems, acceptance sampling, and process analysis and design. Prerequisite: IE 3301 or concurrent enrollment.

**IE 4310. INDUSTRIAL AND PRODUCT SAFETY. 3 Hours.**

Scientific, managerial, and legal aspects of safety hazard control and elimination in the industrial workplace. Methods for enhancing product safety. Prerequisite: accepted in an UTA engineering professional program.

**IE 4314. DATA MINING AND ANALYTICS. 3 Hours.**

This course provides an introduction to data mining and pattern recognition. The basic theories, algorithms, key technologies in data analytics and machine learning will be discussed. Topics include data processing and visualization methods, supervised learning methods (parametric/non-parametric algorithms, KNN, decision tree, discriminant functions, Bayesian classification models, support vector machines, neural networks), unsupervised learning methods (clustering, dimensionality reduction, recommender systems), ensemble learning methods (random forests and adaptive boosting), feature selection methods, and deep learning methods. Prerequisite: IE 3301 and accepted into an UTA engineering professional program.

**IE 4315. OPERATIONS RESEARCH II. 3 Hours.**

A continuation of IE 3315 that includes probabilistic techniques of operations research and their application to decision problems. Topics include Markov chains, game theory, decision analysis, multiple-objective decision making, and queuing theory. Modeling with these techniques is emphasized. Appropriate solvers are used. Projects are required. Prerequisite: IE 3301, IE 3315, and MATH 3319 (or concurrent enrollment).

**IE 4318. ENTERPRISE DESIGN. 3 Hours.**

This course provides students with an introduction to enterprise systems. Students will be exposed to the technology and analysis methodologies for enterprise resource planning, system design, supply chain management. Also, modern and next-generation enterprise systems will be introduced and basic data mining and machine learning methods will be covered. Prerequisite: Accepted in an UTA engineering professional program.

**IE 4322. SIMULATION OF COMPLEX SYSTEMS. 3 Hours.**

The design and analysis of complex manufacturing and service systems using computer-based discrete event simulation techniques. Topics include an introduction to simulation methods, and the design, construction and analysis of discrete-event simulation models, as well as their computer applications. The course also covers the execution and management of simulation projects and the formal presentation of their findings. Prerequisite: IE 3314 and IE 4315.

**IE 4323. AGENT-BASED MODELING AND SIMULATION. 3 Hours.**

A series of agent-based modeling topics will be covered including the fundamental concepts of agent-based modeling approach, when to apply, and how to design and implement agent-based simulation to represent complex systems and solve decision problems. Some programming experience and Excel basic knowledge is required. Prerequisite: IE 3301 and accepted into an UTA engineering professional program.

**IE 4325. AUTOMATION AND ROBOTICS FOR SERVICE AND MANUFACTURING SYSTEMS. 3 Hours.**

Study of the use of industrial automation and robotics technologies in service and manufacturing systems. The course introduces the major classes of industrial automation. Issues associated with the successful deployment of automation to support manufacturing and service system requirements. Laboratory exercises focus on a practical introduction to various automation technologies. Prerequisite: IE 4303 or concurrent enrollment.

**IE 4335. COGNITIVE SYSTEMS ENGINEERING. 3 Hours.**

This course will discuss applications of psychological principles and computer and information sciences related to human-centered designs for both simple and complex systems. Emphasis will be placed on the design of advanced technological systems to support both individual and larger distributed work systems. In this class, you will learn about theories of human-machine systems, human perceptual and cognitive abilities/limitations, the role of technology and techniques in supporting decision-making and problem solving, and various interface evaluation methods that help to identify issues with how people interact with work and technologies. Prerequisite: Must be in a College of Engineering or College of Science professional program or approval of advisor.

**IE 4339. MANUFACTURING PROCESS & SYSTEM ANALYSIS. 3 Hours.**

This course provides students with an introduction to manufacturing systems and processes such as machining, welding, and the emerging technology of additive manufacturing. Students will learn to quantify and measure variabilities in the manufacturing system, describe the system's behavior, and improve the system's performance. The impact of quality and reliability on overall system performance sustainability will be explored. Prerequisite: Accepted in an UTA engineering professional program.

**IE 4340. ENGINEERING PROJECT MANAGEMENT. 3 Hours.**

Introduces engineering project management concepts and tools needed to form, develop and manage cross-disciplinary engineering design teams. Topics include: project life cycle, organizational structures, risk analysis, stakeholder identification and management, requirements elicitation and analysis, scheduling, cost estimating, teams and work groups, and leading technical professionals. Prerequisite: Admitted into an Engineering Professional Program.

**IE 4343. FACILITIES PLANNING AND DESIGN. 3 Hours.**

The course covers strategic facilities planning through detailed facilities layout design. Considerations include product flow, space and activity relationships, personnel requirements, material handling, and layout. Traditional and contemporary issues in manufacturing and their impact on facilities design including receiving, shipping, warehousing, and integration with manufacturing and supporting operations are explored. Facilities planning models and the process of evaluating, selecting, preparing, presenting, and implementing the facilities plan are covered. Prerequisite: IE 4303 or concurrent enrollment.

**IE 4344. HUMAN FACTORS ENGINEERING AND COMPLEX SYSTEMS. 3 Hours.**

Study of the interactions between people and their work, workplace, and the environment. Involves identification, measurement, analysis, and evaluation of interactions via human physical and mental capacities and limitations, and social interactions. Prerequisite: IE 3301, IE 2308, and IE 3343.

**IE 4345. DECISION ANALYSIS IN SYSTEM DESIGN. 3 Hours.**

Application of decision theory principles and tools to evaluate alternative hardware/software system architectures based on technical design requirements such as mass, reliability, power and life cycle costs. Systems engineering trade study approaches are presented with applications in defense, aerospace, energy and related areas. Methods for dealing with technical data risk and uncertainty are presented. Prerequisite: Accepted into an engineering professional program at UTA.

**IE 4349. INDUSTRIAL AUTOMATION. 3 Hours.**

Project oriented course focusing on the design, implementation, and operation of technology. An in-depth study of the design and deployment of industrial technology to meet the needs of high-precision, multi-product environments. The laboratory activities associated with the course provide practical experience. Prerequisite: IE 4325.

**IE 4350. INDUSTRIAL AND SYSTEMS ENGINEERING CAPSTONE DESIGN. 3 Hours.**

This course provides an open-ended design experience in which the student must demonstrate the ability to perform design, analysis, operation, and improvement of integrated systems that produce or supply products or services in an effective, efficient, sustainable and socially responsible manner. Contemporary project management techniques are utilized. The design experience project includes submission of several written and oral presentations culminating in a written project report and oral presentation at the end of the semester. IE 4350 is the capstone design course and draws on material from the total industrial and systems engineering curriculum. The impact of engineering design on society is discussed. Prerequisite: All required 4000 level IE courses or concurrent enrollment.

**IE 4351. SYSTEMS ENGINEERING. 3 Hours.**

This course includes a survey of concepts, principles and processes required to engineer complex systems throughout the life-cycle from concept through disposal. Topics include systems thinking, technical and technical management processes, life cycle models, engineering ethics, sustainability, and model-based systems engineering. This course enables potential systems engineering certification. Prerequisite: IE 3351 and accepted into an engineering professional program at UTA.

**IE 4378. INTRODUCTION TO UNMANNED VEHICLES SYSTEMS. 3 Hours.**

Introduction to UVS (Unmanned Vehicle Systems) such as UAS (Unmanned Aircraft Systems), UGS (Unmanned Ground System) and UMS (Unmanned Maritime System), their history, missions, capabilities, types, configurations, subsystems, and the disciplines needed for UVS development and operation. UVS missions could include student competitions sponsored by various technical organizations. This course is team-taught by engineering faculty. Prerequisite: Admission to a professional engineering or science program.

**IE 4379. UNMANNED VEHICLE SYSTEM DEVELOPMENT. 3 Hours.**

Introduction to the technologies needed to create an UVS (Unmanned Vehicle System). Integration of these technologies (embodied as a set of sensors, actuators, computing and mobility platform sub-systems) into a functioning UVS through team work. UVS could be designed to compete in a student competition sponsored by various technical organizations or to support a specific mission or function defined by the instructors. This course is team-taught by engineering faculty. Prerequisite: B or better in IE 4378 and admission to the UVS certificate program.

**IE 4391. SPECIAL PROBLEMS IN INDUSTRIAL ENGINEERING. 3 Hours.**

The investigation of special individual problems in industrial engineering under the direction of a faculty member. Prerequisite: Consent of instructor and undergraduate advisor.

**IE 5191. ADVANCED STUDIES IN INDUSTRIAL ENGINEERING. 1 Hour.**

Individually approved research projects and reading courses in industrial engineering. Such individual studies will be graded A, B, C, D, F or X. Subject to the approval of the Graduate Advisor, IE 5191, IE 5291 and IE 5391 may be repeated as the topics change. In addition, work on a thesis substitute will be performed under IE 5391. In this case, IE 5391 is graded P/F/R.

**IE 5291. ADVANCED STUDIES IN INDUSTRIAL ENGINEERING. 2 Hours.**

Individually approved research projects and reading courses in industrial engineering. Such individual studies will be graded A, B, C, D, F or X. Subject to the approval of the Graduate Advisor, IE 5191, IE 5291 and IE 5391 may be repeated as the topics change. In addition, work on a thesis substitute will be performed under IE 5391. In this case, IE 5391 is graded P/F/R.

**IE 5300. TOPICS IN INDUSTRIAL ENGINEERING. 3 Hours.**

A study of selected topics in industrial engineering. May be repeated when topics vary. Prerequisite: consent of instructor and Graduate Advisor.

**IE 5301. INTRODUCTION TO OPERATIONS RESEARCH. 3 Hours.**

An introduction to the major quantitative techniques of operations research and their application to decision problems. These techniques include linear programming, integer programming, network analysis, nonlinear programming, game theory, Markov Chains, and queuing theory. Modeling with these techniques is emphasized. Appropriate solvers are used. Prerequisite: IE 3301 or equivalent, or IE 5317 concurrent, or DASC 5302 concurrent.

**IE 5302. INTRODUCTION TO INDUSTRIAL ENGINEERING. 3 Hours.**

An introduction to the fundamental principles of Industrial Engineering. Topics include Human Factors Engineering, Metrics and Measurement, Production and Inventory Control, Quality Systems, Simulation and Optimization, and Facilities Planning and Design. Prerequisite: Graduate standing.

**IE 5303. QUALITY SYSTEMS. 3 Hours.**

Principles and practices of industrial quality control. Topics include the Lean fundamentals, Six Sigma methodology, process improvements, statistical process control, process capability analysis and product acceptance. Prerequisite: IE 3301, or IE 5317, or DASC 5302, or equivalent.

**IE 5304. ADVANCED ENGINEERING ECONOMY. 3 Hours.**

Analysis of capital investments in engineering and technical projects. Topics include decision analysis methods, cash flows, revenue requirements, activity-based analysis, multi-attribute decisions, probabilistic analysis and sensitivity/risk analysis. Prerequisite: graduate standing.

**IE 5305. LINEAR OPTIMIZATION. 3 Hours.**

Theory and applications of linear programming including linear programming formulation, the simplex method, duality, revised simplex, general linear programs, infeasibility, the dual simplex method, column generation, and network flow problems. Prerequisite: IE 3315, or IE 5301, or equivalent.

**IE 5306. DYNAMIC OPTIMIZATION. 3 Hours.**

Dynamic optimization methods including dynamic programming, the calculus of variations, and optimal control theory. Emphasis is on the modeling and solution of practical problems using these techniques. Prerequisites: IE 5301, or consent of instructor.

**IE 5307. QUEUEING THEORY. 3 Hours.**

The fundamentals of queueing theory including Markovian birth-death models, networks of queues, and general arrival and service distributions. Prerequisites: IE 3301, or IE 5317, or equivalent.

**IE 5309. STOCHASTIC PROCESSES. 3 Hours.**

The study of probabilistic model building including the fundamentals of both discrete and continuous Markov chains, queueing theory and renewal theory. Prerequisite: IE 3301, IE 5317, or equivalent.

**IE 5310. PRODUCTION SYSTEMS DESIGN. 3 Hours.**

Methods for the design and analysis of manufacturing and logistics systems. Emphasis is placed on reducing cycle time, increasing throughput, lowering variation, and improving both quality and customer responsiveness through modeling techniques. Prerequisites: IE 3301, or IE 5317, or equivalent; IE 5301 current or equivalent; IE 5329 concurrent or equivalent.

**IE 5311. DECISION ANALYSIS. 3 Hours.**

A survey of methods for making optimal decisions. Topics include decision models, formal logic, fuzzy controls, statistical decision theory, game theory, multiobjective decisions, stochastic programming, information theory and qualitative aspects of the decisions. Prerequisites: IE 5301, or consent of instructor.

**IE 5312. PLANNING AND CONTROL OF ENTERPRISE SYSTEMS. 3 Hours.**

A continuation of IE 5329 covering enterprise resource planning systems (ERP) and other advanced production control techniques. Computer modeling is emphasized. Prerequisite: Graduate standing.

**IE 5313. RELIABILITY AND ADVANCED QUALITY CONTROL TOPICS. 3 Hours.**

Includes advanced quantitative topics in reliability design and quality control. Management of reliability and quality control functions are also included. Prerequisites: IE 4308, or IE 5303, or equivalent.

**IE 5314. SAFETY ENGINEERING. 3 Hours.**

Methods to identify, measure, analyze, and evaluate safety hazards in the workplace. Scientific and managerial methods to prevent or control safety hazards. Prerequisite: graduate standing.

**IE 5315. DATA SCIENCE PROJECT MANAGEMENT. 3 Hours.**

Management and control of multifaceted science and engineering projects. Coordination and interactions between client and various service organizations. Project management selection. Typical problems associated with various phases of project life cycle. Case studies illustrate theories and concepts. Students will be expected to demonstrate an understanding of communication and collaboration, including workflow, reproducibility, codebase management, collaboration tools, oral and written communication, presentation, storytelling, and team management, as well as ethics, such as understanding bias, fairness, credibility and misinformation, security, privacy and codes of conduct. Prerequisite: Graduate standing.

**IE 5317. INTRODUCTION TO PROBABILITY AND STATISTICS. 3 Hours.**

Topics include descriptive statistics, set theory, combinatorics, mathematical expectation, probability distributions, confidence interval estimation, regression analysis, analysis of variance, and design of experiments. Prerequisite: Graduate standing in any program.

**IE 5318. APPLIED REGRESSION ANALYSIS. 3 Hours.**

An in-depth study of one predictor variable followed by the matrix approach to multiple linear regression. Topics include estimation, prediction, analysis of variance, residual analysis, transformations, multicollinearity, model selection, weighted least squares, ridge regression, and robust regression. Prerequisite: IE 3301, or IE 5317, or DASC 5302, or equivalent.

**IE 5319. ADVANCED STATISTICAL PROCESS CONTROL AND TIME SERIES ANALYSIS. 3 Hours.**

Design of control schemes for statistical monitoring and control of modern manufacturing systems. Topics include charts for process control, effect of autocorrelation on SPC charts, and sampling plans for acceptance inspection. Prerequisite: IE 5303 and IE 5318, or consent of instructor.

**IE 5320. ENTERPRISE ENGINEERING METHODS. 3 Hours.**

A survey of enterprise engineering methods. Topics include system development methodology, discussion of enterprise architectures, activity modeling, business modeling, activity-based performance analysis, and process improvement. Prerequisite: Graduate standing.

**IE 5321. ENTERPRISE ANALYSIS AND DESIGN. 3 Hours.**

An in-depth study of techniques useful for the analysis and design of the manufacturing enterprise. This course presents an advanced process description technique that is used, with simulation and activity based costing, to facilitate analysis and design. Prerequisites: Graduate standing.

**IE 5322. SIMULATION AND OPTIMIZATION. 3 Hours.**

An in-depth study of discrete event simulation theory and practice. Optimization and search techniques used in conjunction with simulation experiments are introduced. A commercial simulation software application is used. Prerequisite: IE 5317, DASC 5302, or equivalent, or IE 5318 concurrent.

**IE 5323. AGENT BASED SIMULATION. 3 Hours.**

An introduction to the agent-based modeling approach and their applications to complex systems modeling and simulation. Topics include fundamental concepts of the agent-based modeling approach, when to apply, and how to design and implement agent-based models using a specific computer simulation software. Some programming experience and Excel basic knowledge are preferred but not required. Prerequisite: IE 3301, or IE 5317, or DASC 5302 or equivalent.

**IE 5326. INDUSTRIAL BIOMECHANICS. 3 Hours.**

The development and application of biomechanical models of physical work tasks, especially manual materials handling and hard-arm work activities. Prerequisite: Graduate Standing.

**IE 5327. ADVANCED STATISTICS. 3 Hours.**

Continuation of IE 5317. Topics include multiple linear regression analysis, design of experiments, analysis of variance, and quality control statistics. Prerequisite: IMSE advisor approval.

**IE 5329. PRODUCTION AND INVENTORY CONTROL SYSTEMS. 3 Hours.**

The fundamentals of production and inventory control systems. The economic impacts of fluctuating demand, supply availability and production rates are examined. Prerequisite: IE 3301, or IE 5317, or equivalent, or IE 5318 or equivalent; IE 5301 concurrent or equivalent.

**IE 5330. AUTOMATION AND ADVANCED MANUFACTURING. 3 Hours.**

The design of automated and advanced production processes for manufacturing. Topics include numerical control, robotics, group technology, just-in-time, automated inspection and flexible manufacturing systems. Prerequisite: Graduate standing in IMSE or permission of IMSE advisor.

**IE 5331. INDUSTRIAL ERGONOMICS. 3 Hours.**

The analysis and design of physical work, workplace, and hand tools using ergonomic principles for enhancing performance, health, and safety. Work refers mainly to whole body and hand-arm activities, while workplace refers to industrial and computerized office environments. Applications focus on people's anthropometric, musculoskeletal and psychological characteristics. Prerequisite: Graduate standing in IMSE or permission of IMSE advisor.

**IE 5332. NONLINEAR PROGRAMMING. 3 Hours.**

Methods for nonlinear optimization including classical theory; gradient methods; sequential unconstrained methods; convex programming; genetic algorithms; simulated annealing; and separable, quadratic, and geometric programming. Prerequisite: IE 5301, or consent of instructor.

**IE 5333. LOGISTICS TRANSPORTATION SYSTEMS DESIGN. 3 Hours.**

The design and analysis of domestic and international transportation systems of people, processes, and technology. Topics include the role of transportation in the extended enterprise, transportation modeling and optimization techniques, value-added supply chain issues, and financial performance measures. Prerequisites: IE 3301, or IE 5317, or equivalent or IE 5318; IE 5301 concurrent or equivalent.

**IE 5334. LOGISTICS DISTRIBUTION SYSTEMS DESIGN. 3 Hours.**

The design and analysis of distribution systems of people, processes and technology. The focus is on distribution, warehousing and material handling. Topics include the role of the warehouse in the extended enterprise, warehouse planning, process design, layout, equipment selection, workforce and workplace issues, and financial performance measures. Prerequisites: IE 3301, or IE 5317, or equivalent, or IE 5318 or equivalent; IE 5301 concurrent or equivalent.

**IE 5335. COGNITIVE SYSTEMS ENGINEERING. 3 Hours.**

This course will discuss applications of psychological principles and computer and information sciences related to human-centered designs for both simple and complex systems. Emphasis will be placed on the design of advanced technological systems to support both individual and larger distributed work systems. Topics include theories of human-machine systems, human perceptual and cognitive abilities/limitations, the role of technology and techniques in supporting decision-making and problem solving, and various interface evaluation methods that help to identify issues with how people interact with work and technologies. Prerequisite: IE 3301, or IE 5317, or DASC 5302, or equivalent. Some introductory programming knowledge is recommended.

**IE 5338. HUMAN ENGINEERING AND COMPLEX SYSTEMS. 3 Hours.**

Human structural, physiological, psychological, and cognitive capacities and limitations in the workplace, and their effects on the design of work systems to enhance productivity, and maintain health and safety. Prerequisite: IE 3301, or IE 5317, or equivalent.

**IE 5339. PRODUCT DESIGN, DEVELOPMENT, PRODUCIBILITY, AND RELIABILITY DESIGN. 3 Hours.**

This course covers product development and engineering design process with a focus on collaborative design. Software, manufacturing, reliability, testing, logistical and product support considerations are emphasized. Prerequisite: graduate standing.

**IE 5342. METRICS AND MEASUREMENT. 3 Hours.**

Work measurement, methods improvements, and performance measurement. A survey of enterprise and management measurement systems is presented. Prerequisite: IE 3301, or IE 5317 or equivalent.

**IE 5343. HEALTHCARE SYSTEMS ENGINEERING. 3 Hours.**

Application of continuous process improvement tools in the analysis of healthcare systems. Plan and execute studies that impact healthcare quality and costs. Evaluates the effectiveness of healthcare and administrative processes and procedures. Prerequisite: graduate standing.

**IE 5345. MANAGEMENT OF KNOWLEDGE AND TECHNOLOGY. 3 Hours.**

Review of contemporary issues in knowledge management, databases, decision support systems, and intelligent systems. Topics include knowledge acquisition, intelligent database design, decision support systems, data mining, knowledge transfer, and collaborative development. Prerequisite: Graduate standing.

**IE 5346. TECHNOLOGY DEVELOPMENT AND DEPLOYMENT. 3 Hours.**

Review of management issues in developing and implementing new technologies and methodologies into an organization. Topics include technology forecasting, management of technology based projects, technological competitiveness, technology alliances, and collaboration. Prerequisite: Graduate standing.

**IE 5350. GRADUATE DESIGN CAPSTONE. 3 Hours.**

Practicum consisting of professional level experience in a relevant company, agency, or institution. Students will be expected to demonstrate an understanding of communication and collaboration, including workflow, reproducibility, management, collaboration tools, oral and written communication, presentation and storytelling, and team management, as well as ethics, such as understanding bias, fairness, credibility and misinformation, security, privacy, and codes of conduct. Prerequisite: 9 hours of graduate work.

**IE 5351. INTRODUCTION TO SYSTEMS ENGINEERING. 3 Hours.**

This course includes a survey of concepts, principles and processes required to engineer complex systems throughout the life-cycle from concept through disposal. Topics include systems thinking, technical and management processes, life cycle models, sustainability, and model-based systems engineering. Prerequisite: Graduate standing.

**IE 5352. REQUIREMENTS ENGINEERING. 3 Hours.**

This course focuses on system requirements engineering and related processes and methods. System verification will also be covered. Students will be introduced to model-based systems engineering related to the processes covered in the class. Prerequisite: graduate standing in engineering or consent of instructor.

**IE 5353. SYSTEMS ARCHITECTURE & DESIGN. 3 Hours.**

This course focuses on systems architecting and design for complex systems. Topics covered include logical and physical system architecture analysis, system design, implementation, transition to use, and enabling products. Students will be introduced to model-based systems engineering related to the processes covered in the class. Prerequisite: graduate standing in engineering or consent of instructor.

**IE 5354. MANAGEMENT OF COMPLEX SYSTEMS. 3 Hours.**

This course focuses on the management of the engineering of complex systems including key systems engineering management processes. Prerequisite: graduate standing in engineering or consent of instructor.

**IE 5361. OPERATIONS RESEARCH FOR LOGISTICS. 3 Hours.**

Quantitative techniques of operations research and their application to decision problems in logistics are explored via techniques such as linear programming, integer programming, network analysis, and applied simulation. Modeling with these techniques is emphasized. Prerequisite: Graduate standing.

**IE 5362. LOGISTICS & PRODUCTION PLANNING. 3 Hours.**

The economic impacts of fluctuating demand, supply availability and production rates are examined via design and analysis of manufacturing and logistics systems. Emphasis is placed on reducing cycle time, increasing throughput, lowering variation, and improving both quality and customer responsiveness through modeling techniques. Prerequisite: Graduate standing.

**IE 5363. DISTRIBUTION & TRANSPORTATION SYSTEMS. 3 Hours.**

The role of distribution centers and transportation in the extended enterprise are explored via transportation modeling and optimization techniques, value-added supply chain issues, distribution center process design, layout, equipment selection, workforce and workplace issues, and financial performance measures. Prerequisite: Graduate standing.

**IE 5378. INTRODUCTION TO UNMANNED VEHICLE SYSTEMS. 3 Hours.**

Introduction to UVS (Unmanned Vehicle Systems) such as UAS (Unmanned Aircraft Systems), UGS (Unmanned Ground System) and UMS (Unmanned Maritime System), their history, missions, capabilities, types, configurations, subsystems, and the disciplines needed for UVS development and operation. UVS missions could include student competitions sponsored by various technical organizations. This course is team-taught by engineering faculty. Prerequisite: Permission of instructor.

**IE 5379. UNMANNED VEHICLE SYSTEM DEVELOPMENT. 3 Hours.**

Introduction to the technologies needed to create an UVS (Unmanned Vehicle System). Integration of these technologies (embodied as a set of sensors, actuators, computing and mobility platform sub-systems) into a functioning UVS through team work. UVS could be designed to compete in a student competition sponsored by various technical organizations or to support a specific mission or function defined by the instructors. This course is team-taught by engineering faculty. Prerequisite: Permission of instructor.

**IE 5391. ADVANCED STUDIES IN INDUSTRIAL ENGINEERING. 3 Hours.**

Individually approved research projects and reading courses in industrial engineering. Such individual studies will be graded A, B, C, D, F or X. Subject to the approval of the Graduate Advisor, IE 5191, IE 5291 and IE 5391 may be repeated as the topics change. In addition, work on a thesis substitute will be performed under IE 5391. In this case, IE 5391 is graded P/F/R.

**IE 5398. THESIS. 3 Hours.**

Supervised research projects directed toward the thesis. Graded P, R, F, or W.



**IE 5698. THESIS. 6 Hours.**

Graded P, F, R.

**IE 6197. RESEARCH IN INDUSTRIAL ENGINEERING. 1 Hour.**

Supervised research projects directed toward the dissertation. Graded P, R, F.

**IE 6297. RESEARCH IN INDUSTRIAL ENGINEERING. 2 Hours.**

Supervised research projects directed toward the dissertation. Graded P, R, F.

**IE 6301. ENTERPRISE ARCHITECTURES AND FRAMEWORKS. 3 Hours.**

A survey of enterprise architectures and analysis frameworks that have been proposed for the integration of large complex enterprise systems.

Emphasis is placed on state-of-the-art approaches. Prerequisite: IE 5320.

**IE 6302. FACILITIES PLANNING AND DESIGN. 3 Hours.**

Facilities planning through layout design. Product flow, space-activity relationships, personnel requirements, and material handling are considered, as well as receiving, shipping, warehousing, and integration with manufacturing. Facilities planning models are explored. Prerequisite: IE 3301, or IE 5317, or equivalent; IE 5301 concurrent or equivalent.

**IE 6303. COMBINATORIAL OPTIMIZATION. 3 Hours.**

A survey of problems and algorithms in combinatorial optimization. Topics include integer programming formulation, branch-and-bound and cutting plane algorithms, computational complexity, and polyhedral theory. Prerequisite: IE 5301 or consent of instructor.

**IE 6305. ENGINEERING MANAGEMENT I. 3 Hours.**

The management of the engineering function in high-technology industry with principal emphasis on the historical development of industrial management principles, decision-making and planning. Prerequisite: Graduate standing.

**IE 6306. ENGINEERING MANAGEMENT II. 3 Hours.**

The management of the engineering function in high-technology industry with principal emphasis on human resources and staffing, directing and leading, and controlling. Prerequisite: IE 6305.

**IE 6308. DESIGN OF EXPERIMENTS. 3 Hours.**

Introduction to statistical design and analysis of experiments with applications from engineering, health care and business. Analysis includes analysis of variance, multiple comparisons and model adequacy. Designs include complete factorial, complete block, incomplete block, Latin square, Youden, two-level fractional factorial and hierarchically nested. Prerequisite: IE 3301, or IE 5317, or equivalent, and IE 5318.

**IE 6309. RESPONSE SURFACE METHODOLOGY AND COMPUTER EXPERIMENTS. 3 Hours.**

Empirical model building and process optimization using experimental design and statistical modeling. The first half of the course covers first and second order models and designs, multiresponse experiments and mixture experiments. The second half introduces designs based on Latin hypercubes, orthogonal arrays, and number-based theoretic methods, plus models using kriging, multivariate adaptive regression splines and neural networks. Prerequisite: IE 6308.

**IE 6310. INDUSTRIAL APPLICATIONS. 3 Hours.**

Project oriented course focusing on the requirements and selection criteria for the integration of technology into simple and complex industrial activities. Prerequisite: IE 5330 or equivalent.

**IE 6318. DATA MINING & ANALYTICS. 3 Hours.**

An in-depth introduction to data mining and pattern recognition. Basic theories, algorithms, and key technologies in data analytics will be discussed. Case studies and real-world applications will be presented. Prerequisite: IE 3301, or IE 5317, or DASC 5302, or equivalent; and IE 5318 or concurrent enrollment; or consent of instructor.

**IE 6397. RESEARCH IN INDUSTRIAL ENGINEERING. 3 Hours.**

Supervised research projects directed toward the dissertation. Graded P, R, F.

**IE 6399. DISSERTATION. 3 Hours.**

Graded F, R.

**IE 6697. RESEARCH IN INDUSTRIAL ENGINEERING. 6 Hours.**

Supervised research projects directed toward the dissertation. Graded P, R, F.

**IE 6699. DISSERTATION. 6 Hours.**

Supervised research projects directed toward the dissertation. Graded P, R, F, or W.

**IE 6997. RESEARCH IN INDUSTRIAL ENGINEERING. 9 Hours.**

Supervised research projects directed toward the dissertation. Graded P, R, F.

**IE 6999. DISSERTATION. 9 Hours.**

Supervised research projects directed toward the thesis. Graded P, R, F, or W.

**IE 7399. DOCTORAL DEGREE COMPLETION. 3 Hours.**

This course may be taken during the semester in which a student expects to complete all requirements for the doctoral degree and graduate. Enrolling in this course meets minimum enrollment requirements for graduation, for holding fellowships awarded by The Office of Graduate Studies and for full-time GTA or GRA positions. Students should verify that enrollment in this course meets other applicable enrollment requirements. To remain eligible in their final semester of study for grants, loans or other forms of financial aid administered by the Financial Aid Office must enroll in a minimum of 5 hours as required by the Office of Financial Aid. Other funding sources may also require more than 3-hours of enrollment. Additional hours may also be required to meet requirements set by immigration law or by the policies of the student's degree program. Students should contact the Financial Aid Office, other sources of funding, Office of International Education and/or their graduate advisor to verify enrollment requirements before registering for this course. This course may only be taken twice. Students who do not complete all graduation requirements while enrolled in this course must enroll in a minimum of 6 dissertation hours (6699 or 6999) in their graduation term. Graded P/F/R.

**COURSES****ILDT 5301. FOUNDATIONS OF INSTRUCTIONAL DESIGN AND LEARNING TECHNOLOGY. 3 Hours.**

This course provides the foundation for the study of educational technology and covers topics such as theories of learning, performance, information, and communications; technology support for learning, instruction, and performance; examination of technology tools for the classroom and workplace applications; as well as practical applications of learning technologies.

**ILDT 5302. THEORIES OF TEACHING AND LEARNING WITH TECHNOLOGY. 3 Hours.**

This course explores current topics, evidence-based methods, and educational theories for teaching with digital technologies. Students examine the benefits, challenges, and applications of a wide variety of theories to identify strategies for integrating technologies in a variety of educational contexts.

**ILDT 5303. DESIGNING AND DEVELOPING MEANINGFUL ONLINE LEARNING. 3 Hours.**

This course provides an overview of how to create, deliver, and assess learner-centered online pedagogies. Instructional and design strategies focus on creating engaging, authentic, active, and cooperative online learning environments that can be used by educators in K-12 classes, higher education, and workplace instructional designers.

**ILDT 5304. ASSESSMENT AND EVALUATION WITH LEARNING TECHNOLOGIES. 3 Hours.**

This course examines the theory, practice, and techniques of effective assessment and evaluation using technology tools both in the classroom and in virtual learning environments. Students explore the adoption and implementation of technology assessments in a variety of pedagogical applications: online learning, classroom environments, workplace training programs, hybrid learning, and workshop delivery.

**ILDT 5310. INCLUSIVE, EQUITABLE AND CULTURALLY RESPONSIVE ONLINE LEARNING. 3 Hours.**

This course examines how to develop equity-minded educators who understand inclusive experiences for empowering all students to maximize their educational potential. Course curriculum provides an opportunity to synthesize, develop, and refine knowledge related to both theory and practice of educational instruction and inclusivity. Prerequisite: ILDT 5301, ILDT 5302, or ILDT 5303.

**ILDT 5320. SIMULATIONS AND GAMIFICATION OF LEARNING: THEORIES AND PRACTICE. 3 Hours.**

This course explores how to rethink the learning design process utilizing the interactive, collaborative, and creative tools of simulations and gamification. Students focus on how to incorporate various elements of gamification to increase learner autonomy and engagement including setting goals, providing multidimensional feedback, incorporating multimodal elements, and problem-based learning.

**ILDT 5330. CREATING OPEN AND INFORMAL LEARNING ENVIRONMENTS WITH TECHNOLOGY. 3 Hours.**

This course examines the pedagogical possibilities of open and informal learning activities for inclusion in both in-person and online learning environments. Core topics include increasing learner motivation and self-directed learning, examining social and collaborative online networks, and the incorporation of technology tools. Prerequisite: ILDT 5301, ILDT 5302, or ILDT 5303.

**ILDT 5340. FACILITATION STRATEGIES FOR HYBRID AND ONLINE LEARNING. 3 Hours.**

This course explores how to effectively create relationships with students and facilitate instruction in online courses including increasing motivation, providing opportunities for tailored/customized instruction, promoting interaction and collaboration, utilizing effective and timely communication, teaching time and information management, and promoting digital citizenship.

**ILDT 5350. MULTIMEDIA DESIGN TOOLS FOR ONLINE LEARNING. 3 Hours.**

This course covers instructional theory and provides practical experience in the design and development of online multimedia resources for educators. The following questions guide exploration in this course: What are the existing multimedia tools in teaching and learning? What type of multimedia components fit and can be customized for a specific audience? What factors contribute to the success or failure of multimedia tools for teaching and learning? Course curriculum introduces the uses and features of multimedia software and technologies, investigates online learning strategies, and explores the use of virtual tools to enhance learning.

**ILDT 5360. USER EXPERIENCE DESIGN FOR ACCESSIBILITY. 3 Hours.**

This course examines how designing with accessibility in mind enables students with a range of abilities to perceive, understand, navigate, interact with, contribute to, and create new material for web-based courses and resources. Course curriculum includes both the principles of effective user interface and experience design. Recommended practices for assistive technologies and online support mechanisms are also explored.

**ILDT 5370. PROGRAM PLANNING AND IMPLEMENTATION FOR HYBRID AND VIRTUAL LEARNING ENVIRONMENTS. 3 Hours.**

This course explores the fundamental concepts necessary to understand program and curriculum development in education with a focus on hybrid and virtual courses. Topics include the review of conceptual frameworks for planning, recruitment, evaluation, and research on program implementation and program building, as well as procedures for making course curriculums more engaging, customized, and meaningful for learners. Participants synthesize program planning theory and practice through a series of online lectures, readings from the research literature, collaboration with colleagues, and practical assignments. Taking ILDT 5301, ILDT 5302, or ILDT 5303 before this course is highly recommended.

**ILDT 5380. LEARNING SYSTEM DESIGN AND IMPLEMENTATION. 3 Hours.**

This course examines the entire educational ecosystem with regards to the development and implementation of a learning management system for an individual classroom, school, district, or organization. The technical resources, budgets, expertise of staff, leadership team, curriculum, project plan, and profile of the student body are all examined, including their influence on implementing effective and engaging course structures for students.

**ILDT 5390. LEADERSHIP IN INSTRUCTIONAL TECHNOLOGY. 3 Hours.**

This course prepares teacher-leaders, administrators, and training managers with the theory and skills to improve the quality and effectiveness of instructional technology programs at a classroom, departmental, school, or workplace level. This includes skills to develop technology-enhanced learning experiences, understand principles of change management theory, assess the value and effectiveness of technology programs, and design appropriate professional development. Course topics also include how to create online and blended learning environments that are supported by technology, while implementing a personalized and customized culture for students. Prerequisite: ILDT 5301, ILDT 5302, or ILDT 5303.

**ILDT 5398. INDEPENDENT RESEARCH PROJECT. 3 Hours.**

Research for thesis substitute or equivalent over topic agreed upon between student and instructor. Examples include a white paper, conference paper or presentation, literature review article, or equivalent. Prerequisite: 6 ILDT courses completed.

**ILDT 5399. WORKPLACE CAPSTONE PROJECT. 3 Hours.**

Independent project on instructional design and learning technology application agreed upon between student and instructor based on application in a workplace context. Examples include an online course, mobile learning activity, open educational resource, online lecture series, or equivalent. Prerequisite: 6 ILDT courses completed.

## COURSES

**INSU 4329. PROPERTY AND CASUALTY RISK MANAGEMENT. 3 Hours.**

Fire, marine, and automobile insurance; business, professional, and personal liability insurance; theft insurance; disability and miscellaneous casualty coverage, surety bonds, rate structures, and multiple line contracts. Prerequisite: 60 credit hours.

**INSU 4330. LIFE AND HEALTH RISK MANAGEMENT. 3 Hours.**

Principles underlying the fields of life and health insurance. Types of life, health, and annuity contracts; determination of premiums; policy provisions, reserve provisions, and legal requirements. Prerequisite: 60 credit hours.

## COURSES

**INSY 2303. INTRODUCTION TO M.I.S. AND DATA PROCESSING. 3 Hours. (TCCN = BCIS 1305)**

Introduction to business data processing, computer programming, management information systems, and problems involved in business information processing systems. Selected software tools are presented and managerial applications are required. Formerly BUSA 2303; credit will be granted only once.

**INSY 3300. INTRODUCTION TO PROGRAMMING. 3 Hours.**

An introductory programming course that teaches students how to solve business problems using the scripting language, Python. Students will be exposed to object-oriented programming concepts, file handling, database access, and graphical user interfaces. Prerequisite: INSY 2303.

**INSY 3303. COMPUTER NETWORKS AND DISTRIBUTED COMPUTING. 3 Hours.**

Concepts of computer networks and data communications. Topics include principles of communication and networking protocols, hardware and software, architectures, and management issues. Formerly INSY 4304; credit will be granted only once. Prerequisite: INSY 2303.

**INSY 3304. DATABASE MANAGEMENT SYSTEMS. 3 Hours.**

Comprehensive coverage of database technology and applications. Data models, query processing (SQL), relational database design, and implementation. Topics covered are hierarchical, network, relational, and object-oriented models, data dictionaries, distributed databases, evaluation and selection of database management systems (DBMS), and data administration. Formerly INSY 4302; credit will be granted only once. Prerequisite: INSY 3300.

**INSY 3305. INFORMATION SYSTEMS ANALYSIS AND DESIGN. 3 Hours.**

This is a survey of the concepts and methods of information systems analysis and design, system development life cycle (SDLC) and methodologies associated with the SDLC. Course covers feasibility analysis, requirements definition, systems design, data design, coding design, programming, and implementation. Prerequisite: INSY 3304 and INSY 4305. INSY 4305 may be taken concurrently.

**INSY 3330. INTRODUCTION TO E-COMMERCE. 3 Hours.**

Examines current and projected developments in electronic commerce. Topics include the information technologies upon which electronic commerce is based, such as the telecommunications infrastructure; new perspectives on space, time and money in business; electronic consumers and advertising; the effect of e-commerce on logistics and supply chain management; electronic financial markets and digital payment mechanisms; marketing through digital storefronts and virtual corporations; new frontiers of business such as electronic auctions and business to business e-commerce; the relationship between e-commerce and successful business strategy; and finally, public policy. Formerly BUSA 3330; credit will be granted only once. Prerequisite: INSY 2303.

**INSY 4191. STUDIES IN INFORMATION SYSTEMS. 1 Hour.**

Advanced studies, on an individual basis, in the various fields of information systems. May be repeated for credit with consent of department chair. Prerequisite: Senior standing and permission of instructor.

**INSY 4291. STUDIES IN INFORMATION SYSTEMS. 2 Hours.**

Advanced studies, on an individual basis, in the various fields of information systems. May be repeated for credit with consent of department chair. Prerequisite: 90 credit hours and permission of instructor.

**INSY 4305. ADVANCED APPLICATION DEVELOPMENT. 3 Hours.**

This is a comprehensive Java programming course that not only covers the fundamental object-oriented programming (OOP) topics but also includes advanced Java programming concepts. Topics include structured programming concepts like control structures and methods as well as OOP concepts like encapsulation, composition, inheritance, polymorphism, dynamic binding, and interfaces. The course will also cover Swing components, exception and error handling, and the basics of file processing. Prerequisite: INSY 3300.

**INSY 4306. ADVANCED SYSTEMS DEVELOPMENT. 3 Hours.**

This course will address systems development, testing and deployment using Java. Students will be exposed to advanced Java concepts, including networking, multithreading, JDBC, advanced file handling, and regular expressions. The course will also cover web services and test-driven development using JUnits. Prerequisite: INSY 4305 and INSY 3305. INSY 3305 may be taken concurrently.

**INSY 4307. CLOUD COMPUTING. 3 Hours.**

This course teaches fundamental aspects of Cloud Computing including Virtualization, Cloud Infrastructure, Networking, and Autoscaling. Students will be taught both concept and practical skills through hands-on assignments using a major Cloud provider's environment (a base for Cloud certifications). Prerequisite: INSY 3300 or equivalent.

**INSY 4312. INTRODUCTION TO CYBERSECURITY. 3 Hours.**

This course provides an introduction to the field of Information Security. It covers terminology, history, management, technology and practice of Information Security. It will address topics in many of the Security Domains specified by ISC2. Prerequisite: INSY 3303.

**INSY 4313. BLOCKCHAIN TECHNOLOGY. 3 Hours.**

Students are introduced to fundamental concepts of blockchain technology. First, second, and third generation blockchain technologies are discussed. Students are also assigned case studies and recent research on blockchain to learn the latest developments in the industry.

**INSY 4315. ADVANCED WEB DEVELOPMENT. 3 Hours.**

Concepts and techniques for Web application development. The course will emphasize the use of Web development tools and techniques to develop web applications. Topics include web application development using technologies such as HTML/DHTML/XHTML, client-side scripting, XML/XSL and server-side scripting. Prerequisite: INSY 3300.

**INSY 4321. MOBILE APP DEVELOPMENT. 3 Hours.**

This course will provide a broad introduction to principles, techniques, and best practices needed to build user experiences for the web, mobile devices, and desktop environments. Coverage includes User Design, layouts, UX testing plans, and execution. The course focuses on using Cross-Platform Application Development to build native apps on multiple platforms like Android, iOS, and Windows. Students will use contemporary tools to build basic Multi-platform App UI. Prerequisite: INSY 3300.

**INSY 4324. ENTERPRISE BUSINESS PROCESS DESIGN. 3 Hours.**

This course introduces the concepts and practices of business process design and the execution of common business processes in enterprise resource planning (ERP) systems. Students will learn to describe key business processes, identify integration points across business processes, and understand the cross-functional nature of business processes. Prerequisite: Junior standing.

**INSY 4325. ENTERPRISE SYSTEMS MANAGEMENT. 3 Hours.**

Enterprise systems allow for the integration of firm-wide information. This course focuses on applying IT to satisfy the needs of an organization, and to improve its performance. Knowledge of enterprise systems and how to implement and manage them is essential for managers and for making better decisions. Through case studies and research projects, this course addresses various aspects of enterprise systems and their management, including data integration and standardization. It will also cover advanced topics such as data analytics, cloud computing, Blockchain, AI, and security and privacy. Prerequisite: Prerequisite or concurrent enrollment: INSY 3305 or BANA 4308.

**INSY 4331. SEMINAR IN INFORMATION SYSTEMS. 3 Hours.**

Readings and discussion of special topics in information systems. May be repeated for credit with consent of department. Prerequisite: 60 or 90 credit hours and consent of instructor.

**INSY 4391. STUDIES IN INFORMATION SYSTEMS. 3 Hours.**

Advanced studies, on an individual basis, in the various fields of information systems. May be repeated for credit with consent of department chair. Prerequisite: 90 credit hours and permission of instructor.

**INSY 4393. INFORMATION SYSTEMS INTERNSHIP. 3 Hours.**

Practical training in information systems. Analysis of theory applied to real life situations. May be used as an advanced business elective only; graded on a pass/fail basis. No credit will be given for previous experience or activities. May not be repeated for credit. Prerequisite: Junior standing and consent of department internship advisor.

**INSY 5182. INDEPENDENT STUDIES IN INFORMATION SYSTEMS. 1 Hour.**

Extensive analysis of an information systems topic. Prerequisite: permission of instructor.

**INSY 5199. GRADUATE INFORMATION SYSTEMS INTERNSHIP. 1 Hour.**

Practical training in information systems. Analysis of theory applied to real life situations. Course counts as an elective and has a pass/fail grade. No credit will be given for previous experience or activities.

**INSY 5299. GRADUATE INFORMATION SYSTEMS INTERNSHIP. 2 Hours.**

Practical training in information systems. Analysis of theory applied to real life situations. Course counts as an elective and has a pass/fail grade. No credit will be given for previous experience or activities.

**INSY 5303. MANAGEMENT OF INFORMATION TECHNOLOGIES. 3 Hours.**

This course equips students with a comprehensive understanding of organizational information technologies and systems. It examines their roles and impacts within organizations, key management challenges, the strategic implications of technology, and best practices for leveraging IT to enhance decision-making and competitive advantage. By analyzing critical technologies and real-world applications, students will develop the skills needed to manage information systems effectively and navigate the complexities of IT-driven organizational change in a competitive environment. Prerequisite: MBA classification or consent of the instructor.

**INSY 5309. OBJECT-ORIENTED BUSINESS PROGRAMMING. 3 Hours.**

Topics include fundamental programming structures, objects and classes, inheritance, and other basic concepts related to OO programming.

**INSY 5335. APPLIED DATABASE MANAGEMENT. 3 Hours.**

Concepts, tools, and technologies associated with the design, implementation and management of large databases are presented. Topics include data models (with emphasis on E/R model and relational model), database design and implementation, database query language, transaction management, and distributed databases. Recent advances in data management are also discussed. Use of a commercial DBMS is required. Prerequisite: INSY 5309 or INSY 5336 or approval of MSIS Graduate Advisor.

**INSY 5336. PYTHON PROGRAMMING. 3 Hours.**

An introductory programming course that teaches students how to solve business problems using the scripting language, Python. Students will be exposed to object-oriented programming concepts, file handling, database access, and graphical user interfaces.

**INSY 5337. DATA WAREHOUSING AND BUSINESS INTELLIGENCE. 3 Hours.**

This course covers concepts, tools, and technologies associated with the design and implementation of data warehousing (DW) and business intelligence (BI) applications. Topics covered include data warehouse architecture and infrastructure, dimensional modeling, Extraction Transformation and Loading (ETL), On Line Analytical Processing (OLAP), data quality, and planning and implementation of a DW & BI application. The course objectives are met through a combination of lectures, class projects and homework assignments. Hands-on experience in developing and deploying a DW & BI application is provided. Prerequisite: INSY 5335 or consent of graduate advisor.

**INSY 5339. PRINCIPLES OF BUSINESS DATA MINING. 3 Hours.**

This course will cover the foundations of business data mining. It will examine tools and techniques from the fields of machine learning and statistics used in practical data mining for finding, and describing, structural patterns in data. Topics may include: Knowledge representation and different types of data; Techniques for data pre-processing, cleaning, reduction, transformation, and visualization; Methods for Classification, Clustering, and Association Rules, including Decision Trees, Rules, Naive Bayes, k Nearest Neighbor, Neural Networks, Regression (linear & logistic), A-Priori, K-means, and hierarchical and density-based clustering; Performance evaluation of data mining algorithms using metrics. This course uses real world data sets and widely used statistical packages and programming languages. Prerequisite: BSTAT 5325 or equivalent.

**INSY 5341. ANALYSIS AND DESIGN. 3 Hours.**

Analysis and design phase of systems development life cycle. Topics include systems survey, functional specification, interface specification, data design, program design, system testing, and implementation. Prerequisite: INSY 5335.

**INSY 5342. ADVANCED SYSTEMS DESIGN. 3 Hours.**

This course provides an understanding of state-of-the-art software development methodologies, including those that are fast emerging. The focus will be on how these new methods differ from traditional practices and what research opportunities they afford to IS researchers. There will be a strong emphasis on technical as well as on socio-technical aspects of software development in the context of these new methodologies. Prerequisite: INSY 5341.

**INSY 5343. DATA COMMUNICATIONS AND NETWORKING. 3 Hours.**

This course discusses technological and managerial issues related to building and managing networks that meet organizational needs, maximize competitive advantage, and protect networks and data from cyber security threats. It addresses fundamental concepts and applications related to data communications and networking including topics such as server architecture, network and transport layers, network design processes and tools, wired and wireless networking, and network security and management.



**INSY 5344. BUILDING RESPONSIBLE AND ETHICAL AI APPLICATIONS. 3 Hours.**

This course uses a combination of lectures and hands-on exercises to introduce students to the challenges of bias (in data and algorithms), transparency, accountability, explainability, and ethics in Artificial Intelligence (AI) and Machine Learning (ML) applications. Upon successful completion of the course, students will be able to detect biases in data, build explainable AI/ML applications, evaluate applications for fairness, and address ethical concerns associated with the deployment of AI systems. Prerequisite: INSY 5339.

**INSY 5345. CLOUD COMPUTING - THEORY AND PRACTICE. 3 Hours.**

Cloud Computing has become an important component in Digital Transformation and Analytics. This course covers technical aspects of Cloud Computing including Software Defined Networking, Virtual Machines, Data Storage, Cybersecurity, APIs, Load Balancing, Auto-Scaling, Containers, etc. In addition to learning concepts, students will also obtain the highly demanded technical skills through hands-on assignments using a major Cloud provider's environment (a base for Cloud certifications). Business aspects from the Cloud providers' and users' perspectives will also be addressed. Prerequisite: INSY 5336 or equivalent. May be taken concurrently.

**INSY 5346. BUSINESS INNOVATION THROUGH BLOCKCHAIN TECHNOLOGY. 3 Hours.**

This course covers topics on components of blockchains, cryptocurrencies, smart contracts, tokens, and blockchain governance. Issues such as whether, how, and why businesses in a variety of industries are exploring Blockchain technology to devise potentially disruptive business strategies are also discussed.

**INSY 5347. PRINCIPLES OF CYBER SECURITY. 3 Hours.**

This course introduces fundamental concepts, terminologies, models, and practices in cyber security. It addresses managerial, technological, legal, and socio-political issues related to cyber security, and discusses how different fields of disciplines interact in this area. The course covers the common Body of Knowledge of security certification exams. Topics include emerging technologies and the risks, threats, and vulnerabilities associated with the digital world; ethical, legal, and social aspects of cyber security; risk management; security investigation and analysis. Prerequisite: INSY 5343. May be taken concurrently with INSY 5343.

**INSY 5348. AI AND ANALYTICS FOR MANAGERS. 3 Hours.**

Artificial Intelligence and Machine Learning (AI/ML) technologies offer new opportunities to analyze data, automate business processes, and transform business organizations. This course provides a broad overview of AI/ML technologies and their applications to solve business problems and support managerial decision making. Strategic and operational issues in deploying AI/ML technologies and creating a data-driven decision-making culture within the organization are discussed. A combination of classroom lectures and case analysis are used to provide a real-world perspective of operational and strategic issues related to development, deployment and management of AI/ML and data analytics technologies in business organizations.

**INSY 5350. HEALTH CARE INFORMATION SYSTEMS. 3 Hours.**

Addresses issues in the development, integration, and management of health care information systems. Specifically, topics in financial information systems, patient care systems, and health care delivery applications will be discussed. Both case studies and real life applications will be studied. Prerequisite: Cohort HCAD Major.

**INSY 5352. TOPICS IN OBJECT TECHNOLOGY. 3 Hours.**

Coverage of current topics in Object Technology to include the study of object-oriented agents, components, object request Brokers, distributed objects and related implementations of object-oriented software. Also includes the study of design patterns in object-oriented software design. Prerequisite: INSY 5309.

**INSY 5355. MANAGING RISK IN INFORMATION SYSTEMS. 3 Hours.**

This course provides a broad understanding of the fundamentals of risk management and applies them to the cyber security and digital risk management environments. It addresses how risk, threats, and vulnerabilities impact information systems, discusses strategies and approaches for mitigating risk, and introduces the anatomy of how to create a plan that reduces risk. Topics include risk management basics, risk assessment planning, risk mitigation planning, cost-benefit analysis, business continuity and disaster recovery planning. Prerequisite: INSY 5347.

**INSY 5357. ENTERPRISE RESOURCE PLANNING. 3 Hours.**

An introduction to enterprise resource planning (ERP), a business management paradigm that integrates all facets of the business, including planning, manufacturing, sales, finance and marketing. Course will cover both the methodology and practice of ERP using commercial software packages.

**INSY 5360. COMPUTATIONAL TECHNIQUES FOR BUSINESS ANALYTICS. 3 Hours.**

Computer software is the primary analytical tool for business analytics and modern research methods. Data analysts, statisticians, and researchers need technologies and skills using the computer as a tool for structuring and cleaning data sets, creating validation samples, conducting analyses, fitting models, simulating stochastic systems, model validation, and model presentation. Emphasis is placed on the use of data analytic software. Cross-listed with INSY 5360. Prerequisite: BSTAT 5325 or equivalent.

**INSY 5373. INFORMATION SYSTEMS PROJECT MANAGEMENT. 3 Hours.**

This course introduces students to the concepts and practices of project management and their importance to improving the success of information technology projects. Distinct aspects or characteristics of IT projects which cause these projects to behave differently in the corporate world than do other, non-technical, projects will be discussed.

**INSY 5375. MANAGEMENT OF THE DIGITAL ENTERPRISE. 3 Hours.**

This course explores the strategic applications of emerging digital technologies-including artificial intelligence, cloud computing, data analytics, blockchain, and the Internet of Things (IoT)-in driving business and societal transformations. Through in-depth analysis of a variety of real-world contemporary cases, and interactive presentations, students will gain practical insights into how firms harness digital tools to enhance decision-making, streamline operations, and create innovative business models. They will also learn how to evaluate and implement digital technologies that align with the business strategy and goals of an organization to ensure its long-term success.

**INSY 5376. BIG DATA ANALYTICS. 3 Hours.**

Machine Learning and Artificial Intelligence (AI) are transforming the way organizations harness data to draw business insights. This advanced course focuses on advanced machine learning techniques and deep learning algorithms. Students will receive hands-on training on deep learning models/architectures, including sequential and functional models, convolutional neural networks (CNNs), recurrent neural networks (RNNs), long-short term memory (LSTM), autoencoders, and adversarial networks. The foundations of distributed cluster-computing frameworks, including map-reduce and Spark will also be covered. Prerequisite: INSY 5378.

**INSY 5377. WEB AND SOCIAL ANALYTICS. 3 Hours.**

This course introduces the concepts, techniques, and tools of collecting and analyzing digital data on how users interface with an organization through the web and social media. The Internet and mobile technologies provide the vast sources of user data that describe or imply their behaviors, experiences, and attitudes. Analyzing these web (click) stream data and social media data serves the purposes of strengthening customer relationship management, improving online marketing (e.g. advertising, recommendation, pricing), and increasing the bottom line. The course will consist of lectures, case studies, hands-on exercises, and projects. Prerequisite: BSTAT 5325 or equivalent.

**INSY 5378. DATA SCIENCE: A PROGRAMMING APPROACH. 3 Hours.**

The world is awash in data and companies are now trying to discern patterns and predict behaviors of both consumers and competitors to gain and sustain a competitive advantage. This course provides an in-depth understanding of data preprocessing/feature engineering as well as machine learning concepts and algorithms using Python. Students will receive hands-on training on supervised learning algorithms such as KNN, Naïve Bayes, Linear and Logistic Regression, Support Vector Machines, Decision Trees and Ensembles, and Artificial Neural Networks (ANNs). The course will also cover the foundations of Natural Language Processing (NLP), Social Network Analysis, and unsupervised learning algorithms such as K-Means, Hierarchical Clustering, t-SNE, and DBSCAN. Prerequisite: INSY 5336 and INSY 5339.

**INSY 5379. BUSINESS ANALYTICS CAPSTONE. 3 Hours.**

This is a hands-on course that gives students an opportunity to apply their learning to real-world problems. Students will draw on their repertoire of analytical skills to work on one or more challenging projects. In-class discussions will include advanced topics in AI, Machine Learning, NLP, and other contemporary technologies. In addition to preparing a detailed report, students will present their findings to faculty and/or members of the business community. The course places considerable emphasis on problem-solving as well as on written and oral communication skills. Prerequisite: INSY 5378.

**INSY 5380. SOCIAL NETWORK ANALYSIS. 3 Hours.**

The enormous amount of data being generated by social networking sites as well as social media has the potential to provide insights into the behaviors of people and/or organizations. The course covers various aspects of social network analysis (SNA), including computation of structural characteristics of a network, analysis of ego and complete networks, position and role analysis, and statistical methods used in testing hypotheses related to social networks. In addition to covering the theoretical underpinnings of social networks, the course also emphasizes the analysis of real-world social network data using popular software applications/languages. Prerequisite: INSY 5336.

**INSY 5382. INDEPENDENT STUDIES IN INFORMATION SYSTEMS. 3 Hours.**

Extensive analysis of an information systems topic.

**INSY 5392. SELECTED TOPICS IN INFORMATION SYSTEMS. 3 Hours.**

In-depth study of selected topics in information systems. May be repeated when topics vary.

**INSY 5398. THESIS. 3 Hours.**

Graded F,R,P.

**INSY 5399. GRADUATE INFORMATION SYSTEMS INTERNSHIP. 3 Hours.**

Practical training in information systems. Analysis of theory applied to real life situations. Course counts as an elective and has a pass/fail grade. No credit will be given for previous experience or activities.

**INSY 5698. THESIS. 6 Hours.**

Graded F, R, P.

**INSY 6182. INDEPENDENT STUDY IN INFORMATION SYSTEMS. 1 Hour.**

Doctoral level study of information systems topics. Prerequisite: Doctoral standing.

**INSY 6301. SEMINAR IN RESEARCH FOUNDATIONS. 3 Hours.**

Integrative analysis of research in information systems, including research philosophies and methodologies, contemporary research topics, dissertation research and future directions for information systems research. Prerequisite: Doctoral standing.

**INSY 6306. SEMINAR IN INFORMATION TECHNOLOGIES. 3 Hours.**

Focuses on contemporary technology issues in IS development and deployment. Prerequisite: Doctoral standing and INSY 6301.

**INSY 6307. SEMINAR IN IS MANAGEMENT. 3 Hours.**

Focuses on managerial and organizational issues in IS. Prerequisite: Doctoral standing and INSY 6301.

**INSY 6382. INDEPENDENT STUDIES IN INFORMATION SYSTEMS. 3 Hours.**

Extensive analysis of an information systems topic.

**INSY 6392. SELECTED TOPICS IN INFORMATION SYSTEMS. 3 Hours.**

Advanced doctoral level topics in Information Systems. May be repeated when topics vary. Prerequisite: Doctoral standing.

**COURSES****INTD 1101. ACADEMIC SUCCESS SKILLS INTERIOR DESIGN. 1 Hour.**

This is a required course intended to establish a solid overview of the School of Architecture and the interior design program for all first semester UTA students who intend to declare as an interior design major. Topics for the class include: critical thinking, presentation techniques, internships, attendance of exhibitions and lectures, navigating the advising process, portfolio review and techniques, and utilizing the library and other university resources. Other topics may be discussed. This course may be taken only once for credit.

**INTD 1191. CONFERENCE COURSE. 1 Hour.**

Independent study guided by an instructor on a regular basis. May be repeated for credit. Permission of the instructor and the architecture undergraduate advisor required. Restricted to interior design-intended majors.

**INTD 1342. DESIGN COMMUNICATION II. 3 Hours.**

Introduction to concepts of design and building of interior spaces including ideation, visualization, and creative processes to solve more complex problems. Drawing and communication skills are developed using traditional and digital methods and architectural graphic conventions emphasized. This course is offered as ARCH 1342; credit will be granted only once. Prerequisite: "C" or better in ARCH 1301, ARCH 1341. Restricted to Interior Design-Intended, INTD\_UNIV, Architecture-Intended, and ARCH\_UNIV majors.

**INTD 2343. DESIGN COMMUNICATION III. 3 Hours.**

This is an introductory digital design course that develops visual awareness of the digital environment enabling students to express ideas graphically. This survey course focuses on general exposure to computer visualization software from 2D and 3D modeling and rendering, to technical drawings for design and construction documents. Emphasis is placed on the relationship of digital and graphic skills to the communication of ideas in both digital and printed media. This course was previously offered as INTD 3343; credit will only be granted once. Prerequisite: "C" or better in ARCH 2303, ARCH 2551, credit or concurrent enrollment in ARCH 2304. Restricted to Interior Design-Intended, INTD\_UNIV, Architecture-Intended, and ARCH\_UNIV majors.

**INTD 2391. TOPICS IN INTERIOR DESIGN. 3 Hours.**

Selected topics in concepts, philosophy, and models of interior design and allied arts of design.

**INTD 2552. DESIGN STUDIO: INTERIOR DESIGN I. 5 Hours.**

Exploration of the concepts and methods that shape interior spaces. Introduction to information gathering, exploration of three-dimensional spatial relationships and integration of color, light, and materials. Basics of interior construction, building components and professional standards are introduced. Emphasis on concept development, diagramming, space planning and human-centered design as applied to design solutions. This course offered as INTD 2552 and ARCH 2552; credit will not be granted for both. Prerequisite: "C" or better in ARCH 2303, ARCH 2551, credit or concurrent enrollment in ARCH 2304 and INTD 2343. Restricted to Interior Design-intended and Architecture-intended majors.

**INTD 3305. HISTORY OF INTERIOR DESIGN. 3 Hours.**

This course is a chronological survey that spans from the late nineteenth century to the present and explores a range of scales (micro to macro) from furniture, lighting, fine and decorative arts in the interior, to the related fields of architecture, landscape design, and city planning. Prerequisite: Junior standing in the program. Minimum 2.8 GPAs both cumulative and within the major required.

**INTD 3321. MATERIALS AND RESOURCES. 3 Hours.**

Survey of materials and resources in the design of the built environment in terms of aesthetics, function, and well-being. Exploration of construction processes, application, building codes, and life-cycle cost. Emphasis on understanding and specification of materials based on performance criteria and environmental sustainability. Prerequisite: Junior standing in the program. Minimum 2.8 GPAs both cumulative and within the major required.

**INTD 3322. MATERIALS AND TECHNOLOGY. 3 Hours.**

A course to investigate and explore the application of new and emerging materials in the context of sustainability, innovation and global perspective. Through the integration of technology, digital fabrication and prototyping, and emerging methodologies students explore new concepts in the use of materials that contribute to design of the built environment and human-centered design. Prerequisite: Junior standing in the program. Minimum 2.8 GPAs both cumulative and within the major required.

**INTD 3323. LIGHTING DESIGN. 3 Hours.**

An introduction to lighting technologies, luminaires, and design concepts. Exploration of creative and functional application of light sources relative to the impact on human experience, well-being, and environmental considerations. Course content emphasizes the integrated aspects of architectural lighting in the context of building systems. Prerequisite: Junior standing in the program. Minimum 2.8 GPAs both cumulative and within the major required.

**INTD 3338. BUILDING CODES AND REGULATIONS. 3 Hours.**

This course examines laws, codes, and regulatory processes applied to the built environment including Federal, State, and local codes. Students learn the integration of codes, Federal laws, and standards in the design process and apply concepts to design solutions. Awareness of building systems is emphasized as students learn about the codes and standards organizations, communication strategies, and processes that impact the practice of interior design and their role on interdisciplinary teams. This course is offered as INTD 3338 and ARCH 4338; credit will be granted only once. Prerequisite: Credit or concurrent enrollment in INTD 3553. Junior standing in the program. Restricted to Interior Design and Architecture majors.

**INTD 3357. BUILDING INFORMATION MODELING & VISUALIZATION. 3 Hours.**

An introduction to Building Information Modeling software to develop interior construction detailing and rendering techniques. The course is an overview of the development of an integrated set of interior construction documents, including plans, elevations, details, and schedules as well as visualization strategies. This course is offered as INTD 3357 and ARCH 4357; credit will only be granted once. Prerequisite: INTD 2343 and Junior standing in program. Restricted to Architecture and Interior Design majors. Minimum 2.8 GPAs both cumulative and within the major required.

**INTD 3361. ENVIRONMENTAL DESIGN & SUSTAINABILITY. 3 Hours.**

An exploratory course that considers the impact of design decisions on the environment. Principles of sustainable design are reviewed including theoretical frameworks, concepts, certifications and standards of practice. Environmental stewardship and ethics are introduced as a model for professional practice. Concepts of adaptive re-use, historic preservation, and restoration are introduced. Prerequisite: Junior standing in the program. Restricted to Interior Design majors. Minimum 2.8 GPAs both cumulative and within the major required.

**INTD 3553. DESIGN STUDIO: INTERIOR DESIGN II. 5 Hours.**

A studio course in the application of interior design principles to complex problems. Emphasis on concept development, programming, and the integration of building systems as part of the design process. Introduction to research strategies to inform design decisions and global awareness. Advanced presentation skills and use of technology are integrated to communicate the design solution. Prerequisite: Credit or concurrent enrollment in INTD 3321, INTD 3323, and INTD 3338. Junior standing in the program. Restricted to Interior Design majors. Minimum 2.8 GPAs both cumulative and within the major required.

**INTD 3554. DESIGN STUDIO: INTERIOR DESIGN III. 5 Hours.**

A studio course in the application of interior design principles to complex problems. Emphasis on concept development, programming, and the integration of building systems as part of the design process. Introduction to research strategies to inform design decisions and global awareness. Advanced presentation skills and use of technology are integrated to communicate the design solution. Prerequisite: INTD 3553 and credit or concurrent enrollment in INTD 3357. Junior standing in the program. Restricted to Interior Design majors. Minimum 2.8 GPAs both cumulative and within the major required.

**INTD 4191. CONFERENCE COURSE. 1 Hour.**

Independent study guided by an instructor on a regular basis. May be repeated for credit. Prerequisite: permission of instructor. Junior or senior standing in the program. Restricted to Interior Design majors.

**INTD 4195. SELECTED TOPICS IN INTERIOR DESIGN. 1 Hour.**

Studio and lecture course to explore and present selected topics in interior design. May be repeated for credit as topics change. Prerequisite: Permission of the Instructor or the Architecture Undergraduate Advisor. Junior standing in program. Restricted to Interior Design majors.

**INTD 4314. HISTORIC PRESERVATION AND RESTORATION. 3 Hours.**

Concepts and implementation of the restoration and preservation of historic structures and places, including archaeological, bibliographic, legislative, institutional, and physical parameters to the retention and adaptive re-use of significant architecture. This course is offered as ARCH 4314 and INTD 4314; credit will be granted only once. Prerequisite: ARCH 2303, ARCH 2304. Junior standing in program. Restricted to Architecture and Interior Design majors.

**INTD 4332. PROFESSIONAL PRACTICE IN INTERIOR DESIGN. 3 Hours.**

Introduction to business practices and procedures for interior design including ethics, governmental regulations, financial awareness, and project management. Students develop portfolio, resumes, and other marketing materials through individual and teamwork. Exploration of new models for practice and life-long learning in a global market. Prerequisite: Senior standing in the program. Restricted to Interior Design majors. Minimum 2.8 GPAs both cumulative and within the major required.

**INTD 4344. DESIGN COMMUNICATION IV. 3 Hours.**

A digital design course focusing on advanced visual communication skills. The class investigates the digital realm as a tool to develop and communicate ideas graphically, analytically, and conceptually. Application of 3D computer drawing, modeling, lighting, mapping, and rendering to explore concepts and present individual and team-based design solutions. Prerequisite: INTD 4368 and INTD 4556. Senior standing in the program. Restricted to Interior Design majors. Minimum 2.8 GPAs both cumulative and within the major required.

**INTD 4345. ARCHITECTURAL GRAPHICS. 3 Hours.**

Graphic and signage considerations for interior environments. Wayfinding methods will be addressed. Senior standing in the program. Restricted to Interior Design majors but open to Architecture majors as an elective based on space availability. Prerequisite: Senior standing in the program. Minimum 2.8 GPAs both cumulative and within the major required.

**INTD 4365. IMMERSIVE ENVIRONMENTS. 3 Hours.**

This course explores the use of emerging technology to develop immersive environments. Emphasis on the role of three-dimensional visualization has on the interior design process by accelerating iterations and simulating real world perspectives. Prerequisite: INTD 3553 and INTD 3554. Senior standing in the program and permission of the Interior Design Program Director. Minimum 2.8 GPAs both cumulative and within the major required.

**INTD 4366. HUMAN CENTERED DESIGN. 3 Hours.**

This course explores design from the perspective of human interaction with the environment in which they live. A focus on the physical, social, psychological, social, and cultural factors that influence design decisions. is a fundamental premise of this course. Students understand that the design of the built environment is based on the continual motion of life, social systems, and symbiotic human relationships. Human behavioral theories are integrated into the course. Prerequisite: Senior standing in the program. Minimum 2.8 GPAs both cumulative and within the major required.

**INTD 4368. INTERIOR DETAILING. 3 Hours.**

Application of design communication to interior construction detailing using more advanced software. Develop skills in articulating designs and detailing special elements related to the interior and understand installation processes. The course reviews interior construction documents, details, and schedules. Prerequisite: INTD 3553 and INTD 3554. Senior standing in the program. Restricted to Interior Design majors but open to Architecture majors as an elective based on space availability. Minimum 2.8 GPAs both cumulative and within the major required.

**INTD 4369. FURNITURE DESIGN AND CONSTRUCTION. 3 Hours.**

A studio course in the design, detailing, and construction of furniture. Prerequisite: INTD 3553 and INTD 3555. Restricted to Interior Design majors but open to Architecture majors as an elective based on space availability. Minimum 2.8 GPAs both cumulative and within the major required.

**INTD 4391. CONFERENCE COURSE. 3 Hours.**

Independent study guided by an instructor on a regular basis. May be repeated for credit. Prerequisite: permission of instructor. Junior or senior standing in the program. Restricted to Interior Design majors.

**INTD 4394. DESIGN RESEARCH METHODS AND APPLICATION. 3 Hours.**

Research conducted by undergraduate students that contributes to ongoing faculty research within the Interior Design program or the School of Architecture. Research must be conducted under the supervision of a full-time Interior Design or Architecture faculty member. Prerequisite: Senior standing in the program and permission of the Interior Design Program Director. Open to Architecture majors as an elective based on space availability. Minimum 2.8 GPAs both cumulative and within the major required.

**INTD 4395. SPECIAL TOPICS IN INTERIOR DESIGN. 3 Hours.**

This course addresses areas of special interest to Interior Design studies and gives students an opportunity for a more in-depth exploration of selected topics than is possible within the embedded content of the core course requirements. Prerequisite: Junior standing in the program. Restricted to Interior Design majors but open to Architecture majors as an elective based on space availability.

**INTD 4493. INTERIOR DESIGN INTERNSHIP. 4 Hours.**

Workplace or professional experience: internship agreement negotiated between intern and site supervisor requiring program approval. Duties should be challenging, productive, and develop professional skills. documentation of work performed, weekly timesheets and final presentation required. Prerequisite: INTD 3553 and INTD 3554. Senior standing in the program and permission of the Interior Design Program Director. Minimum 2.8 GPAs both cumulative and within the major required.

**INTD 4556. DESIGN STUDIO: INTERIOR DESIGN IV. 5 Hours.**

Research for evidence based design decision-making in the context of emerging design practice. Introduction to research methodologies including primary and secondary research to frame design problems. Application of design theories and principles to understand human interaction with the built environment. Emphasis on application of interior knowledge to solve complex design problems. Prerequisite: INTD 3553 and INTD 3554. Senior standing in the program. Restricted to Interior Design majors. Minimum 2.8 GPAs both cumulative and within the major required.

**INTD 4557. DESIGN STUDIO: INTERIOR DESIGN V. 5 Hours.**

Synthesis of design knowledge to a complex project scenario. Students apply critical and creative thinking to communicate understanding of large scale interior environments; focus on building systems and technology to communicate concepts and solutions. The impact of interior design on human well-being in the context of global issues is explored. Prerequisite: INTD 4368 and INTD 4556. Senior standing in the program. Restricted to Interior Design majors. Minimum 2.8 GPAs both cumulative and within the major required.

**INTD 4591. CONFERENCE COURSE. 5 Hours.**

Independent study guided by an instructor on a regular basis. May be repeated for credit. Prerequisite: INTD 3553 and INTD 3555. Senior standing in program. Restricted to Interior Design majors.

**INTD 4595. SELECTED TOPICS IN INTERIOR DESIGN. 5 Hours.**

Studio and lecture courses to explore and present selected topics in interior design. May be repeated for credit as topics change. Prerequisite: permission of the Instructor or the Architecture Undergraduate Advisor. Senior standing in program. Restricted to Interior Design majors. The course may be repeated up to four times as the topics change.

## COURSES

**INTS 1310. INTRODUCTION TO POPULAR CULTURE. 3 Hours.**

This course will introduce students to the role of popular culture in American society. It examines culture as a process through which people make symbolic meaning out of the world. Since everyone has access to popular culture, it constructs the way that people think about the world around them. The course will explore the creation, production, dissemination, reception and consumption of popular culture.

**INTS 2301. ENVISIONING INTERDISCIPLINARITY. 3 Hours.**

This foundational course is designed to introduce students to a variety of academic discourses and modes of knowledge-making, and to present some of the key concepts and aims of interdisciplinary studies.

**INTS 2388. SPECIAL TOPICS INTERDISCIPLINARY STUDIES. 3 Hours.**

Special topics or problems that lend themselves to an interdisciplinary approach. May be repeated for credit when the topic changes.

**INTS 3320. INTERDISCIPLINARY THEORY. 3 Hours.**

This course examines the important theories that form the foundation for interdisciplinary studies. These theories are put into a historical context that not only covers the origins of the disciplines, but the theories and ideas that have come to dominate the 21st century outlook on knowledge and the world. Prerequisite: Junior Standing or Permission of the instructor.



**INTS 4388. SPECIAL TOPICS INTERDISCIPLINARY STUDIES. 3 Hours.**

Special topics or problems that lend themselves to an interdisciplinary approach. May be repeated for credit when the topic changes. Prerequisite: INTS 2301.

**INTS 4391. INTERDISCIPLINARY STUDIES SENIOR SEMINAR. 3 Hours.**

The purpose of this course is to allow students to develop their job applications in a way to explain interdisciplinary studies. The seminar includes both readings on a topic of general academic interest and guest speakers from across campus to engage topics from an interdisciplinary perspective. This will provide students the opportunity to reflect on their own interdisciplinary degrees and see how their peers envisioned interdisciplinarity. Students are encouraged to use the seminar as a foundation for their future careers. Prerequisite: Completion of INTS 2301.

**INTS 4392. INTERDISCIPLINARY STUDIES SERVICE LEARNING. 3 Hours.**

Students work with a UTA faculty mentor to produce a detailed, substantive written project that focuses on a disciplinary problem and documents how the community service learning project helped them in addressing and/or understanding the problem. May be repeated with permission. Prerequisite: Completion of INTS 2301.

**INTS 4394. INTERDISCIPLINARY STUDIES SENIOR THESIS/PROJECT. 3 Hours.**

Students complete sustained original research or creative activity under the guidance of a UTA faculty mentor in their area(s) of concentration. Prerequisite: Completion of INTS 2301.

**INTS 4395. INTERDISCIPLINARY STUDIES INTERNSHIP. 3 Hours.**

Students work with a UTA faculty mentor to produce a detailed, substantive written project that focuses on a disciplinary problem and documents how the internship helped them in addressing and/or understanding the problem. Prerequisites: Completion of INTS 2301.

**INTS 4396. INTERDISCIPLINARY STUDIES STUDY ABROAD. 3 Hours.**

Students work with a UTA faculty mentor to produce a detailed, substantive written project that focuses on a disciplinary problem and documents how a study abroad experience helped them in addressing and/or understanding the problem. Prerequisite: Completion of INTS 2301.

## COURSES

**JOUR 2330. INTRODUCTION TO JOURNALISM. 3 Hours. (TCCN = COMM 2302)**

Providing an overview of ethics, history, principles and fundamentals of journalism as reflected in current practices.

**JOUR 2340. PHOTOJOURNALISM I. 3 Hours. (TCCN = COMM 1316)**

Basic theory and techniques of photojournalism; introduction to electronic digital photography and editing; professional, technical, and aesthetic values.

**JOUR 2346. REPORTING. 3 Hours. (TCCN = COMM 2315)**

Complex journalistic stories with emphasis on ethics, researching, interviewing, and writing of general news stories, news features, and specialized stories. Prerequisite: A grade of C or better in both COMM 2311 and JOUR 2330.

**JOUR 3330. DATA JOURNALISM. 3 Hours.**

Use of data management skills and software to report stories, using journalistic principles and writing style as well as visualization. Prerequisite: JOUR 2346 with a C or better.

**JOUR 3341. PHOTOJOURNALISM II. 3 Hours.**

Advanced electronic imaging techniques as applied to newspapers, magazines, and public relations. Prerequisite: JOUR 2340 with a grade of C (2.0/4.0) or better.

**JOUR 3345. COPY EDITING. 3 Hours.**

Focus on the function of editors, copy editors and copy editing for journalistic and other publications in print and online formats. Prerequisite: A grade of C or higher in both JOUR 2330 and JOUR 2346, or permission of the department.

**JOUR 3360. SPORTS REPORTING. 3 Hours.**

Reporting on sports across multiple platforms. Credit will not be given for both BCMN 3360 and JOUR 3360. Prerequisite: A grade of C or better in both JOUR 2340 and JOUR 2346.

**JOUR 4325. SPECIALIZED REPORTING. 3 Hours.**

This course focuses on the unique demands of a specialized form of journalism. Subjects include such topics as sports reporting, business reporting, health and science reporting, travel reporting and writing for new media. Prerequisite: JOUR 2346 with a grade of C or higher and COMM 3315.

**JOUR 4326. FEATURE AND OPINION WRITING. 3 Hours.**

Nature, function, and structure of articles for print and online media. Prerequisite: JOUR 2346 with a grade of C or better and COMM 3315.

**JOUR 4341. DIGITAL STORYTELLING. 3 Hours.**

Creating multimedia packages in news, illustrative, and narrative formats. Conducting social media journalism. Readings in newsroom practices, law, and ethics of digital communication. Prerequisites: COMM 3315, and a grade of C (2.0/4.0) or better in JOUR 2346 and JOUR 3341.

**JOUR 4346. PUBLIC AFFAIRS REPORTING. 3 Hours.**

Research in planning and writing techniques required for covering such public affairs news sources as governmental offices, bureaus, and agencies. Experience in covering local government agencies, including agency budgets. Investigative and in-depth methods of news gathering; extensive practice in news writing. Prerequisite: COMM 3315, JOUR 2346 with a grade of C or higher, and completion or concurrent enrollment in JOUR 3330.

**JOUR 4391. CONFERENCE COURSE. 3 Hours.**

Topic assigned on an individual basis, covering individual research or study in the designated areas. May be repeated when topic changes. Prerequisite: 60 or more hours earned and permission of the department.

**JOUR 4393. SPECIAL TOPICS. 3 Hours.**

Special studies in journalism. Topic varies from semester to semester. May be repeated as topics vary. Prerequisite: JOUR 2346, 60 or more hours earned, and permission of the department.

**JOUR 4395. PROFESSIONAL INTERNSHIP. 3 Hours.**

Individual research while working with business and industry. Individual conference to be arranged. Graded P/F. Prerequisite: 60 or more hours earned and permission of the department.

## COURSES

**KINE 1100. LAB SKILLS IN KINESIOLOGY AND EXERCISE SCIENCE. 1 Hour.**

The course is designed to provide basic lab measurement and testing experiences for Kinesiology and Exercise Science students. Prerequisite: or Co-requisite: KINE 1300.

**KINE 1230. FIRST AID / CPR / AED TRAINING. 2 Hours.**

This course is designed to cover the components of Standard First Aid, Cardio-Pulmonary Resuscitation (CPR) for the Professional Rescuer, and Automated External Defibrillator (AED) training. Certification is possible upon successful course completion. Offered as HEED 1230 and KINE 1230. Students seeking credit in HEED should enroll in HEED 1230 and students seeking credit in KINE should enroll in KINE 1230. Credit will not be granted for both courses.

**KINE 1300. INTRODUCTION TO KINESIOLOGY AND EXERCISE SCIENCE. 3 Hours. (TCCN = PHED 1301)**

Introduction to key concepts concerning the anatomical, motor, biomechanical, and physiological basis of exercise science. The student is introduced to cardiovascular responses to training, analysis of human and motor behavior, and basic principles of exercise prescription.

**KINE 1315. INTRODUCTION TO PHYSICAL EDUCATION AND SPORT. 3 Hours.**

This course is an introduction to, and observation of, practices in pedagogical kinesiology and sports leadership.

**KINE 1400. INTRODUCTION TO EXERCISE SCIENCE. 4 Hours.**

Introduction to key concepts concerning the anatomical, biomechanical, and physiological basis of exercise science. Through lecture and laboratory experiences, the student is introduced to cardiovascular responses to training, analysis of human movement, and basic principles of exercise prescription. Credit cannot be given for both KINE 1400 and the combination of courses it replaces: KINE 1124 and KINE 1314.

**KINE 2130. ATHLETIC TRAINING CLINICAL PRACTICUM I. 1 Hour.**

Laboratory and clinical experiences designed to provide students with formal instruction and evaluation in the Entry Level Athletic Training Clinical Proficiencies with an instructional emphasis on preventive and protective taping and wrapping procedures. This course requires the completion of 120 clinical hours under the supervision of an Approved Clinical Instructor (ACI) or Clinical Instructor (CI).

**KINE 2230. INTRODUCTION TO MUSCULOSKELETAL INJURIES. 2 Hours.**

This course is designed to introduce students to the mechanisms of musculoskeletal injury and their associated signs, symptoms, and tissue responses. Students will also be introduced to the basic principles of musculoskeletal assessment. This course is a prerequisite for admission to the Athletic Training Education Program. Prerequisite: KINE 2120, KINE 2320; must be concurrently enrolled in KINE 2130.

**KINE 2301. TEACHING GAMES FOR UNDERSTANDING. 3 Hours.**

The course will provide students with theoretical concepts with which they can design and analyze various short- and long-term plans related to the Teaching Games for Understanding theoretical model. Students will learn various tactical strategies and modification principles for applying learned concepts in instructional settings. The instructor will use expertise from given sports to help students transfer the common themes across the spectrum of the model's category of games. KINE 1315 is a co-requisite for this course. Prerequisite: Co-requisite KINE 1315.

**KINE 2302. DANCE AND MOVEMENT ACTIVITIES. 3 Hours.**

This course is designed to enhance the students performance knowledge of skills and strategies in dance and movement activities to acquaint them with effective teaching behaviors appropriate for these activities. Co-requisite KINE 1315. Prerequisite: Co-requisite KINE 1315.

**KINE 2307. SPORTS AND SOCIETY. 3 Hours.**

This course will examine the bidirectional impact of sport and societal institutions. The class will explore the co-dependent nature of sport and society and attempt to separate fact from fiction to aid in the understanding of the true role of sport as it fits into society. Topics to be addressed include the potentially controversial areas of race, gender, disability, institutional rule violations, and ethics in the contemporary sports arena. This is a lower level elective. Credit cannot be received for this course and KINE 3307.

**KINE 2330. CARE AND PREVENTION OF ATHLETIC INJURIES. 3 Hours. (TCCN = PHED 2356)**

An introduction to the profession of Athletic Training. Common sports-related injuries and illnesses will be discussed with an emphasis on the proper methods for prevention, recognition, and immediate care. Offered as HEED 2330 and KINE 2330. Kinesiology majors must take KINE 2330.

**KINE 2350. PUBLIC HEALTH: PRINCIPLES AND POPULATIONS. 3 Hours.**

This course will provide students with an overview of Public Health: what it is, how it works, and why it is important. Topics include current health issues, global health, health disparities and how Public Health impacts community settings. Class requirement includes participation in community-based, experiential-learning activities. Examination of public health concepts, values and functions. Exploration of the underlying science of human health and disease as that is impacted by socioeconomic, behavioral, biological, environmental and other factors that impact human health and contribute to health disparities. This course satisfies the University of Texas at Arlington core curriculum requirement in Social and Behavioral Sciences.

**KINE 2351. HEALTH ISSUES IN DIVERSE & VULNERABLE POPULATIONS. 3 Hours.**

Cultural competence is attracting increased attention across the spectrum of public health. However, many vulnerable populations continue to be "invisible," resulting in a lack of awareness and knowledge in public health and healthcare workers. This course provides students with information related to the multi-faceted disparities that exist beyond ethnic differences to investigate the many other facets of cultural diversity and health issues.

**KINE 2420. INTRODUCTION TO ATHLETIC TRAINING. 4 Hours.**

Classroom and laboratory experiences that provide an introduction to the profession of Athletic Training with an emphasis on prevention and immediate care of sports related injuries. Specific topics will include injury prevention techniques; emergency first aid and acute care; superficial application of therapeutic modalities; proper use and fitting of protective equipment; and environmental considerations. Credit cannot be given for KINE 2420 and the combination of courses it replaces: KINE 2320 and KINE 2120.

**KINE 3130. ATHLETIC TRAINING CLINICAL PRACTICUM II. 1 Hour.**

Laboratory and clinical experiences designed to provide students with formal instruction and evaluation in the Entry Level Athletic Training Competencies and Clinical Proficiencies. This course requires the completion of 250 hours of clinical experience performed under the supervision of an Approved Clinical Instructor (ACI) or Clinical Instructor (CI). Prerequisites: BIOL 2457, Athletic Training Majors only or permission of instructor. Corequisite: KINE 3320.

**KINE 3131. ATHLETIC TRAINING CLINICAL PRACTICUM III. 1 Hour.**

Laboratory and clinical experiences that provide students with formal instruction and evaluation in the Entry Level Athletic Training Competencies and Clinical Proficiencies. This course requires the completion of 250 hours of clinical education experience performed under the supervision of an Approved Clinical Instructor (ACI) or Clinical Instructor (CI). Prerequisite: BIOL 2457, Athletic Training Majors only or permission of instructor. Corequisite: KINE 3324.

**KINE 3300. FUNCTIONAL ANATOMY. 3 Hours.**

A study of the musculoskeletal anatomy to include bony landmarks, muscle origin, insertion and action, as well as nerve innervation. Knowledge of the functional anatomy is crucial to the understanding of sports performance, the design of strength training programs, and injury prevention. Prerequisite: KINE 1300, KINE 1100 and BIOL 2457.

**KINE 3302. SPORT AND EXERCISE PSYCHOLOGY. 3 Hours.**

Analysis of exercise and sport activities in terms of psychological skills and strategies. Topics include motivation, arousal regulation, focus, concentration, group cohesion & imagery.

**KINE 3303. ORGANIZATIONAL PRINCIPLES OF EXERCISE AND SPORT ACTIVITIES. 3 Hours.**

An organizational analysis of exercise and sport in terms of participation rules, regulations, and responsibilities. Emphasis on knowledge and understanding of the principles governing the organization and conduct of exercise and sport activities.

**KINE 3304. ADAPTED PHYSICAL EDUCATION & SPORT. 3 Hours.**

Analysis of conditions that impact individuals with disabilities in society, schools and disability sport. Emphasis is placed on adapted physical education and sport strategies that facilitate the learning of this population. Prerequisite: Instructor Permission.

**KINE 3306. MOTOR INTEGRATION. 3 Hours.**

Principles of motor skill acquisition, performance, and control. Topics include practice strategies, memory, neuromotor functioning, attention, and learning (assessment, transfer & stages). Prerequisite: KINE 1315, and KINE 1400, or permission of instructor.

**KINE 3307. SPORT AND SOCIETY: ISSUES AND DEBATES. 3 Hours.**

This course will examine the bidirectional impact of sport and societal institutions. The class will explore the co-dependent nature of sport and society and attempt to separate fact from fiction to aid in the understanding of the true role of sport as it fits into society. Topics to be addressed include the potentially controversial areas of race, gender, disability, institutional rule violations, and ethics in the contemporary sports arena. This is an upper level elective. Credit cannot be received for this course and KINE 2307.

**KINE 3309. FOUNDATIONS OF RECREATION. 3 Hours.**

Leisure time in our social structure and the agencies which have developed to provide leisure time activities. Program development and leadership skills in the recreation profession.

**KINE 3311. RECREATION AND LEISURE SERVICE. 3 Hours.**

Application of management and organizational principles, objectives, and procedures involved in implementing recreational and leisure service programs.

**KINE 3312. SPORTS LEADERSHIP AND COACHING. 3 Hours.**

This course will provide students with theoretical concepts and principles to design, lead, and manage sport programs. The instructor will use expertise from given sports and invasion games to help students learn and apply coaching strategies and leadership principles in a collaborative community sport program.

**KINE 3313. COACHING OF NET/WALL GAME PRINCIPLES. 3 Hours.**

The course will provide students with theoretical concepts with which they can design and analyze various short and long-term plans related to net/wall games. Students will learn various tactical strategies and modification principles for applying learned concepts in instructional settings. The instructor will use expertise from given sports to help students transfer the common themes across the spectrum of net/wall games.

**KINE 3320. LOWER EXTREMITY EVALUATION. 3 Hours.**

A study of the common orthopedic and musculoskeletal injuries involving the lower extremities and lumbar spine, with a special emphasis on recognition, evaluation, diagnosis, and initial management. Prerequisite: BIOL 2457, Athletic Training Majors only or permission of instructor. Corequisite: KINE 3130.

**KINE 3324. UPPER EXTREMITY EVALUATION. 3 Hours.**

A study of the common orthopedic and musculoskeletal injuries involving the upper extremities, spine, head, face, abdomen, and thorax, with a special emphasis on recognition, evaluation, diagnosis, and initial management. Prerequisite: BIOL 2457, Athletic Training Majors only or permission of instructor. Corequisite: KINE 3131.

**KINE 3325. UNDERGRADUATE RESEARCH METHODS. 3 Hours.**

Current practices in the conduct of quantitative research, measurement, and evaluation processes applied to programs related to exercise science, pedagogical kinesiology, athletic training and related fields will be examined. Enrolled students will develop and conduct a research project based on their declared discipline. Prerequisite: KINE 1300, KINE 1100, MATH 1302 OR MATH 1402, MATH 1308.

**KINE 3330. PATHOLOGY AND PHARMACOLOGY. 3 Hours.**

Study of acute and chronic illness and their response to, and impact on, physical activity. Discussion of pharmacological agents used in the care of general illnesses and musculoskeletal disorders in the physically active. Prerequisite: BIOL 2458, acceptance into the Athletic Training Education Program or permission of instructor.

**KINE 3333. THERAPEUTIC INTERVENTION II. 3 Hours.**

This course is designed to provide the student with an understanding of upper extremity and low back rehabilitation protocols and the use of electric therapeutic modalities like ultrasound, diathermy, laser, and electric stimulation. Emphasis will be placed on understanding the disablement model and learning how to plan, implement, document, and evaluate programs for the rehabilitation and reconditioning of injuries and illnesses of athletes and others involved with physical activity. Operation of electrical therapeutic modalities and how they can be incorporated into a rehabilitation program will be investigated. The underlying principles and application techniques for each modality, therapeutic exercise progressions, patient clinical goals, legal and safe practice guidelines, and evidence based therapeutic modality science will allow for critical thinking and problem solving in relation to common upper extremity and low back injuries. Both surgical and non-surgical rehabilitation models for the upper extremity and low back will be discussed with a special emphasis on the use of functional progressions. Prerequisites: BIOL 2457 and BIOL 2458. Concurrent enrollment in KINE 4131 is required for all Athletic Training Education Program students.

**KINE 3342. SOCIOLOGY OF THE HUMAN BODY. 3 Hours.**

Drawing from the social sciences, cultural and gender studies, and exercise physiology, this course in body sociology addresses several contemporary issues relating to diet, nutrition and exercise. Specific topics include eating disorders, factory farming, and "body industries" involving weight-loss diets, gyms, fashion, and cosmetic and bariatric surgery. The medical model of bodies is also examined. Also listed as SOCI 3342; credit will not be granted for both KINE 3342 and SOCI 3342.

**KINE 3350. URBANIZATION AND VULNERABLE POPULATIONS. 3 Hours.**

Investigation of diversity of individuals and populations in a community, including how diversity may influence policies, programs, services, and the health of a community, and the importance for a diverse public health workforce.

**KINE 3352. INTRODUCTION TO PUBLIC HEALTH EPIDEMIOLOGY. 3 Hours.**

Analysis of factors that affect the health of a community, including how disease spreads, legal aspects of epidemics, and how data is used to drive public health decision making. Overview of how public health practice and science come together to protect the health of the public, or of a specific population. Prerequisite: MATH 1301 or MATH 1302 or MATH 1303 or MATH 1426 and MATH 1308 and KINE 2350 required.

**KINE 3353. HEALTH AND THE HUMAN CONDITION IN THE GLOBAL COMMUNITY. 3 Hours.**

Study of the history, philosophy and contemporary issues of public health as those apply to public health in both urban and global societies.

**KINE 3354. EMERGENCY PREPAREDNESS & MANAGEMENT. 3 Hours.**

Inquiry into the structures, functions, and authorizations of governmental public health programs. Identification of tools, processes, and activities related to both practice and policy used to support community responses to public health emergencies and other disasters. Prerequisite: KINE 2350.

**KINE 3355. ADDICTIVE BEHAVIORS. 3 Hours.**

Students will examine substance abuse including alcohol, drugs (illegal and prescription), smoking, vaping, and gaming from a population-based approach. There will also be a focus on compulsive behaviors including topics such as food over- and undereating, gambling, shopping and internet/technology addictions. While the course emphasis is on addictive behaviors, material and learning activities will also address how diverse and vulnerable populations are impacted by addictive behaviors as those relate to injury and illness prevention.

**KINE 3356. PUBLIC HEALTH IN ACADEMIC SETTINGS. 3 Hours.**

Public Health in Academic Settings This course addresses common health issues found throughout educational settings. Topics include chronic stress, health and well-being, school violence and the roles of hunger and obesity as concerns in the school environment. A focus on school climate, the role of school-based healthcare and preventing dropout from public health perspectives will be included.

**KINE 3357. PHYSICAL ACTIVITY IN PUBLIC HEALTH. 3 Hours.**

Designed for public health and health/fitness/wellness professionals who are interested in the promotion of physical activity in a variety of areas of public health. Emphasis on advocating for the importance of integration of physical activity in community health. This course prepares students to sit for the American College of Sports Medicine/National Physical Activity Society Physical Activity in Public Health Specialist certification examination.

**KINE 3358. COMMUNICATION FOR HEALTH PROFESSIONALS. 3 Hours.**

Information and experiences that identify the health literacy of populations, including assessment of barriers and unique situations for vulnerable populations. Communication of information through appropriate, culturally competent methodologies. Integration of basic concepts of public health-specific communication into technical and professional writing. The use of mass media and electronic technology. Prerequisite: KINE 2350 and KINE 3350.

**KINE 3388. THEORY AND APPLICATION IN MOTOR DEVELOPMENT. 3 Hours.**

A study of motor skill development from infancy to adolescence with emphasis upon motor development theory and aspects that effect motor competence, underlie movement control, and influence change in the acquisition of motor skills. Prerequisite: KINE 1100 and KINE 1300.

**KINE 3401. BIOMECHANICS OF HUMAN MOVEMENT. 4 Hours.**

Quantitative and qualitative analyses of human movement. Emphasis is on the application of the principles of human movement, with consideration of functional anatomy, kinesiology and mechanical concepts to exercise, sport, and activities of daily living. Course credit may not be granted for both KINE 3301 and KINE 3401. Prerequisite: KINE 1300, KINE 1100, BIOL 2457 and MATH 1302 OR MATH 1402.

**KINE 3415. PHYSIOLOGY OF EXERCISE. 4 Hours.**

Provides the physiology background necessary for an understanding of the acute and chronic effects of exercise on the body. Physiological concepts and their relationship to exercise, sport, and health programs are examined. Laboratory experiences are designed for evaluating physiological responses to exercise. Course credit may not be granted for both KINE 3315 and KINE 3415. Prerequisite: Restricted to Kinesiology, Athletic Training and Exercise Science Majors. KINE 1300, KINE 1100, BIOL 2457, BIOL 2458, and MATH 1302 OR MATH 1402 required.

**KINE 4130. ATHLETIC TRAINING CLINICAL PRACTICUM IV. 1 Hour.**

Laboratory and clinical experiences designed to provide students with formal instruction and evaluation in the Entry Level Athletic Training Competencies and Clinical Proficiencies. The instructional emphasis is the development of functional rehabilitation programs for musculoskeletal injuries and common orthopedic surgeries. This course requires the completion of 250 hours of clinical experience performed under the supervision of an Approved Clinical Instructor (ACI) or Clinical Instructor (CI). Prerequisite: BIOL 2457 and BIOL 2458; Athletic Training Majors only or permission of instructor. Corequisite: KINE 4336.

**KINE 4131. ATHLETIC TRAINING CLINICAL PRACTICUM V. 1 Hour.**

Laboratory and clinical experiences designed to provide students with formal instruction and evaluation in the Entry Level Athletic Training Competencies and Clinical Proficiencies. Instructional emphasis is on the selection and clinical application of therapeutic modalities. This course requires the completion of 250 hours of clinical experience performed under the supervision of an Approved Clinical Instructor (ACI) or Clinical Instructor (CI). Prerequisite: BIOL 2457 and BIOL 2458; Athletic Training Majors only or permission of instructor. Corequisite: KINE 3333.

**KINE 4132. ATHLETIC TRAINING CLINICAL PRACTICUM VI. 1 Hour.**

Laboratory and clinical experiences designed to provide students with formal instruction and evaluation in the Entry Level Athletic Training Competencies and Clinical Proficiencies. This course requires the completion of 200 hours of clinical experience performed under the supervision of an Approved Clinical Instructor. Prerequisite: KINE 3130, KINE 3131, KINE 3320, KINE 3324, KINE 3330, KINE 3333, KINE 4130, KINE 4131, KINE 4336, and acceptance into the Athletic Training Education Program or approval of instructor. Must be concurrently enrolled in KINE 4233.

**KINE 4188. CLINICAL HEALTH PROFESSIONS INTERNSHIP. 1 Hour.**

Individualized academic training in an internal or external clinical health professions setting (e.g. university, hospital, physical therapy clinic, or physician's office) under the direct supervision of a health care professional (MD, PT, OT, PA). Prerequisite: Corequisite: KINE 4315 or successful completion of KINE 4315 and proof of sufficient professional liability insurance.

**KINE 4191. CONFERENCE COURSE. 1 Hour.**

Topics assigned on an individual basis covering personal research or study in the designated area. Prerequisite: permission of department chairperson.

**KINE 4193. PHYSICAL EDUCATION TEACHER CERTIFICATION PRACTICUM. 1 Hour.**

In this course students will be prepared for the TExES PE-EC-12 and PPR- EC-12 exams and prepared for the professional dispositions associated with being a Physical Educator with an emphasis on ethics, interviewing, and role modeling. The students will take and review the PE Content and Pedagogy and Professional Responsibilities practice teaching licensure exams. Through this process teacher candidates will be cleared for official TExES registration. This course is to be taken the semester immediately prior to the student teaching semester.

**KINE 4201. ADVANCED TECHNIQUES AND TACTICS OF BASEBALL. 2 Hours.**

Development and analysis of skills, offensive and defensive strategies used in the sport of baseball.

**KINE 4202. ADVANCED TECHNIQUES AND TACTICS OF BASKETBALL. 2 Hours.**

Development and analysis of skills, offensive/defensive strategies used in the sport of basketball.

**KINE 4203. ADVANCED TECHNIQUES AND TACTICS OF FOOTBALL. 2 Hours.**

Development and analysis of skills, offensive and defensive strategies used in the sport of football.

**KINE 4204. ADVANCED TECHNIQUES AND TACTICS OF TRACK AND FIELD. 2 Hours.**

Development and analysis of track and field event techniques and strategies.



**KINE 4205. ADVANCED TECHNIQUES AND TACTICS OF VOLLEYBALL. 2 Hours.**

Development and analysis of skills, offensive and defensive strategies used in the sport of volleyball.

**KINE 4233. ATHLETIC TRAINING ORGANIZATION & ADMINISTRATION. 2 Hours.**

A study of the administrative issues and management theories that may be encountered in athletic training. Special emphasis is placed on the practical application of concepts related to legal liability, facility design and maintenance, documentation, financial management, health insurance, and general day-to-day operations. Prerequisite: KINE 3130, KINE 3131, KINE 3320, KINE 3324, KINE 3330, KINE 3333, KINE 4130, KINE 4131, KINE 4336, and acceptance into the Athletic Training Education Program or approval of instructor.

**KINE 4291. CONFERENCE COURSE. 2 Hours.**

Topics assigned on an individual basis covering personal research or study in the designated area. Prerequisite: permission of department chairperson.

**KINE 4293. SEMINAR IN ATHLETIC TRAINING. 2 Hours.**

Synthesis of theories and concepts in athletic training. Review of the competencies and proficiencies in athletic training with special emphasis on professional development and the refinement of clinical decision-making. Prerequisite: KINE 3320, KINE 3324, KINE 3330, KINE 3333, KINE 4233, KINE 4336; Athletic Training Majors only.

**KINE 4296. SPECIAL TOPICS IN EXERCISE AND SPORT. 2 Hours.**

Designed to meet the current needs of students. May be repeated for credit when the topic changes.

**KINE 4307. OVERVIEW OF MEDICINE. 3 Hours.**

This course is designed to provide undergraduate students an overview of the basic, preclinical, and clinical sciences, emphasizing the main principles and logic of medicine, how doctors think, and how the healthcare system works. Specific topics covered include an Introduction to Medicine, Embryology & Principles of Anatomy, General & Systems Physiology, Molecular Biology & Biochemistry, Neuroscience, Microbiology & Immunology, Pathology, Pharmacology, Epidemiology & Public Health, Internal Medicine specialties (Cardiology, Pulmonology, Nephrology, Gastroenterology, Infectious Diseases, Endocrinology, Rheumatology, Hematology / Oncology), Neurology, Pediatrics, Obstetrics & Gynecology, Surgery, Anesthesiology, Surgical Subspecialties (Cardiovascular Surgery, Orthopedic Surgery, Ophthalmology, Otorhinolaryngology, Dermatology, Urology, Neurosurgery), Psychiatry, Radiology and Radiation Oncology. Importantly, it spans both the scientific and humanistic aspects of medicine, referencing the visual arts, music, film, and other forms of art to highlight key points. Though primarily designed for students aiming for a career in the health professions, it should appeal to anyone curious about how health and medicine works. Prerequisite: Instructor Approval.

**KINE 4316. FITNESS PROGRAMMING. 3 Hours.**

This course will provide students with practical and theoretical applications of fitness programming. The successful student will acquire a level of proficiency in the development of fitness programs and plans based upon client specific fitness assessment characteristics. Fitness programs shall include, but not be limited to: musculoskeletal symmetry, strength, and flexibility; body composition; cardiovascular endurance, and nutritional recommendations. Additionally, successful students will become proficient in the application of client related historical, nutritional, medical, psychological, and psychosocial factors that impact the development of a properly designed exercise program. Prerequisite: Current CPR certification, MATH 1302, KINE 3300, KINE 3315, and KINE 4315, or permission of instructor.

**KINE 4317. EXERCISE PRESCRIPTION FOR SPECIAL POPULATIONS. 3 Hours.**

This course will discuss the pathophysiology of prevalent cardiovascular, metabolic and pulmonary diseases. Methods of exercise prescription and issues of concern will also be presented for these populations, as well as, low back pain, pregnancy, osteoporosis, cancer, children, older adults, fibromyalgia, multiple sclerosis and cardiac disease. Prerequisite: MATH 1302, MATH 1308, BIOL 2457, BIOL 2458, KINE 3300, KINE 3415 and KINE 3325.

**KINE 4319. FITNESS, HEALTH AND OUTDOOR ADVENTURE ACTIVITIES EDUCATION. 3 Hours.**

The course will provide students with theoretical health-related concepts with which they can design and apply fitness learning into various physical education settings. In addition, this course is designed to introduce students to outdoor and adventure education activities and adventure-based learning. Time will be spent on low element group initiatives and high element adventure activities. Prerequisite: KINE 2301 and KINE 2302.

**KINE 4320. TEACHING SECONDARY PHYSICAL EDUCATION. 3 Hours.**

Designed to enhance teacher candidates' understanding of curriculum development as it applies to theory of motor learning and the sciences of kinesiology. These progressions are synthesized into a collaborative service-learning project with secondary public school partner(s). Candidates take responsibility for creating, coordinating, and facilitating learning experiences that are developmentally appropriate, motivating, and based on research. Prerequisite: KINE 3304, KINE 3388.

**KINE 4321. TEACHING ELEM PHYSICAL EDUCATION. 3 Hours.**

This course is designed to synthesize the sciences of anatomy and physiology, biomechanics, motor integration and motor control with sound pedagogical knowledge into an applied elementary physical education setting. Criminal background check required. Prerequisite: KINE 3304 and KINE 3388.

**KINE 4323. MOTOR CONTROL AND LEARNING. 3 Hours.**

This course will expose students to the theoretical perspectives and current principles associated with the control and learning of movement skills. Specifically, the neural and mechanical mechanisms underlying motor behavior and the variables influencing motor learning will be addressed. Throughout the course, application of theoretical concepts to instructional and clinical settings will be emphasized. Prerequisite: KINE 1300, KINE 1100, MATH 1308, and KINE 3325.

**KINE 4329. STRENGTH & CONDITIONING IN SPORT AND PERFORMANCE. 3 Hours.**

This course covers the physiology and biomechanics of strength training and conditioning. Additional topics include: testing and evaluation of athletes, resistance training techniques, training program design, and organization administration of a strength training facility. This course is designed to prepare students to take the CSCS, Certified Strength and Conditioning Specialist, certification examination. Prerequisite: MATH 1302, MATH 1308, BIOL 2457, BIOL 2458, KINE 3300, KINE 3415, KINE 3325.

**KINE 4330. PROGRAM DESIGN & ADMINISTRATION. 3 Hours.**

The development and operation of health/wellness programs and facilities will be presented, including: program design and administration, facility design, organizational development, management theory, marketing, financial management, legal issues, strategic planning, and evaluation models. The student will participate in all phases of program and facility development, such as budget development, recruiting and retaining employees and clients, market niche, and conflict resolution. Prerequisite: KINE 3415 and KINE 3325.

**KINE 4331. OBESITY & WEIGHT MANAGEMENT. 3 Hours.**

This course is a review of the scientific literature on the causes and consequences of obesity. Topics include: techniques for assessing body composition, metabolic factors promoting obesity, the role of obesity in metabolic and cardiovascular disease, traditional and non-traditional weight loss programs, economic consequences and contributors of obesity, and psychosocial consequences and contributors of obesity. Prerequisite: KINE 3415 and KINE 3325.

**KINE 4335. GRADED EXERCISE TESTING & PRESCRIPTION. 3 Hours.**

The knowledge and skills necessary for assessment of health history and appraisal, blood pressure, electrocardiogram, cardiovascular fitness and function will be acquired in lecture and laboratory sessions. Various test modalities and protocols will be discussed for health and diseased populations. Prerequisite: BIOL 2457, BIOL 2458, and KINE 3315, KINE 4315, or permission of instructor.

**KINE 4336. THERAPEUTIC INTERVENTION I. 3 Hours.**

This course is designed to provide the student with an understanding of the scientific theory and the basic principles of musculoskeletal rehabilitation and therapeutic modalities. Emphasis will be placed on understanding the disablement model and learning how to plan, implement, document, and evaluate programs for the rehabilitation and reconditioning of injuries and illnesses of athletes and others involved with physical activity. Operation of superficial heating and cooling therapeutic modalities and how manual treatments (e.g., traction, muscle energy and massage) can be incorporated into a rehabilitation program will be investigated. The underlying principles and application techniques for each modality, therapeutic exercise progressions, patient clinical goals, legal and safe practice guidelines, and evidence based therapeutic modality science will allow for critical thinking and problem solving in relation to common lower extremity injuries. Both surgical and non-surgical rehabilitation models for the lower extremity will be discussed with a special emphasis on the use of functional progressions. Prerequisites: BIOL 2457 and BIOL 2458. Concurrent enrollment in KINE 4130 is required for all Athletic Training Education Program students.

**KINE 4337. STRENGTH AND CONDITIONING IN GENERAL POPULATIONS: HEALTH AND DISEASE. 3 Hours.**

This course covers the physiology and biomechanics of strength training and conditioning as it applies to the general populations across the spectrum of health and disease. This includes: testing, evaluation, resistance training techniques and training program design for individuals with orthopedic injuries and rehabilitation concerns, metabolic conditions (e.g., diabetes), youth, elderly, and pregnant or post-prenatal women. This course is designed to prepare students to take the NSCA-CPT, and apply the skills needed to be a leader within the personal training and physical therapy career paths. Prerequisite: KINE 3415 and KINE 3325.

**KINE 4339. SPORTS LEADERSHIP AND MANAGEMENT INTERNSHIP. 3 Hours.**

Individualized training and experience in a youth, college, professional or other sport-based organization. Students will work with a mentor and university supervisor in a community-based setting to better understand, explore, and apply principles of coaching and operations. Prerequisite: KINE majors and Senior standing.

**KINE 4349. PUBLIC HEALTH INFORMATICS. 3 Hours.**

Explain and apply ethical principles that apply to the use of information technology as those pertain to accessing, collecting, analyzing, using, maintaining, and disseminating data and information. Prerequisite: KINE 2350, KINE 3350, KINE 3358, KINE 3352, and KINE 3353.

**KINE 4350. SPORTS PSYCHOLOGY. 3 Hours.**

The course will provide an overview of the growing field of Sports Psychology, which involves applying psychological science to sports. Topics such as maximizing sports performance, elite performance and personality, motivation techniques in sports, leadership skills in sports, etc., will be covered.

**KINE 4351. PUBLIC HEALTH ETHICS. 3 Hours.**

Study of ethical standards and how those are incorporated into practice and decision-making that relate to interactions with individuals, organizations, and communities. Exploration of strategies for public health, health care, and other allied healthcare organizations to work together or individually to impact the health of a community. Prerequisite: Junior status, KINE 2350 and KINE 3350.

**KINE 4352. PUBLIC HEALTH SCIENCES AND METHODS. 3 Hours.**

Identify scientific concepts and research methods of population health, along with the basic processes, approaches, and interventions that identify and address the major health-related needs and concerns of populations. Analysis of project implementation such as planning, assessment and evaluation. Prerequisite: KINE 2350, KINE 3350, KINE 3352, KINE 3353, and KINE 3358. Minimum GPA of 2.5 required to enroll in the course.

**KINE 4353. EMERGENCY PREPAREDNESS & MANAGEMENT. 3 Hours.**

Inquiry into the structures, functions, and authorizations of governmental public health programs. Identification of tools, processes, and activities related to both practice and policy used to support community responses to public health emergencies and other disasters. Credit may not be given for both KINE 3354 and KINE 4353. Prerequisite: KINE 2350, KINE 3350, KINE 3352, KINE 3353, and KINE 3358.

**KINE 4354. PUBLIC HEALTH ADVOCACY AND LEADERSHIP. 3 Hours.**

Appraisal of leadership philosophies and actions that reflect and model effective strategies for protecting and promoting the public's health. Prerequisite: KINE 2350, KINE 3350, KINE 3352, KINE 3353, KINE 3354, KINE 3358, MANA 4326, KINE 4352, KINE 4349, KINE 4357. Concurrent enrollment in KINE 4359 recommended. 2.5 GPA required for course enrollment.

**KINE 4356. PUBLIC HEALTH PROJECT DESIGN & ADMINISTRATION. 3 Hours.**

This course includes content designed to develop the knowledge, skills and competencies necessary for public health project management. The course includes experiential learning activities and case studies that integrate practice-based learning on topics such as project design, team dynamics, project evaluation and quality improvement measures. Prerequisite: KINE 2350 and junior status.

**KINE 4357. PREPARATION FOR THE PUBLIC HEALTH WORKFORCE. 3 Hours.**

The development and operational systems and processes in public health programs and facilities will be presented, including: concepts and experiences necessary for success in the workplace, community dynamics, independent work and development of a personal work ethic, networking and professional communication, and teamwork. The student will participate in multiple career readiness learning experiences through a co-curricular collaboration with UTA Career Services. Prerequisite: KINE 2350, KINE 3350, KINE 3352, KINE 3353, KINE 3358, and MANA 4326.

**KINE 4358. APPLIED APPROACHES TO DIVERSITY AND CULTURAL AWARENESS IN PUBLIC HEALTH ORGANIZATIONS. 3 Hours.**

Applied Approaches to Diversity and Cultural Awareness in Public Health Organizations This course examines the changing demographics of the public health workforce and organizations, presenting students with varied perspectives, approaches and competencies required for understanding and appreciation of greater diversity across the public health and healthcare systems.

**KINE 4359. PUBLIC HEALTH CUMULATIVE EXPERIENCE. 3 Hours.**

Individualized learning opportunity to integrate, synthesize and apply knowledge through cumulative and experiential activities. All students complete a cumulative, integrative and scholarly or applied experience or inquiry project that serves as an optimum point to the education experience. These experiences may include, but are not limited to, internships, service-learning projects, senior seminars, portfolio projects, research papers or honors theses. Students are encouraged to gain exposure to local-level public health professionals and/or agencies that engage in public health practice. To be taken during the final semester prior to graduation. Prerequisite: KINE 2350, KINE 3350, KINE 3352, KINE 3353, KINE 3358, KINE 4352, KINE 4349, KINE 4357 and MANA 4326 required. Corequisite: KINE 4354. Minimum GPA of 2.5 required for enrollment.

**KINE 4387. EXERCISE SCIENCE PRACTICUM. 3 Hours.**

Academic training within the internal setting of U.T. Arlington's exercise science laboratories. Each student will receive 135 hours of professional practicum experience in a variety of exercise science settings including wellness, physical fitness activity classes, physical fitness theory classes, the physical fitness center, and/or other exercise science settings. Prerequisite: Current CPR certification, KINE 4315, KINE 4316, and permission of instructor.

**KINE 4388. EXERCISE SCIENCE INTERNSHIP. 3 Hours.**

Individualized academic training in an external professional exercise science setting (e.g., hospital, physical therapy, cardiac rehabilitation, fitness center) under the direct supervision of an exercise science professional or licensed therapist. Proof of sufficient professional liability insurance is required for enrollment. A minimum of 135 hours in the field is required for completion of the course. Prerequisite: KINE 4415 (or Corequisite).

**KINE 4389. FITNESS MANAGEMENT INTERNSHIP. 3 Hours.**

Individualized academic training in an external professional exercise science setting (e.g., hospital, physical therapy, cardiac rehabilitation, fitness center) under the direct supervision of an exercise science professional or licensed therapist. Proof of sufficient professional liability insurance is required for enrollment. A minimum of 135 hours in the field is required for completion of the course. Prerequisite: KINE 4415 (or Corequisite).

**KINE 4390. PRACTICUM IN SPORT PERFORMANCE. 3 Hours.**

Designed on an individual basis as a field experience in the observation of sport performance, and the application of performance principles to sport participation. Students must make application for enrollment prior to October 1 for Spring Semester and prior to April 1 for Fall Semester.

**KINE 4391. CONFERENCE COURSE. 3 Hours.**

Topics assigned on an individual basis covering personal research or study in the designated area. Prerequisite: permission of department chairperson.

**KINE 4394. HONORS THESIS/SENIOR PROJECT. 3 Hours.**

Required of all students in the University Honors College. During the senior year, the student must complete a thesis or a project under the direction of a faculty member in the major department.

**KINE 4395. INDIVIDUAL STUDY IN EXERCISE AND SPORT. 3 Hours.**

The completion of an existing course on an individual basis as contracted with an approved faculty member. This procedure is limited to emergency situations, and must be identified through the departmental advising process.

**KINE 4396. SPECIAL TOPICS IN EXERCISE AND SPORT. 3 Hours.**

Designed to meet the current needs of students. May be repeated for credit when the topic changes.

**KINE 4400. APPLIED EXERCISE PHYSIOLOGY. 4 Hours.**

Application of physiological principles of training of physical fitness and sport; examination of factors influencing anaerobic and aerobic training methods and their effect on fitness. Physiological responses studied include cardiovascular, bioenergetics, and extreme environments. Site visits, laboratory experiences and a research project enhance the student's understanding of physiological changes and career paths in exercise science. Prerequisite: KINE 3415, KINE 3325, MATH 1302 (or MATH 1402) and MATH 1308. KINE 4415 is a co/pre-requisite.

**KINE 4415. FITNESS ASSESSMENT/PROGRAMMING. 4 Hours.**

Classroom and laboratory experiences provide the student with an opportunity to become familiar with the assessment of physical fitness including graded exercise testing, metabolic studies, basic ECG interpretation, and body composition. The student will also learn risk factor identification and exercise prescription. Course credit may not be granted for both KINE 4315 and KINE 4415. Prerequisite: KINE 3415 and KINE 3325.

**KINE 4420. APPLIED MOTOR BEHAVIOR. 4 Hours.**

Application of motor behavior and biomechanical principles as well as factors influencing learning, re-learning and enhancing motor skills will be examined. Students will craft a research project to enhance their understanding of principles of motor behavior and will be involved in several case studies that can help understand how to apply motor behavior in their career paths. Prerequisite: KINE 3325; KINE 3388; KINE 4323.

**KINE 4490. EXERCISE SCIENCE INTERNSHIP. 4 Hours.**

Individualized academic training in an external professional exercise science setting (e.g., hospital, physical therapy, cardiac rehabilitation, fitness center) under the direct supervision of an exercise science professional or licensed therapist. Proof of sufficient professional liability insurance is required for enrollment. A minimum of 180 hours in the field is required for completion of the course. Prerequisite: KINE 4415 (or Corequisite).

**KINE 4491. MRS INTERNSHIP. 4 Hours.**

Individualized academic training in an external professional movement or rehabilitation setting (e.g., hospital, OT clinic, SLP clinic, school, recreation center, therapy setting, etc) under the direct supervision of an exercise science professional or licensed therapist. Proof of sufficient professional liability insurance is required for enrollment. A minimum of 180 hours in the field is required for completion of the course. Prerequisite: KINE 3388; KINE 3415.

**KINE 4589. EXERCISE SCIENCE INTERNSHIP. 5 Hours.**

Individualized academic training in an external professional exercise science setting (e.g., hospital, physical therapy, cardiac rehabilitation, fitness center) under the direct supervision of an exercise science professional or licensed therapist. Proof of sufficient professional liability insurance is required for enrollment. A minimum of 225 hours in the field is required for completion of the course. Prerequisite: KINE 4415 (or Corequisite).

**KINE 4639. SPORTS LEADERSHIP AND MANAGEMENT INTERNSHIP II. 6 Hours.**

Individualized training and experience in a youth, college, professional or other sport-based organization. Students will work with a mentor and university supervisor in a community-based setting to better understand, explore, and apply principles of coaching and operations. Prerequisite: KINE majors and Senior standing.

**KINE 4647. CLINICAL TEACHING PHYSICAL EDUCATION EC-12. 6 Hours.**

This supervised course is designed as a culminating field experience of pre-service professional preparation giving an opportunity to practically apply theoretical and pedagogical knowledge in real school settings. Applied experience will be attained in both Elementary and Secondary settings. Criminal background check required. Prerequisite: KINE 1315, KINE 2301, KINE 3304, KINE 3306, KINE 3325, KINE 3388, KINE 4193, KINE 4319, KINE 4320, KINE 4321, LIST 4343, and EDUC 4340.

**KINE 4659. PUBLIC HEALTH EXTENDED CUMULATIVE EXPERIENCE. 6 Hours.**

Individualized practice-based public health work experience in a professional public health-related setting (e.g., public health agency, nonprofit organization, legislative representative office, hospital) under the direct supervision of a public health professional. To be taken during the final semester prior to graduation. Prerequisite: KINE 2350, KINE 3350, KINE 3351, KINE 3352, KINE 3353, KINE 3354, KINE 4352, KINE 4355, KINE 4357 and MANA 4326 required. Corequisite: KINE 4354.

**KINE 4689. FITNESS MANAGEMENT INTERNSHIP. 6 Hours.**

Designed on an individual basis to allow the student to apply academic training in a professional fitness center under the direct supervision of a fitness specialist. Prerequisite: Current CPR certification, KINE 4315, KINE 4316, KINE 4387 (or concurrent enrollment), proof of sufficient professional liability insurance, and permission of instructor.

**KINE 4988. EXERCISE SCIENCE INTERNSHIP. 9 Hours.**

Individualized academic training in an external professional exercise science setting (e.g., hospital, physical therapy, university laboratory) under the direct supervision of an exercise science professional. Prerequisite: KINE 4315, KINE 4316, KINE 4387 (or concurrent enrollment), current CPR certification, proof of sufficient professional liability insurance, and permission of instructor.

**KINE 4989. FITNESS MANAGEMENT INTERNSHIP. 9 Hours.**

Designed on an individual basis to allow the student to apply academic training in a professional fitness center under the direct supervision of a fitness specialist. Prerequisite: Current CPR certification, KINE 4315, KINE 4316, KINE 4387 (or concurrent enrollment), proof of sufficient professional liability insurance, and permission of instructor.

**KINE 5120. ATHLETIC TRAINING CLINICAL I. 1 Hour.**

An introduction to clinical experiences in athletic training. Students will be introduced to ethical and confidentiality standards, basic clinical skills, communication and interprofessional practice skills, and cultural competency and humility. Prerequisite: Admission to the MSAT Program. Prerequisite: Admission to the MSAT Program.

**KINE 5121. FUNCTIONAL ANATOMY AND BIOMECHANICS FOR THE ATHLETIC TRAINER II. 1 Hour.**

This course builds on prerequisite knowledge of human musculoskeletal anatomy to describe human movement. Principles of biomechanics and kinesiology will guide an advanced, applied understanding of arthrokinematics, kinetic chain principles, functional movement, and the anatomy of common musculoskeletal injuries. Prerequisite: KINE 5229.

**KINE 5122. DOCUMENTATION AND HEALTH INFORMATICS FOR THE ATHLETIC TRAINER. 1 Hour.**

This course is designed to introduce and develop effective medical documentation skills. Health informatic concepts and disablement classification models will be introduced to support quality of care and to measure functional outcomes/treatment goals. Prerequisite: KINE 5120, KINE 5229, KINE 5230, KINE 5236.

**KINE 5123. PHARMACOLOGY IN ATHLETIC TRAINING. 1 Hour.**

This course will provide background information on pharmacological agents for the management of general medical and orthopedic conditions. Emphasis will be placed on the development of patient education in the areas of indication, contraindication, dosing, interaction, route of administration, and adverse reaction related to various medications and therapeutic agents. Prerequisite: KINE 5222, KINE 5237, KINE 5324, KINE 5325.

**KINE 5125. IMMUNOLOGY. 1 Hour.**

This course will include a brief review of the immune system and factors that affect immune function with emphasis on the effect of exercise and stress on muscle and overall immune function. The effect of nutrition and over-training on the immune system and associated syndromes/diseases will also be presented.

**KINE 5128. CLINICAL DIAGNOSTIC PROCEDURES. 1 Hour.**

This course provides fundamental clinical knowledge of commonly utilized diagnostic procedures and tests in medical practice. Emphasis will be placed on understanding of indications, contraindications, and clinical implications of diagnostic tests and understanding of normal and diseased states. Correlation and integration of test results into clinical examination findings and clinical plan of care will be addressed. Prerequisite: Admission to MSAT Program.

**KINE 5130. CLINICAL ATHLETIC TRAINING II. 1 Hour.**

Clinical experiences in selected health care settings that provide students the opportunity to integrate their knowledge and skills into actual patient care. Emphasis will be placed on the development of clinical decision-making skills. This course requires the completion of 250 hours of clinical experience under the supervision of a program approved clinical preceptor. Prerequisites: KINE 5420, KINE 5220, KINE 5120.

**KINE 5140. CLINICAL ATHLETIC TRAINING III. 1 Hour.**

Clinical experiences in selected health care settings that provide students the opportunity to integrate their knowledge and skills into actual patient care. Emphasis will be placed on the development of clinical decision-making skills. This course requires the completion of 250 hours of clinical experience under the supervision of a program approved clinical preceptor. Prerequisite: KINE 5130.

**KINE 5150. CLINICAL ATHLETIC TRAINING IV. 1 Hour.**

Clinical experiences in selected health care settings that provide students the opportunity to integrate their knowledge and skills into actual patient care. Emphasis will be placed on the development of clinical decision-making skills. This course requires the completion of 250 hours of clinical experience under the supervision of a program approved clinical preceptor. Prerequisite: KINE 5140.

**KINE 5160. CLINICAL ATHLETIC TRAINING V. 1 Hour.**

Clinical experiences in selected health care settings that provide students the opportunity to integrate their knowledge and skills into actual patient care. Emphasis will be placed on the development of clinical decision-making skills. This course requires the completion of 250 hours of clinical experience under the supervision of a program approved clinical preceptor. Prerequisite: KINE 5150.

**KINE 5170. JOURNAL CLUB IN PHYSIOLOGY. 1 Hour.**

This course is designed to provide the students an opportunity to learn the art of critically reading and interpreting research articles. There will be emphasis on identifying strengths and weakness of research studies. There will also be an opportunity for the students to present their research study ideas and / or their preliminary findings of their research to the class. This will provide an opportunity for students to interact and receive / provide feedback regarding methodological approaches and interpretation of findings. Lastly, the student will learn how to prepare and deliver presentations to an audience.

**KINE 5171. JOURNAL CLUB IN MOVEMENT & REHABILITATION SCIENCES. 1 Hour.**

There is a growing emphasis on research and in particular student involvement in research at UTA. A fundamental skill that will be critical in the successful growth of student involvement in research is their ability to read and critically analyze / interpret journal articles. In addition to this important skill set the students will also gain valuable experience by presenting their research study ideas and / or their preliminary findings of their research to the class. This will provide an opportunity for students to interact and receive / provide feedback regarding methodological approaches and interpretation of findings.

**KINE 5190. SPECIAL TOPICS IN KINESIOLOGY. 1 Hour.**

In-depth study of selected topics in physical education and exercise science. May be repeated when topics vary. Prerequisite: consent of instructor.

**KINE 5191. INTERNSHIP IN CARDIOPULMONARY REHABILITATION. 1 Hour.**

The student will complete 400 internship hours in an approved Cardiopulmonary rehabilitation setting. The student may take two semesters of KINE 5191 at 200 hours each. The student will be involved in patient/client assessment, training, rehabilitation, risk factor identification and lifestyle management services provided for individuals with or at risk for cardiovascular, pulmonary, and metabolic diseases. In addition the student will observe common cardiac surgeries and diagnostic procedures to better understand the pathophysiology and treatment of cardiovascular, pulmonary and metabolic disease.



**KINE 5192. INTERNSHIP IN GRADED EXERCISE TESTING FOR HIGH RISK POPULATIONS. 1 Hour.**

The student will complete 200 hours of graded exercise testing in an approved hospital or outpatient clinical setting which conducts exercise tests for high risk populations, including clients with suspected cardiopulmonary and metabolic diseases. The student will be exposed to noninvasive (echocardiography and graded exercise testing) and invasive methods used to diagnose cardiopulmonary and metabolic disease, including procedures conducted in cath and nuclear testing laboratories.

**KINE 5193. PHYSIOLOGY OF EXERCISE INTERNSHIP. 1 Hour.**

Individualized academic training in an external professional exercise physiology setting (e.g., physical medicine, athletic training, external laboratory, health/fitness facility, professional teams or sports management) under the direct supervision of an exercise science professional.

**KINE 5194. RESEARCH IN KINESIOLOGY. 1 Hour.**

Individually approved research projects selected from the various areas of Kinesiology.

**KINE 5195. INTERNSHIP IN GRADED EXERCISE TESTING FOR HIGH RISK POPULATIONS. 1 Hour.**

The student will complete 200 hours of graded exercise testing in an approved hospital or outpatient clinical setting which conducts exercise tests for high risk populations, including clients with suspected cardiopulmonary and metabolic diseases. The student will be exposed to noninvasive (echocardiography and graded exercise testing) and invasive methods used to diagnose cardiopulmonary and metabolic disease, including procedures conducted in cath and nuclear testing laboratories.

**KINE 5196. LABORATORY TECHNIQUES IN EXERCISE SCIENCE. 1 Hour.**

A primary objective of this course is to further your understanding of exercise physiology. A second but equally important objective is to enhance your ability for critical thinking on exercise physiology through the scientific process. This includes formation of a research question, hypothesis, designing an experiment, and inferring conclusions from data. Secondary objectives include improving technology skills to assist collecting and analyzing data, and writing and oral communication skills for demonstrating understanding of the physiological principles.

**KINE 5198. THESIS. 1 Hour.****KINE 5220. PREVENTATIVE AND ACUTE CARE TECHNIQUES IN ATHLETIC TRAINING. 2 Hours.**

Classroom and laboratory experiences designed to provide students with formal instruction and evaluation in the prevention and acute care of activity related injuries and illnesses.

**KINE 5221. CLINICAL ATHLETIC TRAINING II. 2 Hours.**

This course will include clinical experiences and simulation, providing students the opportunity to integrate their knowledge and skills into actual patient care. Emphasis will be placed on the development of clinical decision-making skills. This course requires the completion of clinical experience under the supervision of a program approved preceptor. The course will also provide opportunities for simulation and mastery of clinical skills. Prerequisite: KINE 5120, KINE 5229, KINE 5230, KINE 5236.

**KINE 5222. CLINICAL ATHLETIC TRAINING III. 2 Hours.**

This course will include clinical experiences and simulation, providing students the opportunity to integrate their knowledge and skills into actual patient care. Emphasis will be placed on the development of clinical decision-making skills. This course requires the completion of clinical experience under the supervision of a program approved preceptor. Prerequisite: KINE 5121, KINE 5221, KINE 5321, KINE 5332.

**KINE 5224. CLINICAL ATHLETIC TRAINING V. 2 Hours.**

This course will include clinical experiences and simulation providing students the opportunity to integrate their knowledge and skills into actual patient care. Emphasis will be placed on the development of clinical decision-making skills as well as exam review and test-taking strategies. This course requires the completion of clinical experience under the supervision of a program approved preceptor. Prerequisite: KINE 5123, KINE 5306, KINE 5339, KINE 5343.

**KINE 5226. PATHOPHYSIOLOGY AND PHARMACOLOGY II. 2 Hours.**

Further study of acute and chronic illnesses and their response to, and impact on, physical activity. Discussion of pharmacological agents used in the care of general illnesses and musculoskeletal disorders in the physically active. Prerequisite: KINE 5348.

**KINE 5227. LITERATURE AND RESEARCH FOR THE ATHLETIC TRAINER. 2 Hours.**

This course is an overview of concepts and procedures necessary for designing, conducting, and critically appraising research in Athletic Training from multiple research paradigms. The course will focus on the steps involved in the administration of a research project, including literature review, design, data collection and analysis. Prerequisite: KINE 5223, KINE 5234, KINE 5341, KINE 5356.

**KINE 5228. SEMINAR IN ATHLETIC TRAINING. 2 Hours.**

A capstone course designed to provide students the opportunity to synthesize and integrate the athletic training theories and concepts taught in the previous courses. Class discussions and projects will emphasize health care administration, professional development, cultural competence, transition to practice, inter-professional education and skills required of the entry-level athletic trainer. Prerequisite: KINE 5333, KINE 5227, KINE 5224.

**KINE 5229. FUNCTIONAL ANATOMY AND BIOMECHANICS FOR THE ATHLETIC TRAINER. 2 Hours.**

This course builds on prerequisite knowledge of human musculoskeletal anatomy to describe human movement. Principles of biomechanics and kinesiology will guide the understanding of mechanical and physiologic interactions between muscles and joints to form the basis of understanding normal and pathological movement. This course will specifically focus on identifying musculoskeletal landmarks through lecture, virtual cadaver learning, and hands-on palpation. Prerequisite: Admission to MSAT Program.

**KINE 5230. FOUNDATIONS OF ORTHOPEDIC ASSESSMENT AND THERAPEUTIC INTERVENTIONS. 2 Hours.**

This course is designed to develop foundational skills in orthopedic injury assessment and an understanding of the theory and the basic principles of diagnostic testing and therapeutic interventions for the rehabilitation and reconditioning of injuries and illnesses of those involved with physical activity. The focus of the course is on patient-centered care and will include principles related to the injury evaluation process, healing and pain physiology, and therapeutic interventions commonly utilized during the initial phases of acute and chronic injuries and conditions. The use of patient rated outcome scales along with quality improvement through planning, implementing, documenting, and evaluating clinical techniques used in orthopedic injury assessment and intervention programs will be discussed. Prerequisite: Admission to MSAT Program.

**KINE 5231. FUNDAMENTALS OF ATHLETIC TRAINING I. 2 Hours.**

This course is designed to provide the entry level athletic training student with classroom and laboratory experiences to provide an introduction to the profession and the role of athletic trainers in the overall health care environment. Emphasis will be placed on the epidemiology of orthopedic injuries, orthopedic trauma, emergency planning and care, cold and hot therapeutic modalities, and prevention of sudden death. Prerequisite: Admission to MSAT Program.

**KINE 5232. FUNDAMENTALS OF ATHLETIC TRAINING II. 2 Hours.**

This course is designed to provide the entry level athletic training student with classroom and laboratory experiences to further their development as an athletic trainer in a dynamic health care system. Emphasis will be placed on interprofessional practice, prevention of sudden death, nutrition for the physically active, ergonomics, body composition assessment, and fitness assessment/programming. Prerequisite: Admission to MSAT Program.

**KINE 5233. THERAPEUTIC MODALITIES. 2 Hours.**

This course is designed to provide the entry level athletic training student with classroom and laboratory experiences to provide an understanding of the theory and application of common therapeutic modalities for the treatment of musculoskeletal injuries. Emphasis will be placed on using the disablement model to plan, implement, and document the use of therapeutic modalities for the treatment and rehabilitation of injuries and illnesses of those involved with physical activity. Critical appraisal of research studies regarding the effectiveness and efficacy of therapeutic modalities will also be emphasized. Prerequisite: Admission to MSAT Program.

**KINE 5234. CLINICAL REASONING AND DECISION MAKING. 2 Hours.**

This course is designed to provide an understanding and application of theories and frameworks to clinical decision making. Students will work toward becoming an effective practitioner, able to make clinical decisions by studying clinical situations and how health care professionals make clinical decisions. Emphasis will be placed on problem solving strategies, decision making and evidence based rationale. Clinical reasoning will be developed while integrating knowledge and skills in management of complex clinical conditions using scientific and contemporary evidence-based clinical knowledge. Prerequisite: Admission into MSAT Program.

**KINE 5235. ADVANCED FUNCTIONAL ASSESSMENT AND CORRECTIVE EXERCISE. 2 Hours.**

This course will introduce functional movement assessments and corrective exercises as a preventative and therapeutic approach to musculoskeletal conditions. Specific topics will include advanced techniques designed to restore body symmetry and theories of functional movement. Evidence-based application of functional assessment, evaluation and assignment of corrective exercises will be emphasized. Prerequisite: KINE 5123, KINE 5306, KINE 5339, KINE 5343.

**KINE 5236. PREVENTION, HEALTH PROMOTION, AND WELLNESS. 2 Hours.**

This course will highlight the athletic trainer's role in promoting and maintaining the health and well-being of individuals and populations before and after injuries and illnesses. Emphasis will be placed on the epidemiology and prevention of musculoskeletal injuries, medial conditions, and chronic disease, emergency planning and care, environmental monitoring, nutrition and dietary interventions, biometrics, and other determinants including social, economic, and individual factors that affect health outcomes. Prerequisite: Admission to the MSAT Program.

**KINE 5237. BEHAVIORAL AND POPULATION HEALTH. 2 Hours.**

This course will highlight the athletic trainer's role in promoting and maintaining the health and well-being of individuals and populations. The athletic trainer's role in behavioral health will be emphasized, as well as development, implementation, and assessment of preventative measures to reduce injury risk and long-term health conditions across the lifespan. Emphasis will also be placed on population-level problems, including health risks and determinants as well as individual and behavioral factors that affect health outcomes. Prerequisite: KINE 5121, KINE 5221, KINE 5321, KINE 5332.

**KINE 5238. ADVANCED MANUAL THERAPY AND INTEGRATED MODALITIES. 2 Hours.**

This course is designed to introduce students to advanced manual therapy and integrated therapeutic modalities that are currently used in musculoskeletal rehabilitation. Both the theoretical and scientific basis of novel therapeutic interventions will be examined using an evidence-based approach. Emphasis will be placed on the foundational concepts and techniques associated with selection and application and how to make effective clinical decisions. Prerequisite: KINE 5123, KINE 5306, KINE 5339, KINE 5343.

**KINE 5239. HEALTH CARE ADMINISTRATION. 2 Hours.**

A study of the administrative issues and management theories that may be encountered in overseeing an athletic training/sports medicine program. Special emphasis is placed on the practical application of concepts related to legal liability, facility design and maintenance, financial and budget management, common health insurance models, insurance contract negotiation, strategic planning as a means to assess and promote organizational improvement, the impact of organizational structure on the daily operations of a healthcare facility, components of developing and implementing a basic business plan, medical record and documentation systems, federal and state infection control regulations and guidelines, risk management plan development, emergency action planning, and general day to day operations. Prerequisite: KINE 5123, KINE 5306, KINE 5339, KINE 5343.

**KINE 5240. ADVANCED IMMEDIATE AND EMERGENCY CARE. 2 Hours.**

This course is designed to provide knowledge and skills related to the immediate and emergent care of injuries/conditions in work settings of athletic trainers. Prerequisite: KINE 5123, KINE 5306, KINE 5339, KINE 5343.

**KINE 5241. PERFORMANCE ENHANCEMENT FOR THE ATHLETIC TRAINER. 2 Hours.**

Concepts, theories, and foundational background information will be presented to optimize human movement and performance. An emphasis on sports science, technology and data analysis will be discussed to enhance program design and patient goals. Prerequisite: KINE 5123, KINE 5306, KINE 5339, KINE 5343.

**KINE 5250. PUBLIC HEALTH PRACTICUM I. 2 Hours.**

This is a required community-based internship for all students pursuing the Master of Public Health degree. Students will complete 150 to 200 hours of their internship during the semester in which they are enrolled in this course. Prerequisite: KINE 5375 and KINE 5376 and KINE 5372 and KINE 5377 and KINE 5378.

**KINE 5252. PUBLIC HEALTH INTEGRATED LEARNING EXPERIENCE. 2 Hours.**

This course is the culmination of all previous coursework for Master of Public Health (MPH) students, requiring the student to complete a final paper, poster and oral presentation about the project completed as part of the Community-Based Internship. In addition, the student will complete a professional portfolio comprised of work illustrating the competencies learned during the MPH program and applied during the Internship. Prerequisite: KINE 5375 and KINE 5376 and KINE 5372 and KINE 5377 and KINE 5378.

**KINE 5290. SPECIAL TOPICS IN KINESIOLOGY. 2 Hours.**

In-depth study of selected topics in physical education and exercise science. May be repeated when topics vary. Prerequisite: consent of instructor.

**KINE 5291. INTERNSHIP IN CARDIOPULMONARY REHABILITATION. 2 Hours.**

The student will complete 400 internship hours in an approved Cardiopulmonary rehabilitation setting. The student may take two semesters of KINE 5191 at 200 hours each. The student will be involved in patient/client assessment, training, rehabilitation, risk factor identification and lifestyle management services provided for individuals with or at risk for cardiovascular, pulmonary, and metabolic diseases. In addition the student will observe common cardiac surgeries and diagnostic procedures to better understand the pathophysiology and treatment of cardiovascular, pulmonary and metabolic disease.

**KINE 5292. SPECIAL TOPICS IN KINESIOLOGY. 2 Hours.****KINE 5293. PHYSIOLOGY OF EXERCISE INTERNSHIP. 2 Hours.**

Individualized academic training in an external professional exercise physiology setting (e.g., physical medicine, athletic training, external laboratory, health/fitness facility, professional teams or sports management) under the direct supervision of an exercise science professional.

**KINE 5294. RESEARCH IN KINESIOLOGY. 2 Hours.**

Individually approved research projects selected from the various areas of Kinesiology.

**KINE 5298. THESIS. 2 Hours.****KINE 5300. RESEARCH METHODS. 3 Hours.**

This course is an overview of concepts and procedures necessary for designing, conducting, and analyzing hypothesis driven research across multiple academic disciplines with a focus on multiple research paradigms. The course will focus on the steps involved in the administration of a research project, including literature review, design, data collection and analysis.

**KINE 5305. APPLIED STATISTICAL PRINCIPLES IN KINESIOLOGY. 3 Hours.**

The course covers descriptive statistics, elementary probability, one- and two-population mean and variance comparisons, ANOVA, simple linear regression, and correlations. In addition, more advanced principles in parametric and non-parametric statistics will be emphasized.

**KINE 5306. CLINICAL ATHLETIC TRAINING IV. 3 Hours.**

This course will include clinical experiences, providing students the opportunity to integrate their knowledge and skills into actual patient care. Emphasis will be placed on the development of clinical decision-making skills. This course requires the completion of clinical experience under the supervision of a program approved preceptor. Prerequisite: KINE 5222, KINE 5237, KINE 5324, KINE 5325.

**KINE 5307. OVERVIEW OF MEDICINE. 3 Hours.**

This course is designed to provide undergraduate students an overview of the basic, preclinical, and clinical sciences, emphasizing the main principles and logic of medicine, how doctors think, and how the healthcare system works. Specific topics covered include an Introduction to Medicine, Embryology & Principles of Anatomy, General & Systems Physiology, Molecular Biology & Biochemistry, Neuroscience, Microbiology & Immunology, Pathology, Pharmacology, Epidemiology & Public Health, Internal Medicine specialties (Cardiology, Pulmonology, Nephrology, Gastroenterology, Infectious Diseases, Endocrinology, Rheumatology, Hematology / Oncology), Neurology, Pediatrics, Obstetrics & Gynecology, Surgery, Anesthesiology, Surgical Subspecialties (Cardiovascular Surgery, Orthopedic Surgery, Ophthalmology, Otorhinolaryngology, Dermatology, Urology, Neurosurgery), Psychiatry, Radiology and Radiation Oncology. Importantly, it spans both the scientific and humanistic aspects of medicine, referencing the visual arts, music, film, and other forms of art to highlight key points. Though primarily designed for students aiming for a career in the health professions, it should appeal to anyone curious about how health and medicine works. Prerequisite: Instructor Permission.

**KINE 5308. ADVANCED STATISTICAL ANALYSIS. 3 Hours.**

This course presents an applied approach on the use of mixed effects and/or multilevel models for clustered, repeated, and longitudinal experimental designs. Develops the skills to implement and interpret random effects, variance component models of time varying and time invariant predictors on outcome variables. Included topics: transitioning from general linear model to mixed effects model, interpretation of population-average and subject specific models containing random intercept and random slopes. Discussion of special topics including importance of graphing data, model fitting, centering, variance/covariance matrix, sample size, sample power, missing data in repeated measures designs. Prerequisite: Instructor Approval.

**KINE 5320. ADVANCED PHYSIOLOGY OF EXERCISE. 3 Hours.**

Lecture and laboratory sessions are designed to investigate concepts of energy metabolism, lactate production and accumulation, energy expenditure, excess post exercise oxygen consumption, cardiovascular and temperature regulation, neuromuscular control, aerobic and anaerobic adaptations and ergonomics.

**KINE 5321. THERAPEUTIC INTERVENTIONS I. 3 Hours.**

This course will present the theoretical and scientific basis for traditional therapeutic interventions including taping, wrapping, padding, durable medical equipment, cryotherapy, thermotherapy, joint mobilizations, exercise, and manual therapy techniques commonly used in the treatment of orthopedic injuries and conditions. Discussions will include the study of physical rehabilitation theory including basic physics, physiological effects, indications, and contraindications for traditional therapeutic interventions. Emphasis will be placed on the critical analysis of clinical practice and existing research to establish quality patient care. This course includes the execution of clinical and home care plans, the use of patient rated outcome scales, and the integration of pharmacological interventions. Prerequisite: KINE 5120, KINE 5229, KINE 5230, KINE 5236.

**KINE 5322. METABOLISM & EXERCISE BIOCHEMISTRY. 3 Hours.**

This course will address the regulation of exercise metabolism as well as the distinct biochemical pathways through which energy transduction occurs. This will allow the student to appreciate not only the end result of metabolism, ultimately the production and maintenance of cellular ATP levels, but also the pathways that biological machines use to achieve ATP homeostasis. Calorimetry, respiratory exchange ratio, and substrate utilization during exercise will be assessed as part of the laboratory section of this course.

**KINE 5323. MOTOR CONTROL AND LEARNING. 3 Hours.**

This course advances on fundamental concepts of motor behavior and performance combining theoretical principles to a variety of realistic contexts to provide the basis of skilled behavior. Contemporary research in human motor behavior models is used to identify effective solutions to practical problems and to spark ideas for optimizing development, learning, and control of motor skills.

**KINE 5324. ASSESSMENT AND MANAGEMENT II. 3 Hours.**

This course will focus on examination and initial management of chronic musculoskeletal pathologies. Emphasis will be placed on diagnostic testing and development of a care plan. Prerequisite: KINE 5121, KINE 5221, KINE 5321, KINE 5332.

**KINE 5325. THERAPEUTIC INTERVENTIONS II. 3 Hours.**

This course will present the theoretical and scientific basis for traditional therapeutic interventions including taping, wrapping, padding, durable medical equipment, thermotherapy, electrotherapy, acoustic therapy, exercise, and manual therapy techniques commonly used in the treatment of orthopedic injuries and conditions. Discussions will include the study of physical rehabilitation theory including basic physics, physiological effects, indications, and contraindications for traditional therapeutic interventions. Emphasis will be placed on the critical analysis of clinical practice and existing research to establish quality patient care. This course includes the execution of clinical and home care plans, the use of patient rated outcome scales, and the integration of pharmacological interventions. Prerequisite: KINE 5121, KINE 5221, KINE 5321, KINE 5332.

**KINE 5326. CARDIOCIRCULATORY PHYSIOLOGY OF EXERCISE. 3 Hours.**

The structure and function of the cardiovascular and circulatory system will be studied, as well as, cardiac control, the cardiac cycle, cardiac output, hemodynamics, vascular resistance, arterial-venous oxygen difference and oxygen delivery and consumption. Heat production and thermal control during exercise will also be addressed in lecture and laboratory sessions.

**KINE 5327. PULMONARY PHYSIOLOGY OF EXERCISE. 3 Hours.**

Examines the structure and function of the pulmonary system including mechanics of breathing, lung capacity tests, pulmonary circulation, lung diseases, gas exchange, ventilation, diffusing capacity, acid/base balance, neural and chemical regulation of breathing, and blood flow with respect to rest and exercise values in healthy and diseased populations. Prerequisite: KINE 5320.

**KINE 5328. NEUROMUSCULAR PHYSIOLOGY OF EXERCISE. 3 Hours.**

The structure and function of muscle, including the motor unit, control and integration, central and peripheral modifiers of neuromuscular control and biochemical characteristics of fibers will be studied. These concepts will also be applied to concepts in strength and power development.

**KINE 5329. STRENGTH & CONDITIONING IN SPORT AND PERFORMANCE. 3 Hours.**

The course covers the physiology and biomechanics of strength training and conditioning. Additional topics include: testing and evaluation of athletes, resistance training techniques, training program design, and organization administration of a strength training facility. This course is designed to prepare students to take the CSCS certification examination. Prerequisite: current CPR certification, KINE 3300, KINE 3301, KINE 3315, or permission of the instructor.

**KINE 5330. ENVIRONMENTAL PHYSIOLOGY OF EXERCISE. 3 Hours.**

This course will address the impact of environmental stress (e.g., thermal, gravitational, microgravity, etc.) on the cardiovascular system. Related focus will be given to cardiac function, blood pressure regulation and thermoregulation. Topics will be addressed in lecture and laboratory sessions. \*Doctoral students will be required to complete an additional research-related assignment.

**KINE 5331. OBESITY & WEIGHT MANAGEMENT. 3 Hours.**

This course is a review of the scientific literature on the causes and consequences of obesity. Topics include techniques for assessing body composition, factors promoting fat metabolism and deposition, traditional and non-traditional weight-loss programs, and adherence to weight-loss programs. Offered as KINE 4331 and KINE 5331. Credit will be granted only once. Prerequisite: KINE 5320 or permission of department.

**KINE 5332. ASSESSMENT AND MANAGEMENT I. 3 Hours.**

This course builds on the foundation from functional anatomy and biomechanics. Examination skills and immediate management interventions that apply to acute orthopedic and medical conditions are reviewed.

**KINE 5334. SEMINAR IN ATHLETIC TRAINING. 3 Hours.**

Graduate seminar discussing current issues in athletic training. Class discussions and projects will prepare students for entry-level practice.

**KINE 5335. GRADED EXERCISE TESTING AND PRESCRIPTION. 3 Hours.**

The knowledge and skills necessary for assessment of health history and appraisal, blood pressure, electrocardiogram, cardiovascular fitness and function will be acquired in lecture and laboratory sessions. Various test modalities and protocols will be discussed for health and diseased populations.

**KINE 5336. ECG INTERPRETATION. 3 Hours.**

Principles of electrocardiography will be explored, with emphasis on interpretation of resting and stress ECGs. Interpretation of dynamic rhythm strips will prepare students to work in cardiac rehabilitation and other allied health professions.

**KINE 5337. STRENGTH AND CONDITIONING IN GENERAL POPULATIONS: HEALTH AND DISEASE. 3 Hours.**

This course covers the physiology and biomechanics of strength training and conditioning as it applies to the general populations across the spectrum of health and disease. This includes: testing, evaluation, resistance training techniques and training program design for individuals with orthopedic injuries and rehabilitation concerns, metabolic conditions (e.g., diabetes), youth, elderly, and pregnant or post-prenatal women. This course is designed to prepare students to take the NSCA-CPT, and apply the skills needed to be a leader within the personal training and physical therapy career paths. Prerequisite: KINE 3300, KINE 3315, and KINE 3325.

**KINE 5338. EXERCISE PRESCRIPTION FOR SPECIAL POPULATIONS. 3 Hours.**

This course will discuss the pathophysiology of prevalent cardiovascular, metabolic and pulmonary diseases. Methods of exercise prescription and issues of concern will also be presented for these populations, as well as, low back pain, pregnancy, osteoporosis, cancer, children, older adults, fibromyalgia, multiple sclerosis and cardiac disease.

**KINE 5339. ASSESSMENT AND MANAGEMENT III. 3 Hours.**

This course introduces the study of acute and chronic illnesses and their response to, and impact on, physical activity. An emphasis will be placed on clinical examination skills and tools to screen patients for the presence of signs and symptoms related to acute and chronic illness. Prerequisite: KINE 5222, KINE 5237, KINE 5324, KINE 5325.

**KINE 5340. ENVIRONMENTAL PHYSIOLOGY. 3 Hours.**

This course will address the impact of environmental stress (e.g., thermal, gravitational, microgravity, etc.) on the cardiovascular system. Related focus will be given to cardiac function, blood pressure regulation and thermoregulation. Topics will be addressed in lecture and laboratory sessions.

**KINE 5342. IMMEDIATE AND EMERGENCY CARE 2. 3 Hours.**

This course is designed to build off of Immediate and Emergency Care 1 and include didactic and clinical experiences surrounding best practices in general emergency care and acute management of injuries and illness. Students will also be required to complete a scholarship project concerning general emergency care and acute management of injuries and illnesses. Clinical hours will be required in an emergency medicine environment.

**KINE 5343. LITERATURE AND RESEARCH FOR THE ATHLETIC TRAINER. 3 Hours.**

This course is an overview of concepts and procedures necessary for designing, conducting, and critically appraising research in Athletic Training from multiple research paradigms. The course will focus on the steps involved in the administration of a research project, including literature review, design, data collection and analysis. Prerequisite: KINE 5222, KINE 5237, KINE 5324, KINE 5325.

**KINE 5344. SCHOLARSHIP IN ATHLETIC TRAINING PRACTICE. 3 Hours.**

This course is designed to build off of the foundations of Literature and Research for the Athletic Trainer with further study of data collection and analysis as well as evidence-based practice principles. Students will be expected to complete a scholarship project related to athletic training practice. Prerequisite: KINE 5227.

**KINE 5345. SPORT NUTRITION. 3 Hours.**

Overview of nutrients necessary for healthful living and nutritional impact on reducing risk factors of lifestyle diseases. Application of nutrient recommendations for sports and exercise activities, including fluid replacement, sports supplements, and ergogenic aids. In addition, students will construct plans for dietary intake of athletes during training and competition for both endurance and resistance training. Offered as KINE 5345 and KINE 3301. Credit will be granted only once.

**KINE 5346. ADVANCED FUNCTIONAL ASSESSMENT AND CORRECTIVE EXERCISE. 3 Hours.**

Classroom and laboratory experiences that provide an introduction to functional assessment and corrective exercises. Specific topics will include an analysis of common biomechanics of movement and the evidence-based application of functional assessment and assignment of corrective exercises. Prerequisite: KINE 5420, KINE 5430, KINE 5431, KINE 5433, KINE 5434.

**KINE 5347. ADVANCED FUNCTIONAL ASSESSMENT AND CORRECTIVE EXERCISE. 3 Hours.**

Classroom and laboratory experiences that provide an introduction to functional assessment and corrective exercises. Specific topics will include an analysis of common biomechanics of movement and the evidence-based application of functional assessment and assignment of corrective exercises. Prerequisite: KINE 5420, KINE 5430, KINE 5431, KINE 5433, KINE 5434.

**KINE 5348. PATHOPHYSIOLOGY AND PHARMACOLOGY I. 3 Hours.**

This course provides an introduction to the study of acute and chronic illnesses and their response to, and impact on, physical activity. Discussion of pharmacological principles will be incorporated as it relates to the care of general illnesses and musculoskeletal disorders in the physically active. Prerequisite: KINE 5120, KINE 5231.



**KINE 5350. APPLIED BIOMECHANICS. 3 Hours.**

Application of Newtonian mechanics to human movement analysis. Biomechanical models using three-dimensional video and force plate data will be used to analyze human movement.

**KINE 5353. LOWER EXTREMITY ASSESSMENT AND REHABILITATION. 3 Hours.**

This course will focus on common orthopedic injuries involving the lower extremities, with a special emphasis on recognition, evaluation, diagnosis, and initial management. Additionally, students will learn to implement rehabilitation programs and therapeutic techniques for lower extremity injuries. Prerequisite: Admission to MSAT Program.

**KINE 5354. UPPER EXTREMITY ASSESSMENT AND REHABILITATION. 3 Hours.**

This course will focus on common orthopedic injuries involving the upper extremities, with a special emphasis on recognition, evaluation, diagnosis, and initial management. Additionally, students will learn to implement rehabilitation programs and therapeutic techniques for upper extremity injuries. Prerequisite: Admission to MSAT Program.

**KINE 5355. PATHOPHYSIOLOGY & PHARMACOLOGY II. 3 Hours.**

This course provides further study of acute and chronic illnesses and their response to, and impact on, physical activity. Discussion of pharmacological principles will be incorporated as it relates to the care of general illnesses and musculoskeletal disorders in the physically active. Prerequisite: KINE 5348.

**KINE 5356. HEAD AND SPINE ASSESSMENT AND REHABILITATION. 3 Hours.**

This course will focus on common orthopedic injuries involving the head and spine, with a special emphasis on recognition, evaluation, diagnosis, and initial management. Additionally, students will learn to implement rehabilitation programs and therapeutic techniques for head and spine injuries. Prerequisite: KINE 5353, KINE 5354.

**KINE 5357. PREVENTATIVE MEDICINE AND POPULATION HEALTH. 3 Hours.**

This course will highlight the athletic trainer's role in promoting and maintaining the health and well-being of individuals and populations. Development, implementation, and assessment of preventative measures to reduce injury risk and long-term health conditions across the lifespan will be addressed. Emphasis will also be placed on population-level problems, including health risks and determinants as well as individual and behavioral factors that affect health outcomes. Prerequisite: Admission to MSAT Program.

**KINE 5360. FUNDAMENTAL PRINCIPLES OF INTEGRATIVE PHYSIOLOGY. 3 Hours.**

This course is designed to provide a fundamental understanding of human physiology. Physiological function is a complex process that involves a complex interaction among the various physiological systems. As such there will be an emphasis on the integration of cellular, cardiovascular, renal, autonomic, respiratory, and endocrine physiology.

**KINE 5362. PRINCIPLES OF MOVEMENT NEUROSCIENCE. 3 Hours.**

This course focuses on principles of movement that have emerged from the computational study of motor control. The principles and application to processes such as motor planning, control, estimation, prediction and learning are explored.

**KINE 5363. CONDITIONS OF THE MOTOR SYSTEM IN CHILDHOOD. 3 Hours.**

This course explores a prevalent dysfunction of the motor system in childhood, known as Developmental Coordination Disorder (DCD). This class explores potential causes of DCD, common mechanisms and impairments, intervention methods and their effectiveness, and associated co-morbidities. In addition, students will understand the current state of research in the field and understand future avenues for research.

**KINE 5364. CURRENT PERSPECTIVES IN MOTOR LEARNING AND CONTROL. 3 Hours.**

This course explores five aspects of the new directions in research in the Motor Learning and Control field: Perception-Action mechanisms, Dynamical systems, Motor disorders, Learning and intervention for motor behavior, and neural mechanisms.

**KINE 5365. ADVANCED MOTOR DEVELOPMENT. 3 Hours.**

This course explores the current field of research in Motor Development applied to typical and special populations. More specifically, it discusses issues related to motor skill learning in childhood, the development of motor control, the relationship between motor competence and general health, and how lack of appropriate motor skills affect several domains of development (Developmental Coordination Disorder). To that, we use current research articles that discuss each one of these topics from different perspectives.

**KINE 5370. GLOBAL HEALTH. 3 Hours.**

Today's public health practice requires an awareness of health threats beyond U.S. borders. "Global health" implies health concerns and solutions that are shared worldwide. In this course, students will study global health priorities among different populations, cultures, and health systems. Students will examine health challenges and disease threats faced in resource-constrained countries, and the roles of health determinants, socioeconomics and health equity in improving health outcomes. In addition, students will learn about the foundational elements of global health, including globalization and health, water, sanitation, the burden of infectious and chronic diseases, human rights and global health partnerships.

**KINE 5371. PUBLIC HEALTH PROGRAM PLANNING AND EVALUATION. 3 Hours.**

Before we can effectively receive funding and implement programs that benefit our communities, we have to answer many questions. Who is the target audience? What are the program's goals? What are the intended outcomes of the program? How can we measure program effectiveness? Program evaluation is the methodology to developing scientifically sound answers to these questions. This course will teach you how evaluators work with stakeholders and project teams to tailor an intervention to a target audience, and document program activities, outcomes and impact on a community health issue. This course will allow you to have hands-on experience designing and conducting program evaluation.

**KINE 5372. INTRODUCTION TO EPIDEMIOLOGY. 3 Hours.**

By participating in this course students will learn the critical role that epidemiology plays in preventing and controlling disease. This course provides students with a foundation of the methods and concepts used in epidemiology. Students will learn the measures used in epidemiology and apply principles of causality, study design, disease surveillance, and outbreak investigations. In addition, students will be introduced to sources of data used in epidemiologic studies. The major course project will provide students with hands-on experience using skills sought by employers in public health agencies.

**KINE 5373. INTRODUCTION TO ENVIRONMENTAL AND OCCUPATIONAL HEALTH. 3 Hours.**

This course provides an overview of the critical environmental health problems in industrialized and developing countries, discusses their causes and solutions, and emphasizes the role of science in environmental policy decisions. Topics include climate change, water and air contaminants, injury risk and prevention in the workplace, food and water-borne disease, toxic metals, and how the body reacts to environmental pollutants.

**KINE 5374. RACE, ETHNICITY AND HEALTH. 3 Hours.**

Despite advances in medicine and health policies, racial and ethnic health disparities persist. Americans of color have higher mortality rates and an unequal burden of many health concerns compared to their white counterparts. Such health inequities compromise the cultural and economic fabric of our country. This course will discuss the complex relationship between socioeconomic status, race/ethnicity, and health. In addition, this course will examine the economic and societal threats that health disparities pose to our communities and nation, as well as policies and approaches to addressing such disparities.

**KINE 5375. COMMUNITY HEALTH. 3 Hours.**

This course explores population health, providing students with learning experiences that facilitate an understanding of what public health is and why it is important. Course activities guide students in exploring their role in population health dynamics of their communities. The course will provide students an investigation of theoretical and evidence-based strategies designed to improve community health from population-based approaches. Students will then narrow those areas of foci to contemplate real-world, practice-based learning experiences.

**KINE 5376. INTRODUCTION TO BIOSTATISTICS. 3 Hours.**

The course will introduce students to analysis skills applied in the public health sciences. Students will learn how to apply descriptive statistics, t-tests, ANOVA, correlation, multiple regression, and non-parametric statistics to public health problems.

**KINE 5377. INTRODUCTION TO HEALTH SYSTEMS AND POLICY. 3 Hours.**

What is "population health" and why does it matter? Why are U.S. health care costs so high? How is the U.S. health system financed? What are the basic principles of health insurance? Who are the uninsured? It is critical that public health professionals be able to answer these questions and understand the basic functions that comprise the U.S. health care system. This course will help students answer these questions through an introduction to health systems and policy, including the delivery, quality and costs of health care for individuals and populations. The course will also examine the structure, processes and outcomes of health services, financing, organization, outcomes and accessibility of care.

**KINE 5378. FOUNDATIONS OF PUBLIC HEALTH. 3 Hours.**

This course teaches students what public health is and how it works. The mission of public health is to assure conditions in which people can be healthy. This course will present the history, frameworks, values, and goals of public health which support this mission. Students will study the principles and core responsibilities of public health from a multidisciplinary perspective, with emphasis on the public health core functions of assessment, policy development, and assurance. This course will provide the foundation for further studies in public health practice through developing public health problem solving and decision-making skills through case studies and applied coursework.

**KINE 5379. FUNDAMENTALS OF POPULATION HEALTH. 3 Hours.**

Public health is charged with advancing health while reducing health care costs. This requires us to move away from a reactionary model of health care delivery and towards models of disease prevention and health promotion. Students will consider how collaborations among organizations within and outside the health care system, and the integration of public health into clinical care, impacts population health. The course will use case studies and applied learning to discuss the role of incentives, financing, data, measurement, structure of health care delivery, and policy in advancing population health.

**KINE 5380. URBAN COMMUNITY HEALTH ASSESSMENT. 3 Hours.**

We must learn the health needs in a community before we can address those needs to improve the health of the community. Assessment skills allow us to learn what health needs exist in a community by using sound scientific methods to collect evidence about gaps in health. In this course, students will apply quantitative and qualitative methods, data analysis, community mobilization, and capacity building to assess community health needs and strategies for health improvement.

**KINE 5381. SOCIAL AND BEHAVIORAL EPIDEMIOLOGY. 3 Hours.**

Social epidemiology considers how social determinants impact population health. Behavioral epidemiology studies how lifestyle and behaviors affect health conditions. The class will explore how social, political, cultural and economic forces influence our health and health behaviors. The course will focus on social and health inequities, and resulting health behaviors. Theory from social science is integrated with epidemiological methods to learn how social circumstances influence behavior and health, and determine how we can target interventions to reduce health inequities in our community, nation and world. Prerequisite: KINE 5372 Introduction to Epidemiology.

**KINE 5382. CHRONIC DISEASE EPIDEMIOLOGY. 3 Hours.**

Chronic diseases are the leading causes of death in the United States and globally. Chronic diseases, such as cardiovascular disease, cancer, diabetes, HIV/AIDS, respiratory conditions, and neurologic disorders have devastating consequences for population health. This class will explore and apply epidemiologic methods which help identify strategies to prevent and treat chronic diseases, emphasizing modifiable risk factors. Coursework will aim to increase student understanding of how epidemiologic methods are used to identify determinants of chronic diseases, and how to identify and target interventions to reduce the burden of chronic disease locally, nationally, and across the globe. Prerequisite: KINE 5372.

**KINE 5383. COMMUNITY-BASED INTERNSHIP. 3 Hours.**

This course is a required 200-hour service learning experience for Master of Public Health (MPH) students which combines specific learning objectives with reflection. The student will apply skills learned in the MPH program in a "real-life" environment. The student will complete a defined project, mutually agreed upon between the MPH Graduate Advisor and the partner organization, which benefit both the student and the partner organization. Students will keep a log of hours, work performed, and competencies addressed throughout the internship experience, and comply with specified reporting periods. Prerequisite: KINE 5372, KINE 5373, KINE 5376, KINE 5305, KINE 5377, KINE 5375, KINE 5371, and KINE 5378.

**KINE 5384. PUBLIC HEALTH CAPSTONE EXPERIENCE. 3 Hours.**

This course is the culmination of all previous coursework for Master of Public Health (MPH) students, requiring the student to complete a final paper, poster and oral presentation about the project completed as part of the Community-Based Internship. In addition, the student will complete a professional portfolio comprised of work illustrating the competencies learned during the MPH program and applied during the Internship. Prerequisite: KINE 5372, KINE 5373, KINE 5376, KINE 5305, KINE 5377, KINE 5375, KINE 5371, KINE 5378, and KINE 5383, and completion of all MPH coursework required for graduation, or concurrent enrollment in final courses needed for graduation.

**KINE 5385. COMMUNICATION AND HEALTH. 3 Hours.**

Students will learn how interpersonal, organizational and mass media communications influence health behaviors and health outcomes. Students will study theories and applied techniques of interpersonal communication in health care and health education settings, as well as the theory and practice of media in achieving desired effects from public health messages.

**KINE 5386. BIG DATA FOR EPIDEMIOLOGY. 3 Hours.**

Big Data have revolutionized science, including the future of public health. This course prepares future public health practitioners to integrate knowledge of epidemiology methods with the data analytics savvy. Students will gain competence in conducting analysis using large, commonly used health-related databases. Learn how to use large datasets to advance your practice of epidemiology by enrolling in this course. Prerequisite: KINE 5376 or KINE 5305. Prior completion or concurrent enrollment in KINE 5372.

**KINE 5387. INFECTIOUS DISEASE EPIDEMIOLOGY. 3 Hours.**

From Ebola to COVID-19, tuberculosis to hepatitis A--every outbreak has a team of behind-the-scenes disease detectives tracking its source and pathways. Students will learn the methods of infectious disease epidemiology, studying outbreak investigations, disease surveillance, study designs, laboratory diagnosis, and dynamics of transmission. Students must have completed KINE 5372 Introduction to Epidemiology to enroll in this course. Prerequisite: Prior or concurrent enrollment in KINE 5372.

**KINE 5388. GLOBAL HEALTH ON-SITE EXPERIENCE ABROAD. 3 Hours.**

Students will study the factors impacting health for populations in a selected country outside of the U.S. Then, students will travel to that country at the end of the course for a real life experience learning from people who are impacted by, and/or who help address the health factors in that region. Prerequisite: MPH student or Instructor Permission.

**KINE 5389. RESEARCH MANUSCRIPT SUBMISSION. 3 Hours.**

The student will collect scientific data in the Physiology of Exercise laboratories or in a work-related environment under the supervision of a faculty member. The student will analyze the data, write a manuscript, and submit a manuscript for publication in a peer-reviewed journal. This course must be taken in the final semester of graduate work and requires approval of the Graduate Advisor.

**KINE 5390. SPECIAL TOPICS IN KINESIOLOGY. 3 Hours.**

In-depth study of selected topics in physical education and exercise science. May be repeated when topics vary. Prerequisite: consent of instructor.

**KINE 5391. INTERMEDIATE BIostatISTICS FOR PUBLIC HEALTH. 3 Hours.**

This course builds on the foundational skills taught in Intro to Biostatistics. Students will learn how to conduct multivariate regression analysis and code using the statistical analysis program "R." It counts towards the required coursework for the Epidemiology concentration in the MPH. It is open to all graduate students who have completed an introductory statistics course at the graduate level. Prerequisite: KINE 5376 Intro to Biostatistics and KINE 5372 Intro to Epidemiology.

**KINE 5392. SPECIAL TOPICS IN KINESIOLOGY. 3 Hours.****KINE 5393. PHYSIOLOGY OF EXERCISE INTERNSHIP. 3 Hours.**

Individualized academic training in an external professional exercise physiology setting(e.g., physical medicine, athletic training, external laboratory, health/fitness facility, professional teams or sports management) under the direct supervision of an exercise science professional.

**KINE 5394. RESEARCH IN KINESIOLOGY. 3 Hours.**

Individually approved research projects selected from the various areas of Kinesiology.

**KINE 5395. EPIDEMIOLOGIC METHODS. 3 Hours.**

This course will teach students how to craft research questions, research objectives, plans for data analysis, and other important skills needed when designing original research. Examples and objectives will be tailored to the field of public health. Prerequisite: KINE 5376 Intro to Biostatistics and KINE 5372 Intro to Epidemiology.

**KINE 5396. RESEARCH IN ATHLECTIC TRAINING. 3 Hours.**

Independent research under the supervision of an individual faculty member; may be repeated for credit with consent of Graduate Advisor. Prerequisite: consent of the instructor.

**KINE 5397. INTERNSHIP ATHLETIC TRAINING. 3 Hours.**

Individualized clinical experience in an external athletic training or other medical setting (e.g., physician's office, rehabilitation clinic, professional sports teams) under the direct supervision of a health care professional.

**KINE 5398. THESIS. 3 Hours.**

This is a thesis course for student to take to satisfy their MS in Exercise Science degree requirements.

**KINE 5399. MENTAL HEALTH IN PUBLIC HEALTH. 3 Hours.**

This course explores topics in mental health facing public health researchers and practitioners, including substance use disorder, interpersonal violence, suicidality, and other topics. These topics are explored from the perspective of public health practice.

**KINE 5420. CONCEPTS IN ATHLETIC TRAINING. 4 Hours.**

Classroom and laboratory experiences that provide an introduction to the profession of Athletic Training with an emphasis on prevention and acute care of activity related injuries and illnesses. Specific topics will include injury prevention strategies; emergency first aid and acute care; superficial application of therapeutic modalities; nutritional considerations; and environmental considerations.

**KINE 5430. ORTHOPEDIC ASSESSMENT I. 4 Hours.**

A study of the common orthopedic injuries involving the lower extremities, with a special emphasis on recognition, evaluation, diagnosis, and initial management. Prerequisites: KINE 5120, KINE 5220, and KINE 5420.

**KINE 5431. ORTHOPEDIC ASSESSMENT II. 4 Hours.**

A study of the common orthopedic injuries involving the upper extremities, spine, head, and face with a special emphasis on recognition, evaluation, diagnosis, and initial management. Prerequisite: KINE 5430.

**KINE 5432. PATHOPHYSIOLOGY AND PHARMACOLOGY. 4 Hours.**

A study of acute and chronic illnesses and their response to, and impact on, physical activity. Discussion of pharmacological agents used in the care of general illnesses and musculoskeletal disorders in the physically active. Prerequisite: KINE 5430, KINE 5433, KINE 5130.

**KINE 5498. THESIS. 4 Hours.****KINE 5520. CLINICAL ATHLETIC TRAINING VI. 5 Hours.**

This course will include clinical experiences providing students the opportunity to integrate their knowledge and skills into actual patient care. Emphasis will be placed on the development of clinical decision-making skills. This course requires the completion of clinical experience under the supervision of a program approved preceptor. Prerequisite: KINE 5123, KINE 5306, KINE 5339, KINE 5343.

**KINE 5598. THESIS. 5 Hours.****KINE 5647. CLINICAL TEACHING PHYSICAL EDUCATION EC-12. 6 Hours.**

This supervised course is designed as a culminating field experience of pre-service professional preparation giving an opportunity to practically apply theoretical and pedagogical knowledge in school settings with a mentor teacher. Applied experience will be attained in both Elementary and Secondary settings. Additionally, a field-research project will be required to be arranged with course supervisor. Criminal background check required. Prerequisite: KINE 1315, KINE 2301, KINE 2302, KINE 3304, KINE 3388, KINE 4319, KINE 4320, KINE 4321, EDUC 5310, EDUC 5314, and LIST 5345.

**KINE 5693. PHYSIOLOGY OF EXERCISE INTERNSHIP. 6 Hours.**

Individualized academic training in an external professional exercise physiology setting (e.g., physical medicine, athletic training, external laboratory, health/fitness facility, professional teams or sports management) under the direct supervision of an exercise science professional.

**KINE 5694. RESEARCH IN KINESIOLOGY. 6 Hours.**

Individually approved research projects selected from the various areas of Kinesiology.

**KINE 5698. THESIS. 6 Hours.****KINE 5994. RESEARCH IN KINESIOLOGY. 9 Hours.**

Individually approved research projects selected from the various areas of Kinesiology.

**KINE 6100. SEMINAR IN KINESIOLOGY. 1 Hour.**

Implements the research process with faculty guidance. Students will attend regularly scheduled lectures from internal and external faculty members. Learning activities based on student and faculty interest.

**KINE 6105. LABORATORY TECHNIQUE ROTATIONS IN KINESIOLOGY I. 1 Hour.**

A primary objective of this course is to further your understanding of lab work in Kinesiology. A second objective is to enhance your ability for critical thinking in Kinesiology through the scientific process. This includes formation of a research question, hypothesis, designing an experiment, and inferring conclusions from data. Secondary objectives include improving technology skills to assist collecting and analyzing data, and writing and oral communication skills for demonstrating understanding of the kinesiology principles. Prerequisite: Consent of faculty.

**KINE 6106. LABORATORY TECHNIQUE ROTATIONS IN KINESIOLOGY II. 1 Hour.**

A primary objective of this course is to further your understanding of lab work in Kinesiology. A second objective is to enhance your ability for critical thinking in Kinesiology through the scientific process. This includes formation of a research question, hypothesis, designing an experiment, and inferring conclusions from data. Secondary objectives include improving technology skills to assist collecting and analyzing data, and writing and oral communication skills for demonstrating understanding of the kinesiology principles. This section must occur in a different laboratory than KINE 6105. Prerequisite: KINE 6105 and consent of faculty.

**KINE 6126. JOURNAL CLUB IN EX PHYSIOL. 1 Hour.**

This course is designed to provide doctoral students an opportunity to learn the art of critically reading and interpreting research articles. There will be emphasis on identifying strengths and weakness of research studies. There will also be an opportunity for the students to present their research study ideas and/or their preliminary findings of their research to the class. This will provide an opportunity for students to interact and receive/provide feedback regarding methodological approaches and interpretation of findings. Lastly, the student will learn how to prepare and deliver presentations to an audience. Prerequisite: Instructor Approval.

**KINE 6170. JOURNAL CLUB IN PHYSIOLOGY. 1 Hour.**

There is a growing emphasis on research and in particular student involvement in research at UTA. A fundamental skill that will be critical in the successful growth of student involvement in research is their ability to read and critically analyze / interpret journal articles. In addition to this important skill set the students will also gain invaluable experience by presenting their research study ideas and / or their preliminary findings of their research to the class. This will provide an opportunity for students to interact and receive / provide feedback regarding methodological approaches and interpretation of findings. \*Doctoral students will be required to complete an additional research related topic.

**KINE 6171. JOURNAL CLUB IN MOVEMENT & REHABILITATION SCIENCES. 1 Hour.**

There is a growing emphasis on research and in particular student involvement in research at UTA. A fundamental skill that will be critical in the successful growth of student involvement in research is their ability to read and critically analyze / interpret journal articles. In addition to this important skill set the students will also gain invaluable experience by presenting their research study ideas and / or their preliminary findings of their research to the class. This will provide an opportunity for students to interact and receive / provide feedback regarding methodological approaches and interpretation of findings. \*Doctoral students will be required to complete an additional research related topic.

**KINE 6194. RESEARCH IN KINESIOLOGY. 1 Hour.**

Individually approved research projects selected from the various areas of Kinesiology. May be repeated for credit with consent of the Graduate Advisor. Graded P/F/R. Prerequisite: Consent of Instructor.

**KINE 6293. GRANT WRITING. 2 Hours.**

Students will learn strategies associated with grant applications. Students will prepare an individual proposal associated with a research grant application. Although submission for funding (e.g., pre-doctoral fellowship) is not required for the course, students will develop and complete a grant application.

**KINE 6294. RESEARCH IN KINESIOLOGY. 2 Hours.**

Individually approved research projects selected from the various areas of Kinesiology. May be repeated for credit with consent of the Graduate Advisor. Graded P/F/R. Prerequisite: Consent of the instructor.

**KINE 6300. RESEARCH METHODS IN KINESIOLOGY. 3 Hours.**

This course is an overview of concepts and procedures necessary for designing, conducting, and analyzing research in Kinesiology from multiple research paradigms. The course will focus on the steps involved in the administration of a research project, including literature review, design, data collection and analysis. \*Doctoral students will be required to complete an additional research related topic. Prerequisite: Instructor Approval.

**KINE 6303. PROFESSIONAL DEVELOPMENT. 3 Hours.**

The philosophy and methods of conducting a university class for undergraduates are examined. Specific tips and suggestions for managing course materials, lectures, audiovisual aids, grading, etc. will be presented. The role of the university instructor as a researcher as well as a teacher will be elaborated. Specific topics will include the ethics and regulation of research, service as a journal referee, corresponding with peers, participating in a research team, manuscript preparation, presentation at professional conferences, and submitting material for publication.

**KINE 6305. APPLIED STATISTICAL PRINCIPLES IN KINESIOLOGY. 3 Hours.**

The course covers descriptive statistics, elementary probability, one- and two-population mean and variance comparisons, ANOVA, simple linear regression, and correlations. In addition, more advanced principles in parametric and non-parametric statistics will be emphasized. \*Doctoral students will be required to complete an additional research related topic. Prerequisite: Instructor Permission.

**KINE 6308. ADVANCED STATISTICAL ANALYSIS. 3 Hours.**

This course presents an applied approach on the use of mixed effects and/or multilevel models for clustered, repeated, and longitudinal experimental designs. Develops the skills to implement and interpret random effects, variance component models of time varying and time invariant predictors on outcome variables. Included topics: transitioning from general linear model to mixed effects model, interpretation of population-average and subject specific models containing random intercept and random slopes. Discussion of special topics including importance of graphing data, model fitting, centering, variance/covariance matrix, sample size, sample power, missing data in repeated measures designs. \*Doctoral students will be required to complete an additional research related topic. Prerequisite: Instructor Approval.



**KINE 6320. ADVANCED PHYSIOLOGY OF EXERCISE. 3 Hours.**

Lecture and laboratory sessions are designed to investigate concepts of energy metabolism, lactate production and accumulation, energy expenditure, excess post exercise oxygen consumption, cardiovascular and temperature regulation, neuromuscular control, aerobic and anaerobic adaptations and ergonomics. \*Doctoral students will be required to complete an additional research related topic. Prerequisite: Instructor Approval.

**KINE 6322. METABOLISM & EXERCISE BIOCHEMISTRY. 3 Hours.**

This course will address the regulation of exercise metabolism as well as the distinct biochemical pathways through which energy transduction occurs. This will allow the student to appreciate not only the end result of metabolism, ultimately the production and maintenance of cellular ATP levels, but also the pathways that biological machines use to achieve ATP homeostasis. Calorimetry, respiratory exchange ratio, and substrate utilization during exercise will be assessed as part of the laboratory section of this course. \*Doctoral students will be required to complete an additional research-related assignment. Prerequisite: Instructor Approval.

**KINE 6323. MOTOR CONTROL AND LEARNING. 3 Hours.**

This course advances on fundamental concepts of motor behavior and performance combining theoretical principles to a variety of realistic contexts to provide the basis of skilled behavior. Contemporary research in human motor behavior models is used to identify effective solutions to practical problems and to spark ideas for optimizing development, learning, and control of motor skills. \*Doctoral students will be required to complete an additional research-related assignment. Prerequisite: Instructor Approval.

**KINE 6326. CARDIOCIRCULATORY PHYSIOLOGY OF EXERCISE. 3 Hours.**

The structure and function of the cardiovascular and circulatory system will be studied, as well as, cardiac control, the cardiac cycle, cardiac output, hemodynamics, vascular resistance, arterial-venous oxygen difference and oxygen delivery and consumption. Heat production and thermal control during exercise will also be addressed in lecture and laboratory sessions. \*Doctoral students will be required to complete an additional research-related assignment. Prerequisite: Instructor Approval.

**KINE 6327. PULMONARY PHYSIOLOGY OF EXERCISE. 3 Hours.**

Examines the structure and function of the pulmonary system including mechanics of breathing, lung capacity tests, pulmonary circulation, lung diseases, gas exchange, ventilation, diffusing capacity, acid/base balance, neural and chemical regulation of breathing, and blood flow with respect to rest and exercise values in healthy and diseased populations. \*Doctoral students will be required to complete an additional research-related assignment. Prerequisite: Instructor Approval.

**KINE 6328. NEUROMUSCULAR PHYSIOLOGY OF EXERCISE. 3 Hours.**

The structure and function of muscle, including the motor unit, control and integration, central and peripheral modifiers of neuromuscular control and biochemical characteristics of fibers will be studied. These concepts will also be applied to concepts in strength and power development. \*Doctoral students will be required to complete an additional research-related assignment. Prerequisite: Instructor Approval.

**KINE 6330. ENVIRONMENTAL PHYSIOLOGY OF EXERCISE. 3 Hours.**

This course will address the impact of environmental stress (e.g., thermal, gravitational, microgravity, etc.) on the cardiovascular system. Related focus will be given to cardiac function, blood pressure regulation and thermoregulation. Topics will be addressed in lecture and laboratory sessions. \*Doctoral students will be required to complete an additional research-related assignment. Prerequisite: Instructor Approval.

**KINE 6338. EXERCISE PRESCRIPTION FOR SPECIAL POPULATIONS. 3 Hours.**

This course will discuss the pathophysiology of cardiovascular, metabolic and pulmonary diseases. Methods of exercise prescription and issues of concern will also be presented for these populations, as well as, low back pain, pregnancy, osteoporosis, cancer, children, older adults, fibromyalgia, multiple sclerosis, and cardiac disease. \*Doctoral students will be required to complete an additional research-related assignment. A student may not receive course credit for both KINE 5338 and KINE 6338. Prerequisite: Instructor Approval.

**KINE 6350. APPLIED BIOMECHANICS. 3 Hours.**

Application of Newtonian mechanics to human movement analysis. Biomechanical models using three-dimensional video and force plate data will be used to analyze human movement. \*Doctoral students will be required to complete an additional research-related assignment. Prerequisite: Instructor Approval.

**KINE 6360. FUNDAMENTAL PRINCIPLES OF INTEGRATIVE PHYSIOLOGY. 3 Hours.**

This course is designed to provide a fundamental understanding of human physiology. Physiological function is a complex process that involves a complex interaction among the various physiological systems. As such there will be an emphasis on the integration of cellular, cardiovascular, renal, autonomic, respiratory, and endocrine physiology. \*Doctoral students will be required to complete an additional research-related assignment. Prerequisite: Instructor Approval.

**KINE 6362. PRINCIPLES OF MOVEMENT NEUROSCIENCE. 3 Hours.**

This course focuses on principles of movement that have emerged from the computational study of motor control. The principles and application to processes such as motor planning, control, estimation, prediction and learning are explored. \*Doctoral students will be required to complete an additional research-related assignment. A student may not receive course credit for both KINE 5362 and KINE 6362.

**KINE 6363. CONDITIONS OF THE MOTOR SYSTEM IN CHILDHOOD. 3 Hours.**

This course explores a prevalent dysfunction of the motor system in childhood, known as Developmental Coordination Disorder (DCD). This class explores potential causes of DCD, common mechanisms and impairments, intervention methods and their effectiveness, and associated co-morbidities. In addition, students will understand the current state of research in the field and understand future avenues for research. \*Doctoral students will be required to complete an additional research-related assignment. A student may not receive course credit for both KINE 5363 and KINE 6363.

**KINE 6364. CURRENT PERSPECTIVES IN MOTOR LEARNING AND CONTROL. 3 Hours.**

This course explores five aspects of the new directions in research in the Motor Learning and Control field: Perception-Action mechanisms, Dynamical systems, Motor disorders, Learning and intervention for motor behavior, and neural mechanisms. \*Doctoral students will be required to complete an additional research-related assignment. A student may not receive course credit for both KINE 5364 and KINE 6364.

**KINE 6365. ADVANCED MOTOR DEVELOPMENT. 3 Hours.**

This course explores the current field of research in Motor Development applied to typical and special populations. More specifically, it discusses issues related to motor skill learning in childhood, the development of motor control, the relationship between motor competence and general health, and how lack of appropriate motor skills affect several domains of development (Developmental Coordination Disorder). To that, we use current research articles that discuss each one of these topics from different perspectives. \*Doctoral students will be required to complete an additional research-related assignment. A student may not receive course credit for both KINE 5365 and KINE 6365.

**KINE 6389. RESEARCH MANUSCRIPT SUBMISSION. 3 Hours.**

The student will collect scientific data in the Physiology of Exercise laboratories or in a work-related environment under the supervision of a faculty member. The student will analyze the data, write a manuscript, and submit a manuscript for publication in a peer-reviewed journal. This course must be taken in the final semester of graduate work and requires approval of the Graduate Advisor. \*Doctoral students will be required to complete an additional research-related assignment. Prerequisite: Instructor Approval.

**KINE 6394. RESEARCH IN KINESIOLOGY. 3 Hours.**

Individually approved research projects selected from the various areas of Kinesiology. May be repeated for credit with consent of the Graduate Advisor. Graded P/F/R. Prerequisite: Consent of the instructor.

**KINE 6399. DISSERTATION. 3 Hours.**

Preparation and submission of a doctoral dissertation in an area of kinesiology. Graded R/F only. Prerequisite: Admission to candidacy for the Ph.D. in Kinesiology.

**KINE 6694. RESEARCH IN KINESIOLOGY. 6 Hours.**

Individually approved research projects selected from the various areas of Kinesiology. May be repeated for credit with consent of the Graduate Advisor. Graded P/F/R. Prerequisite: Consent of the instructor.

**KINE 6699. DISSERTATION. 6 Hours.**

Preparation and submission of a doctoral dissertation in an area of kinesiology. Graded R/F only. Prerequisite: Admission to candidacy for the Ph.D. in Kinesiology.

**KINE 6999. DISSERTATION. 9 Hours.**

Preparation and submission of a doctoral dissertation in an area of kinesiology. Graded R/F only. Prerequisite: Admission to candidacy for the Ph.D. in Kinesiology.

**KINE 7399. DOCTORAL DEGREE COMPLETION. 3 Hours.**

This course may be taken during the semester in which a student expects to complete all requirements for the doctoral degree and graduate. Enrolling in this course meets minimum enrollment requirements for graduation, for holding fellowships awarded by The Office of Graduate Studies and for full-time GTA or GRA positions. Students should verify that enrollment in this course meets other applicable enrollment requirements. To remain eligible in their final semester of study for grants, loans or other forms of financial aid administered by the Financial Aid Office must enroll in a minimum of 5 hours as required by the Office of Financial Aid. Other funding sources may also require more than 3-hours of enrollment. Additional hours may also be required to meet to requirements set by immigration law or by the policies of the student's degree program. Students should contact the Financial Aid Office, other sources of funding, Office of International Education and/or their graduate advisor to verify enrollment requirements before registering for this course. This course may only be taken twice. Students who do not complete all graduation requirements while enrolled in this course must enroll in a minimum of 6 dissertation hours (6699 or 6999) in their graduation term. Graded P/F/R.

**COURSES****KINE-HI 5373. INTRODUCTION TO HEALTH INTELLIGENCE AND PUBLIC HEALTH INFORMATICS. 3 Hours.**

This course provides the foundation for the study of health intelligence and public health informatics and prepares students to effectively use public health data to create more timely actionable intelligence for emergency responses while addressing inequities and health disparities.

**KINE-HI 5374. HEALTH LITERACY AND SOCIAL MEDIA LISTENING FOR PUBLIC HEALTH. 3 Hours.**

This course provides an overview of the role played by health literacy in public health and safety and how social media and other emerging communication technologies can connect millions of voices to create a more adaptive and effective public health response.

**COURSES****KORE 1441. BEGINNING KOREAN I. 4 Hours. (TCCN = KORE 1411)**

Multimedia immersion in the culture and language of Korea. Designed to enable students to understand and communicate effectively in Korean at the beginning level.

**KORE 1442. BEGINNING KOREAN II. 4 Hours. (TCCN = KORE 1412)**

Continuation of Beginning Korean I. Prerequisite: KORE 1441 with a grade of C or better.

**KORE 1491. CONFERENCE COURSE. 4 Hours.**

Independent study; consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: Permission of the instructor.

**KORE 2301. TOPICS IN LITERATURE IN TRANSLATION. 3 Hours.**

Study of the works of major authors and intellectual trends of a given period or periods. May be repeated for credit as topics or periods vary. KORE 2301 may be taken to fulfill the foreign language literature requirement. Prerequisite: ENGL 1301 and ENGL 1302.

**KORE 2310. KOREAN CULTURE IN THE WORLD. 3 Hours.**

An overview of the cultures of the Korean-speaking world in a global context, examining cultural products such as food, art, music, popular culture, literature, and/or film. Taught in English.

**KORE 2313. INTERMEDIATE KOREAN I. 3 Hours. (TCCN = KORE 2311)**

Continued immersion in the culture and language of Korea. Application of strategies and technology in mastering listening, speaking, reading, and writing at the intermediate level. Prerequisite: KORE 1442 with a grade of C or better.

**KORE 2314. INTERMEDIATE KOREAN II. 3 Hours. (TCCN = KORE 2312)**

Continuation of Intermediate Korean I. Prerequisite: KORE 2313 with a grade of C or better.

**KORE 2391. CONFERENCE COURSE. 3 Hours.**

Independent study; consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: Permission of the instructor.

**KORE 3301. TOPICS IN KOREAN LITERATURE AND CULTURE IN TRANSLATION. 3 Hours.**

Main currents in contemporary Korean literature, art, film, and thought in relation to Korean political and social history. May be repeated for credit as topics or periods vary. May be taken to fulfill the foreign language literature requirement.

**KORE 3303. KOREAN CONVERSATION AND CULTURE I. 3 Hours.**

Practice in oral expression with an emphasis on vocabulary building, developing conversational skills, and cultural knowledge through the use of readings, film, and other media. Of special interest to students who wish to improve their skills in oral expression, reading comprehension, and writing. Credit will not be granted to native speakers of Korean. However, heritage speakers of Korean may register for the course when they pass the Korean Placement Test administered by the instructor. Prerequisite: KORE 2314 with a grade of C or better.

**KORE 3304. KOREAN CONVERSATION AND CULTURE II. 3 Hours.**

Students continue to develop conversational skills and cultural knowledge through the use of readings, film, and other media. Extensive conversation practice allows students to develop advanced-intermediate level oral skills in a broad range of communicative and cultural contexts. Students learn to express more abstract ideas through description, comparison, and narration. Credit will not be granted to native speakers of Korean. Heritage speakers of Korean may register for the course when they pass the Korean Placement Test administered by the instructor. Prerequisite: KORE 2314 with a grade of C or better.

**KORE 3305. KOREAN READING AND COMPOSITION. 3 Hours.**

An analysis of Korean texts and composition with emphasis on reading comprehension, grammar, writing skills, and compositional techniques. Readings may include newspaper articles, short stories, and essays on various topics of Korean culture. Prerequisite: KORE 2314 with a grade of C or better.

**KORE 3310. KOREAN LOCALIZATION AND TRANSLATION I. 3 Hours.**

Introduction to cultural and linguistic issues in the translation of Korean language texts. Students will explore current technologies used in various real-world translation contexts and how to adapt texts, products, and services to the locale for which they are intended. May not be repeated for credit. Prerequisite: KORE 2314 or the equivalent with a grade of B or better.

**KORE 3311. KOREAN LOCALIZATION AND TRANSLATION II. 3 Hours.**

Continued study of cultural and linguistic issues in the translation of Korean and English language texts. Systematic development of advanced skills in localization and computer-aided translation and in using TMX/TBX (international standards for translation memory and terminology exchange) tools. Translation practice, individually and in translation teams, with increasingly longer and more specialized texts. Prepares localization and translation specialists for real-world careers in the language-services industry. May not be repeated for credit. Prerequisite: KORE 3310 with a grade of B or better.

**KORE 3345. INTRODUCTION TO COMPUTER-ASSISTED TRANSLATION. 3 Hours.**

Introduction to computer-assisted translation (CAT), machine translation (MT), translation memory (TM) and terminology management tools in modern translation and localization workflows. Prepares students for real-world careers in the language services industry. Exclusively for students pursuing a minor in Localization and Translation-Korean. KORE 3310 is strongly recommended before KORE 3345.

**KORE 3391. CONFERENCE COURSE. 3 Hours.**

Independent study; consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: Permission of Instructor.

**KORE 3393. KOREAN INTERNSHIP. 3 Hours.**

A combination of field-related experience in the business or service sector with an academic component. Coursework may include journal writing, outside readings, reflection papers, and formal presentations. Prerequisite: Permission of Instructor.

**KORE 4321. TOPICS IN KOREAN LINGUISTICS. 3 Hours.**

Topics may include fundamentals of the linguistic structure of modern Korean, including phonology, morphology, syntax, and semantics, as well as pragmatics and typology. Focus on linguistic applications to the problems of learning Korean. Taught in English. Students who are working toward a major or minor in Korean will be required to complete some assignments in the target language. May be repeated for credit as topics may change. Prerequisite: KORE 1442 with a grade of C or better.

**KORE 4331. TOPICS IN KOREAN CULTURE AND CIVILIZATION. 3 Hours.**

Historical survey of the social, political, and economic aspects of Korean culture. Topics may include language, culture, history, literature, art, music, film, and other means of mass communication. No prior knowledge of Korean language or culture is necessary. Taught in English. Students who are working toward a major or minor in Korean will be required to complete some assignments in the target language. May be repeated as the topic changes.

**KORE 4332. CONTEMPORARY KOREAN CULTURE. 3 Hours.**

Study of the social, political, and economic aspects of Korean culture with focus on current events relevant to Korea. The course also explores language, literature, art, film, food, and music, including K-pop. No prior knowledge of Korean language or culture is necessary. Taught in English. Students who are working toward a major or minor in Korean will be required to complete some assignments in the target language.

**KORE 4334. THE CULTURE OF BUSINESS. 3 Hours.**

The relationship of culture, language, and meaning to issues affecting business and e-commerce in the Korean-speaking world, with emphasis on intercultural communication in an international business environment. Web-based media segments about international business in Korea and North America are used as an aid in the acquisition of pertinent cultural knowledge, as well as vocabulary. Prerequisite: KORE 2314 with a grade of B or better.

**KORE 4335. BUSINESS KOREAN. 3 Hours.**

Students learn to function in business environments, with emphasis on the skills needed for conducting e-commerce. Web-based media segments from Korea and North America are used to reinforce vocabulary, as well as cultural, and other linguistic knowledge. Prerequisite: KORE 2314 with a grade of B or better.

**KORE 4391. CONFERENCE COURSE. 3 Hours.**

Independent study in the preparation of a paper or a translation on a research topic; consultation with instructor on a regular basis. May be repeated for credit.

**KORE 4393. KOREAN INTERNSHIP. 3 Hours.**

This course is a combination of field-related experience in the business or service sector with an academic component. Coursework may include journal writing in Korean, outside readings, and formal presentations. Prerequisite: Two KORE 3000 level courses and permission of the instructor.

## COURSES

**LAPS 5310. LEARNING ANALYTICS FUNDAMENTALS. 3 Hours.**

Introduction to foundational elements in the emerging field of learning analytics, including theory, philosophy, ethics, cognitive processes, and tools, as well as its contribution to the psychology of learning research and relationship with other academic fields.

**LAPS 5320. EXPERIMENTAL DESIGN & METHODOLOGY. 3 Hours.**

Methodologies in learning analytics research, including the philosophy of science, measurement, and complex experimental and quasi-experimental designs.

**LAPS 5330. PSYCHOLOGY OF LEARNING & LEARNING SCIENCES. 3 Hours.**

Exploration of knowledge processes such as learning, sensemaking, decision-making, and self-regulation with focus on psychological processes and the science of learning.

**LAPS 5340. BIG DATA METHODS. 3 Hours.**

The collection, analysis, and reporting of large-scale educational and social interaction datasets, including the survey of different types of data, data infrastructure, methods for managing and interacting datasets, governing policies, and data stewardship.

**LAPS 5350. PRIVACY & ETHICS IN LEARNING ANALYTICS. 3 Hours.**

Ethical considerations for the collection and use of learning data, including social and trust practices with learners, access, ownership, storage, security, privacy, policy, transparency, and algorithms.

**LAPS 5360. INTRODUCTION TO DATA ANALYSIS AND R. 3 Hours.**

Fundamental elements of conducting data analysis in the R programming language, including basic operations, data structures, dataset cleaning and manipulation, and visualization.

**LAPS 5370. INTRODUCTION TO STATISTICAL ANALYSIS. 3 Hours.**

This course will provide students who receive probationary admission due to an inadequate mathematical background with the core principles of statistical analysis necessary to be successful in the program. Prerequisite: Completion of LAPS 5310, LAPS 5320, LAPS 5330, and LAPS 5340 or LAPS 5360.

**LAPS 5375. PROBABILITY AND STATISTICAL INFERENCE. 3 Hours.**

Examination of probability, distributions, estimation, and hypothesis testing in learning contexts. Prerequisite: Completion of LAPS 5310, LAPS 5320, LAPS 5330, and LAPS 5340 or LAPS 5360.

**LAPS 5376. APPLIED REGRESSION ANALYSIS. 3 Hours.**

A comprehensive review of different regression models that emphasizes modeling, inference, diagnostics, and application to educational datasets. Prerequisite: Completion of LAPS 5310, LAPS 5320, LAPS 5330, and LAPS 5340 or LAPS 5360.

**LAPS 5377. LINEAR MODELS AND EXPERIMENTAL DESIGN. 3 Hours.**

In-depth exploration of univariate and multivariate linear models to derive inferential procedures depending on appropriate learning contexts.

Prerequisite: Completion of LAPS 5310, LAPS 5320, LAPS 5330, and LAPS 5340 or LAPS 5360.

**LAPS 5378. MULTIDIMENSIONAL SCALING AND CLUSTERING. 3 Hours.**

In-depth study of the investigation of observed similarities and dissimilarities between different objects and then grouping the objects based on those similarities. Prerequisite: Completion of LAPS 5310, LAPS 5320, LAPS 5330, and LAPS 5340 or LAPS 5360.

**LAPS 5380. CAUSAL INFERENCE FOR PROGRAM EVALUATION. 3 Hours.**

Using learning analytics to determine the impact of intervention outcomes and critically evaluate quantitative research pertaining to cause and effect in a learning context. This will include potential pitfalls and key factors, as well as application of both practitioner and research lenses. Prerequisite: Completion of LAPS 5310, LAPS 5320, LAPS 5330, and LAPS 5340 or LAPS 5360.

**LAPS 5388. ADVANCED METHODS IN EDUCATIONAL DATA MANAGEMENT/LEARNING ANALYTICS. 3 Hours.**

Sophisticated and emerging techniques for analyzing learning data, including advanced graphing and visualization techniques, multimodal data (such as psychophysiological data), modeling, process mining, measurement of psychological attributes involved in knowledge creation, and learner profile development. Prerequisite: Completion of LAPS 5310, LAPS 5320, LAPS 5330, and LAPS 5340 or LAPS 5360.

**LAPS 5390. LEARNING DESIGN AND ANALYTICS. 3 Hours.**

Survey of foundational learning design theories related to human behavior in formal and informal learning settings. Focus on models and strategies to design and evaluate technology that supports and helps improve learning. Prerequisite: Completion of LAPS 5310, LAPS 5320, LAPS 5330, and LAPS 5340 or LAPS 5360.

**LAPS 5391. INDEPENDENT STUDY. 3 Hours.**

Student and instructor agree upon topic of study and requirements for deadlines and products. Prerequisite: Completion of LAPS 5310, LAPS 5320, LAPS 5330, and LAPS 5340 or LAPS 5360.

**LAPS 5392. COGNITION, COMPUTERS, AND METACOGNITION. 3 Hours.**

The role of learning, sensemaking, human development, and cognition theories in relation to the use of digital technology in knowledge processes. Prerequisite: Completion of LAPS 5310, LAPS 5320, LAPS 5330, and LAPS 5340 or LAPS 5360.

**LAPS 5393. NATURAL LANGUAGE PROCESSING FOR EDUCATIONAL RESEARCH. 3 Hours.**

Application of methods in natural language processing (NLP) and natural language understanding (NLU) to text and language data in the educational setting. Prerequisite: Completion of LAPS 5310, LAPS 5320, LAPS 5330, and LAPS 5340 or LAPS 5360.

**LAPS 5394. SOCIAL NETWORK ANALYSIS. 3 Hours.**

Introduction to social network analysis in educational settings. The course focuses on how to analyze and interpret relationships between people, artifacts, and text in digital learning settings. The students will learn to prepare data, map and analyze these relationships. Foundational graph analysis concepts and their application in learning analytics will be discussed. Students will be trained to use R programming for analysis, but the use of other software is possible. Prerequisite: Completion of LAPS 5310, LAPS 5320, LAPS 5330, and LAPS 5340 or LAPS 5360.

**LAPS 5395. HUMAN AND ARTIFICIAL COGNITION. 3 Hours.**

Artificial intelligence (AI) is exerting growing influence in all aspects of modern life. This course surveys AI trends and details prominent models for how human and machine agents intersect in knowledge work, using discrete cognitive processes as the basic unit for determining agent roles. A specific focus is on optimal relationship determination and the data types that provide indicators of cognitive states. Prerequisite: Completion of LAPS 5310, LAPS 5320, LAPS 5330, and LAPS 5340 or LAPS 5360.

**LAPS 5610. CAPSTONE. 6 Hours.**

Application of program knowledge and skills learned in prior coursework to complete a small-scale, integrative project involving analysis of a real world, educational data set. Students will have the opportunity to apply for competitive internships that will provide small scholarships. All students will work in diverse groups of 5 to 6 students along with a faculty mentor analyzing specific industry data to solve real-world problems. The small groups will be designed to combine students with diverse skill sets and emphasize community and collaboration. Prerequisite: Completion of coursework and approval of department.

**COURSES****LARC 4191. CONFERENCE COURSE. 1 Hour.**

Independent study guided by an instructor on a regular basis. May be repeated for credit. Prerequisite: Departmental permission.

**LARC 4300. INTRODUCTION TO LANDSCAPE ARCHITECTURE. 3 Hours.**

An orientation to this environmental-design profession. Landscape architecture applies a blending of art with knowledge of natural processes and historical, cultural, and social dynamics to design richly supportive and beautiful outdoor places. Open to all students.

**LARC 4301. SITE PLANNING AND DEVELOPMENT PROCESSES. 3 Hours.**

Presents the processes and practices of site planning and development, including site inventory, analysis, and assessment of potential building sites. Students examine the natural, cultural, and social systems that affect design decisions, as well as the language and literature of landscape architecture. Prerequisite: "C" or better in UDES 2441, ARCH 2551, or approved equivalent. Students must have a minimum cumulative GPA of 2.8 and a minimum major course(s) GPA of 2.8. Department consent.



**LARC 4312. HISTORY AND THEORY OF LANDSCAPE ARCHITECTURE I. 3 Hours.**

Traces landscape planning and design from pre-history through Egyptian, Greek, Roman, Islamic and Medieval gardens to Italian, French, and English landscape approaches, culminating in the mid-19th century. Relates landscape design to societal, cultural, technological and belief systems of each period. Culminates in the contemporary history of the profession from Andrew Jackson Downing to the present day. The growth and development of the profession, professional education, the environmental movement, large scale regional land planning and significant landscape architectural projects of the past century and a half. Course also offered as ARCH 4353, credit will only be granted one. Prerequisite: UDES 2303 and LARC 4300 or ARCH 2303 and ARCH 2304. Restricted to Sustainable Urban Design, Architecture, and Interior Design majors.

**LARC 4313. HISTORY AND THEORY OF LANDSCAPE ARCHITECTURE II. 3 Hours.**

The contemporary history of the profession from Andrew Jackson Downing to present day. The growth and development of the American Society of Landscape Architects (ASLA), professional education, the environmental movement, large scale regional planning, and significant landscape architectural projects of the past century. Prerequisite: "C" or better in ARCH 4353. Department consent.

**LARC 4320. COMMUNICATIONS FOR LANDSCAPE ARCHITECTS. 3 Hours.**

Primary class for the development of graphic and communication skills in landscape architecture. Provides a method for transferring conceptual ideas into legible graphic presentations. Prerequisite: "C" or better in UDES 2441, ARCH 2551, or approved equivalent. Students must have a minimum cumulative GPA of 2.8 and a minimum major course(s) GPA of 2.8. Department consent.

**LARC 4324. ENVIRONMENTAL ART AND DATA VISUALIZATION. 3 Hours.**

Siting and creating works of art; analysis of the creative processes of the two different-yet-related disciplines; case studies of built works. Communication of ideas through environmental media. Prerequisite: C or better in UDES 3551, ARCH 2551, or approved equivalent. Restricted to Sustainable Urban Design major. Department approval is required for Architecture and Interior Design majors. Students must have a minimum cumulative GPA of 2.8 and a minimum major course GPA of 2.8.

**LARC 4325. URBAN SKETCHING. 3 Hours.**

This course employs freehand, on-location sketching as a means for exploring and understanding the rich visual language of the urban environment. Lectures will introduce timeless urban design principles and field sketching techniques, which will be further developed through on-location sketching in the city. The course would be of interest to students of art, architecture, landscape architecture, planning, art and related fields. Some background in sketching through art or design coursework is recommended. Prerequisite: "C" or better in UDES 2441, ARCH 1342, or approved equivalent. Students must have a minimum cumulative GPA of 2.8 and a minimum major course(s) GPA of 2.8. Department consent.

**LARC 4326. DESIGN AND HUMAN BEHAVIOR. 3 Hours.**

This course is an introduction to a range of viewpoints, concepts and characteristics of human behavior which should be taken into consideration when designing the urban environment. Cultural, social and psychological factors will be considered. Various theories and methods of environmental assessment and design will be studied that are based on an understanding of mutually supportive relationships between human beings and their physical environment. Field study will be employed to exercise theories and techniques explored. Prerequisite: "C" or better in UDES 2441, ARCH 2551, or approved equivalent. Students must have a minimum cumulative GPA of 2.8 and a minimum major course(s) GPA of 2.8. Department consent.

**LARC 4327. REGIONALISM, CREATIVITY, AND DESIGN. 3 Hours.**

This class will cover various readings and discuss inspiring regionalist essays by architects, landscape architects, philosophers, and others in order to shape a set of beliefs (an ideology) that can productively inform the student's trajectory as a creative designer. Students will learn how regionalism makes the life of a designer more interesting and fulfilling as new regional influences in diverse areas are absorbed and become continuing fodder for personal growth and creativity through a long career. Prerequisite: "C" or better in UDES 2441, ARCH 2551, or approved equivalent. Students must have a minimum cumulative GPA of 2.8 and a minimum major course(s) GPA of 2.8. Department consent.

**LARC 4330. PLANT IDENTIFICATION AND ECOLOGY. 3 Hours.**

Examines the design characteristics and horticultural requirements of a broad palette of plants adapted to the North Texas region. Field trips are required to learn the plants at both ornamental gardens and local ecological communities. Prerequisite: C or better in UDES 4551, ARCH 3554, or approved equivalent. Students must have a minimum cumulative GPA of 2.8 and a minimum major course(s) GPA of 2.8. Department consent.

**LARC 4341. LANDSCAPE TECHNOLOGY I. 3 Hours.**

Surveying, site grading, storm water management, vertical and horizontal curves and an overview of the construction documentation process employed by landscape architects. Prerequisite: C or better in UDES 4551, ARCH 3554, or approved equivalent. Students must have a minimum cumulative GPA of 2.8 and a minimum major course(s) GPA of 2.8. Department consent.

**LARC 4344. PARK AND RECREATION DESIGN AND PLANNING. 3 Hours.**

History, data collection, program formulation, and design principles for public and private park and recreation systems and sites. Includes management objectives, operations and maintenance, and public input as planning components. Prerequisite: C or better in UDES 4551, ARCH 3554, or approved equivalent. Students must have a minimum cumulative GPA of 2.8 and a minimum major course(s) GPA of 2.8. Department consent.

**LARC 4350. LANDSCAPE ARCHITECTURE COMPUTER APPLICATIONS. 3 Hours.**

Examines various computer applications currently used in office practice. Computer applications used for office management, site analysis, design development, construction documentation, and cost estimating. Introduction to computer aided design applications and the underlying theories of application. Prerequisite: "C" or better in UDES 2441, ARCH 2551, or approved equivalent. Students must have a minimum cumulative GPA of 2.8 and a minimum major course(s) GPA of 2.8. Department consent.

**LARC 4351. ADVANCED COMPUTER AIDED DESIGN. 3 Hours.**

Focus is on a methodology for designing and illustrating with computer graphics that is very compatible with the design and production workflow of most landscape architecture offices. All work is done in an AutoCAD environment using AutoCAD for modeling and Lumion for rendering still images, interactive panoramas, and both viewpoint and key-frame animations. Photoshop is used for the creation of texture maps, image manipulation and photo-montage. Emphasis is on working intuitively and creatively. Prerequisite: "C" or better in LARC 4350, ARCH 3343, INTD 2343, or approved equivalent. Students must have a minimum cumulative GPA of 2.8 and a minimum major course(s) GPA of 2.8. Department consent.

**LARC 4382. URBAN DESIGN SEMINAR. 3 Hours.**

The Seminar establishes a basic critical understanding, and a critique of urban design by reviewing its past, present and the future as an academic field and an area of practice. The seminar introduces urban design as a transdisciplinary specialization and professional endeavor that encompasses landscape architecture, architecture, city planning, and real estate to shape and influence the built environment primarily within urban context. Students actively present and lead informed discussions on topics such as urban form, urban landscapes, land-use patterns, population density, circulation, legibility, public art, environmental behavior and urban/rural interchange. Field trips are required. Prerequisite: C or better in UDES 4551, ARCH 3554, or approved equivalent. Students must have a minimum cumulative GPA of 2.8 and a minimum major course(s) GPA of 2.8. Department consent.

**LARC 4391. CONFERENCE COURSE IN LANDSCAPE ARCHITECTURE. 3 Hours.**

Independent study guided by an instructor on a regular basis. Prerequisite: Students must have a minimum cumulative GPA of 2.8 and a minimum major course(s) GPA of 2.8. May be repeated for credit, may not exceed six credits. Permission of the instructor and the Landscape Architecture Program Director.

**LARC 4395. SELECTED TOPICS IN LANDSCAPE ARCHITECTURE. 3 Hours.**

Courses to explore and present selected topics in landscape architecture and design. May be repeated for credit as topics change. Prerequisite: Department consent.

**LARC 4695. CONFERENCE COURSE IN LANDSCAPE ARCHITECTURE. 6 Hours.**

Studio and lecture courses to explore and present selected topics in landscape architecture and design. Not repeatable for credit. Prerequisite: Permission of the Landscape Architecture Program Director.

**LARC 5191. CONFERENCE COURSE IN LANDSCAPE ARCHITECTURE. 1 Hour.**

Special subjects and issues in landscape architecture that may be studied independently under faculty supervision. May be repeated for credit.

**LARC 5294. MASTERS COMPREHENSIVE EXAMINATION. 2 Hours.**

Must be taken concurrently with Thesis. Directed study, consultation, and comprehensive examination of coursework, leading to and including the thesis. Oral presentation required. Required of all Master of Landscape Architecture students in the semester in which they plan to graduate. Prerequisite: LARC 5397.

**LARC 5300. INTRODUCTION TO LANDSCAPE ARCHITECTURE. 3 Hours.**

An orientation to this environmental-design profession. Landscape architecture applies a blending of art with knowledge of natural processes and historical, cultural, and social dynamics to design richly supportive and beautiful outdoor places. Open to all students.

**LARC 5301. SITE PLANNING AND DEVELOPMENT PROCESSES. 3 Hours.**

Presents the processes and practices of site planning and development, including site inventory, analysis, and assessment of potential building sites. Students examine the natural, cultural, and social systems that affect design decisions, as well as the language and literature of landscape architecture.

**LARC 5302. LAND DEVELOPMENT PLANNING. 3 Hours.**

The process of land development planning for landscape architects. Detailed expansion of LARC 5301. Uses case studies in land development planning to instruct students in the environmental, economic, legal, and visual issues associated with the land planning process.

**LARC 5312. HISTORY AND THEORY OF LANDSCAPE ARCHITECTURE. 3 Hours.**

Traces landscape planning and design from pre-history through Egyptian, Greek, Roman, Islamic and Medieval gardens to Italian, French, and English landscape approaches, culminating in the mid-19th century. Relates landscape design to societal, cultural, technological and belief systems of each period. Culminates in the contemporary history of the profession from Andrew Jackson Downing to the present day. The growth and development of the profession, professional education, the environmental movement, large scale regional land planning and significant landscape architectural projects of the past century and a half.

**LARC 5313. HISTORY AND THEORY OF LANDSCAPE ARCHITECTURE II. 3 Hours.**

The contemporary history of the profession from Andrew Jackson Downing to present day. The growth and development of the American Society of Landscape Architects (ASLA), professional education, the environmental movement, large scale regional planning, and significant landscape architectural projects of the past century. Prerequisite: "C" or better in LARC 5312 or ARCH 4353.

**LARC 5320. COMMUNICATIONS FOR LANDSCAPE ARCHITECTS. 3 Hours.**

Primary class for the development of graphic and communication skills in landscape architecture. Provides a method for transferring conceptual ideas into legible graphic presentations. Should be taken concurrently with LARC 5661 Design Studio I. Prerequisite: Credit or concurrent enrollment in LARC 5661.

**LARC 5321. ADVANCED COMMUNICATIONS. 3 Hours.**

Focuses on the symbolic and representational computer graphics as well as communication and presentation techniques typically used in landscape architecture profession. Building on the graphic thinking, production, and communications skills covered in LARC 5320 and further expanding those basics to digital technologies and media. It also introduces students to fundamental concepts and principles of design and graphic composition in the digital environment. Prerequisite: LARC 5320.

**LARC 5323. STUDIO TEACHING. 3 Hours.****LARC 5324. LANDSCAPE ARCHITECTURE AND ENVIRONMENTAL ART SEMINAR. 3 Hours.**

Siting and creating works of art; analysis of the creative processes of the two different-yet-related disciplines; case studies of built works. Communication of ideas through environmental media.

**LARC 5325. URBAN SKETCHING. 3 Hours.**

This course employs freehand, on-location sketching as a means for exploring and understanding the rich visual language of the urban environment. Lectures will introduce timeless urban design principles and field sketching techniques, which will be further developed through on-location sketching in the city. The course would be of interest to students of art, architecture, landscape architecture, planning, art and related fields. Some background in sketching through art or design coursework is recommended.

**LARC 5326. DESIGN AND HUMAN BEHAVIOR. 3 Hours.**

This course is an introduction to a range of viewpoints, concepts and characteristics of human behavior which should be taken into consideration when designing the urban environment. Cultural, social and psychological factors will be considered. Various theories and methods of environmental assessment and design will be studied that are based on an understanding of mutually supportive relationships between human beings and their physical environment. Field study will be employed to exercise theories and techniques explored.

**LARC 5327. REGIONALISM, CREATIVITY, AND DESIGN. 3 Hours.**

This class will cover various readings and discuss inspiring regionalist essays by architects, landscape architects, philosophers, and others in order to shape a set of beliefs (an ideology) that can productively inform the student's trajectory as a creative designer. Students will learn how regionalism makes the life of a designer more interesting and fulfilling as new regional influences in diverse areas are absorbed and become continuing fodder for personal growth and creativity through a long career.

**LARC 5330. PLANT IDENTIFICATION AND ECOLOGY. 3 Hours.**

Examines the design characteristics and horticultural requirements of a broad palette of plants adapted to the North Texas region. Field trips are required to learn the plants at both ornamental gardens and local ecological communities.

**LARC 5331. PLANTING DESIGN. 3 Hours.**

Design applications of plant material. Students apply the design problem-solving approach to the detailed aspects of planting design and complete a progressively-more-difficult series of problems to practice techniques and methods of plant manipulation that encompass both the aesthetic, programmatic, environmental, and ecological objectives of planting design. Prerequisites: LARC 5330; LARC 5661; LARC 5662.

**LARC 5340. PROFESSIONAL PRACTICE. 3 Hours.**

Ethical, legal, and administrative aspects of the public, private, and academic spectrums of practice in landscape architecture.

**LARC 5341. LANDSCAPE TECHNOLOGY I. 3 Hours.**

Surveying, site grading, storm water management, vertical and horizontal curves and an overview of the construction documentation process employed by landscape architects.

**LARC 5342. LANDSCAPE TECHNOLOGY II. 3 Hours.**

Examines hardscape materials and methods typical to the practice of landscape architecture, through readings, examinations, design detail exercises, and the creation of a complete set of construction documents. Construction site tours are required with area industry professionals. Prerequisites: LARC 5341.

**LARC 5344. PARK AND RECREATION DESIGN AND PLANNING. 3 Hours.**

History, data collection, program formulation, and design principles for public and private park and recreation systems and sites. Includes management objectives, operations and maintenance, and public input as planning components.

**LARC 5350. LANDSCAPE ARCHITECTURE COMPUTER APPLICATIONS. 3 Hours.**

Examines various computer applications currently used in office practice. Computer applications used for office management, site analysis, design development, construction documentation, and cost estimating. Introduction to computer aided design applications and the underlying theories of application. Prerequisite: LARC 5320.

**LARC 5351. ADVANCED COMPUTER AIDED DESIGN. 3 Hours.**

Focus is on a methodology for designing and illustrating with computer graphics that is very compatible with the design and production workflow of most landscape architecture offices. All work is done in an AutoCAD environment using AutoCAD for modeling and Lumion for rendering still images, interactive panoramas, and both viewpoint and key-frame animations. Photoshop is used for the creation of texture maps, image manipulation and photo-montage. Emphasis is on working intuitively and creatively. Prerequisite: LARC 5350.

**LARC 5368. DESIGN PRACTICUM. 3 Hours.**

An internship program which includes approved work done in a landscape architect's office or one of the related design fields. The purpose of the practicum is to provide students with practical design experience. Students may enroll in LARC 5368 for half-time employment or LARC 5668 for full time employment.

**LARC 5380. RESEARCH METHODS IN LANDSCAPE ARCHITECTURE. 3 Hours.**

Theories of practical research and methods of applying them as they relate to landscape architecture. Includes research program development, data collection and analysis, thesis proposal writing, and research tools and techniques. Emphasis is on qualitative methods. Prerequisites: LARC 5661, LARC 5662.

**LARC 5382. URBAN DESIGN SEMINAR. 3 Hours.**

The Seminar establishes a basic critical understanding, and a critique of urban design by reviewing its past, present and the future as an academic field and an area of practice. The seminar introduces urban design as a transdisciplinary specialization and professional endeavor that encompasses landscape architecture, architecture, city planning, and real estate to shape and influence the built environment primarily within urban context. Students actively present and lead informed discussions on topics such as urban form, urban landscapes, land-use patterns, population density, circulation, legibility, public art, environmental behavior and urban/rural interchange. Field trips are required.

**LARC 5391. CONFERENCE COURSE IN LANDSCAPE ARCHITECTURE. 3 Hours.**

Special subjects and issues in landscape architecture that may be studied independently under faculty supervision. May be repeated for credit.

**LARC 5395. SELECTED TOPICS IN LANDSCAPE ARCHITECTURE. 3 Hours.**

Selected studio or lecture course offerings in specific areas of expertise or interest. Course allows the program the flexibility to address the ever-changing needs of students and the profession by offering courses beyond the scope of the core curriculum. May be repeated for credit.

**LARC 5397. THESIS PREP. 3 Hours.**

Preparation for landscape architecture thesis (design or written) on design, technology, history or professional principles. Students work closely with a landscape architecture faculty advisor and thesis committee to complete the proposal for a written or design thesis and begin thesis work. Prerequisite: LARC 5380.

**LARC 5398. THESIS. 3 Hours.**

Independent research and presentation of findings under the direction of a supervising committee. The findings of the thesis should extend the boundaries of the professional discipline by either presenting new and unique ideas or information, or by interpreting existing knowledge from a different perspective. Prerequisite: LARC 5397.

**LARC 5623. STUDIO TEACHING PRACTICUM. 6 Hours.**

Students spend one semester as a teaching assistant in the studio sequence under the supervision of the assigned faculty member. They will observe the methods employed in the studio and prepare a comprehensive evaluation of the studio in conjunction with the instructor. The students will oversee one short studio project and evaluate its success or failure based on the criteria learned in LARC 5323 and the goals and objectives of the test project. Prerequisite: LARC 5323.

**LARC 5660. ENRICHMENT DESIGN STUDIO. 6 Hours.**

Review of the principles and processes of design presented in Design Studios I, II, and III. Provides an opportunity for students with weak design and graphic skills to improve those skills to meet requirements for Design Studio IV. Course can use design competitions as projects, for advanced students who have completed the studio sequence. May be repeated for credit as specific topics vary. Prerequisite: LARC 5661 and LARC 5662.

**LARC 5661. DESIGN STUDIO I. 6 Hours.**

A design course for students with no background in landscape architecture or design. Outlines the site planning and site design decision-making process. Focuses on providing students with the verbal, intellectual, and graphic tools necessary to successfully tackle a design problem and bring it to a schematic level of completion. It is highly recommended that this course be taken concurrently with LARC 5320.

**LARC 5662. DESIGN STUDIO II. 6 Hours.**

A continuation of LARC 5661. Basic design principles and their application to three-dimensional spaces. Examines how humans occupy exterior space and combines this information with the principles of design to create garden scale models. Models are used as a medium for design expression. Landscape character, design simulation, landscape media, landscape context, and human spatial experience are included.

**LARC 5663. DESIGN STUDIO III: SITE PLANNING. 6 Hours.**

Features the process of solving complicated site planning and site design problems. Each phase of the site planning process is examined in detail by undertaking one or more studio problems that involve resolution of issues related to existing site conditions, program development, conceptual design, design development, and design detailing.

**LARC 5664. DESIGN STUDIO IV: ENVIRONMENTAL PLANNING. 6 Hours.**

Studio IV is designed to provide the fundamental concepts and mechanisms underlying natural processes, and environmental planning and design. It addresses the influence of both natural and human factors on landscape planning and landscape architectural design within the context of sustainability. The course expands the regional planning and design to the environment as a large scale ecological unit, independent of political boundaries, through the use of Geographic Information System (GIS) and Geodesign framework. Prerequisite: LARC 5341, LARC 5661, LARC 5662, and LARC 5663.

**LARC 5665. DESIGN STUDIO V: THE URBAN LANDSCAPE. 6 Hours.**

The studio uses both real and hypothetical projects as well as competitions as design problems which require in depth understanding of behavioral, social, environmental, and economic conditions in relation to landscape architecture and urban design. Basic design and planning principles acquired in earlier studios are reiterated, and solutions to new problems on complex urban projects are introduced that benefit from interactions with architects, planners, urban designers, and developers. Prerequisite: LARC 5341, LARC 5342, LARC 5661, LARC 5662, LARC 5663, and LARC 5664.

**LARC 5668. DESIGN PRACTICUM. 6 Hours.**

An internship program which includes approved work done in a landscape architect's office or one of the related design fields. The purpose of the practicum is to provide students with practical design experience. Students may enroll in LARC 5368 for half-time employment or LARC 5668 for full time employment.

**LARC 5691. CONFERENCE COURSE IN LANDSCAPE ARCHITECTURE. 6 Hours.**

Special subjects and issues in landscape architecture that may be studied independently under faculty supervision. May be repeated for credit.

**LARC 5693. MASTERS DESIGN THESIS. 6 Hours.**

Independent research and design/planning investigations, under the direction of a supervising committee, that demonstrate rigorous original thinking. Topics can explore material in a new light or engage research and design practices in ways that strengthen and define the final masters design thesis in relationship to the field. Prerequisite: LARC 5397.

**LARC 5698. THESIS. 6 Hours.**

Independent research and presentation of findings under the direction of a supervising committee. The findings of the thesis should extend the boundaries of the professional discipline by either presenting new and unique ideas or information, or by interpreting existing knowledge from a different perspective. Prerequisite: LARC 5397.

**LARC 5998. THESIS. 9 Hours.**

Independent research and presentation of findings under the direction of a supervising committee. The findings of the thesis should extend the boundaries of the professional discipline by either presenting new and unique ideas or information, or by interpreting existing knowledge from a different perspective. Prerequisite: LARC 5397.

**COURSES****LATN 1441. LATIN LEVEL I. 4 Hours. (TCCN = LATN 1411)**

(LATN 1411).

**LATN 1442. LATIN LEVEL II. 4 Hours. (TCCN = LATN 1412)**

Prerequisite: LATN 1441 or equivalent.

**LATN 2313. LATIN LEVEL III. 3 Hours. (TCCN = LATN 2311)**

Prerequisite: LATN 1442 or equivalent.

**LATN 2314. LATIN LEVEL IV. 3 Hours. (TCCN = LATN 2312)**

Prerequisite: LATN 2313 or equivalent.

**LATN 4301. INTENSIVE LATIN FOR READING I. 3 Hours.**

Covers approximately the same material as LATN 1441/LATN 1442 (Levels I and II). Credit will not be granted for both.

**LATN 4302. INTENSIVE LATIN FOR READING II. 3 Hours.**

Covers approximately the same material as LATN 2313 and LATN 2314 (Levels III and IV). Credit will not be granted for both.

**LATN 4335. TOPICS IN LATIN LITERATURE. 3 Hours.**

Close reading of one or more Latin texts, with attention both to grammatical precision and to interpretation. Student should be able to read unaltered Latin. Course may be repeated for credit.

**LATN 4391. CONFERENCE COURSE. 3 Hours.**

Advanced independent study in Latin literature. May be repeated for credit with departmental permission.

**LATN 5301. INTENSIVE LATIN FOR READING I. 3 Hours.**

Covers approximately the same material as LATN 1441 and LATN 1442 (Levels I and II).

**LATN 5302. INTENSIVE LATIN FOR READING II. 3 Hours.**

Covers approximately the same material as LATN 2313 and LATN 2314 (Levels III and IV).

**LATN 5391. CONFERENCE COURSE IN LATIN. 3 Hours.**

May be taken only with the permission of the instructor and the Graduate Advisor.

**COURSES****LING 2301. INTRODUCTION TO THE STUDY OF HUMAN LANGUAGE. 3 Hours.**

An introduction to the scientific study of human language, using English as an example. Topics in the course include how sounds are produced, how words and sentences are structured, how and why language changes, how language is acquired by children and adults, how the brain processes language, and how language and society intersect.

**LING 2321. CONSTRUCTED LANGUAGES. 3 Hours.**

This course is an introduction to constructed languages. Presentation, examination, and analysis of constructed languages, such as Esperanto, Klingon, Dothraki, and many others.

**LING 2351. LANGUAGE AND TECHNOLOGY. 3 Hours.**

Fundamentals of how technology is used to represent, process, and organize human language. We will examine modern technologies such as autocorrect, speech synthesis, speech recognition, machine translation, and chatbots. Students will be able to describe fundamentals of how these technologies work, with a focus on the aspects of human language that present challenges for their development. We will also examine social and ethical considerations surrounding language technology, such as privacy, machine intelligence, and bias.



**LING 2371. LANGUAGE IN A MULTICULTURAL USA. 3 Hours.**

The relationship between language in the U.S. and social power. This course explores how negative attitudes toward some language varieties and languages spoken in the U.S. arise from social factors, rather than features of the languages themselves. In addition to studying language varieties, the course shows how American institutions such as the educational system and the media reinforce these negative attitudes and contribute to discrimination. Offered as AAST 2371 and LING 2371; credit will be granted in only one department.

**LING 2391. CONFERENCE COURSE IN LINGUISTICS. 3 Hours.**

Independent study in Linguistics and TESOL. Consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: Permission of the instructor.

**LING 3301. TOPICS IN LINGUISTICS. 3 Hours.**

Covers issues related to language and linguistics. Topics may include language and film/literature/pop culture, endangered languages, speech synthesis, applied linguistics, or other topics determined by instructor. May be repeated for credit when content changes. No prerequisites.

**LING 3309. LINGUISTICS FOR LANGUAGE TEACHERS. 3 Hours.**

An examination and analysis of the linguistic structures of English, with a focus on how this knowledge can inform language teaching.

**LING 3311. PRINCIPLES OF LINGUISTIC ANALYSIS. 3 Hours.**

This course prepares students for the systematic study of human language. Drawing on data from a range of languages, it will examine the sound patterns of language (phonetics and phonology), words and word formation (morphology), sentence structure (syntax), meaning (semantics), and language in context (pragmatics). Emphasis will be placed on methods of linguistic analysis to solve problems in phonology, morphology, syntax, and semantics. Additional topics may include language acquisition; linguistic variation; and/or historical/comparative linguistics.

**LING 3330. PHONETICS AND PHONOLOGY. 3 Hours.**

Introduction to the scientific study of speech sounds and sound patterns in the world's languages. We will explore how human speech sounds are produced, how to describe speech sounds, and the patterns in how sounds combine to make words in different languages. Prerequisite: LING 3311 with a grade of C or better.

**LING 3340. SYNTAX I. 3 Hours.**

An examination of syntactic investigation, developed primarily through the study of central aspects of English syntax. A major purpose is to introduce students to the study of language as an empirical science. Prerequisite: LING 3311 with a grade of C or better.

**LING 3345. CRITICAL REASONING IN LINGUISTICS. 3 Hours.**

A survey of formal logical approaches used to describe and explain natural language phenomena. Topics include the fundamentals of logical representation and argumentation, the effective use of inductive and deductive reasoning, and the construction of more complex linguistic arguments. Prerequisites: LING 3311 and either PHIL 1301 or PHIL 3321.

**LING 3350. LEXICAL SEMANTICS. 3 Hours.**

Examines meaning at the lexical level. Topics may include ways of describing meaning (sense and reference, componential analysis and prototype theory), organizing meaning (the mental lexicon, connotation and euphemism, linguistic relativity), and applying these concepts to analyzing word classes. Prerequisite: LING 3311 with a grade of C or better.

**LING 3360. LANGUAGE ACQUISITION. 3 Hours.**

An examination of the principles and patterns that underlie the acquisition of language, with a focus on child language acquisition. Prerequisite: LING 3311 or LING 3309, with a grade of C or better.

**LING 3366. TOPICS IN RACE/ETHNICITY AND LANGUAGE IN THE U.S.. 3 Hours.**

Either an intensive focus within one racial/ethnic group or a comparison between two or more groups. Focus may include language in the U.S. as it pertains to one (or more) of these communities: African Americans, Mexican Americans and Latinos/as, Native Americans, and/or Asian Americans. May be repeated for credit as course content changes.

**LING 3370. PSYCHOLOGY OF LANGUAGE. 3 Hours.**

An examination of psycholinguistics, or the cognitive processes involved in the acquisition, comprehension, and production of language. The class will focus mainly on language perception and production by native speakers, but will also address issues related to bilingual/second language processing. Prerequisite: LING 3311 with a grade of C or better, or instructor approval.

**LING 3391. CONFERENCE COURSE IN LINGUISTICS. 3 Hours.**

Independent study in Linguistics and TESOL. Consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: Permission of the instructor.

**LING 4301. PHONOLOGICAL THEORY I. 3 Hours.**

Investigation of the sound systems of language with a focus on building analytical skills. Students will conduct hands-on phonological analysis with real language data and develop familiarity with common phonological patterns in the world's languages. Prerequisite: LING 3330 with a grade of C or better.

**LING 4303. SYNTAX II. 3 Hours.**

Continuation of LING 3340, which explores further aspects of English syntax; universal and language-particular constraints on syntactic structure and rules. Further development and extensions of the generative approach to syntactic investigation. Prerequisite: LING 3340 with a grade of C or better.

**LING 4317. SOCIOLINGUISTICS. 3 Hours.**

Language in its social context, including linguistic variation, address and reference, speech levels, bilingualism, code switching, speech acts, conversation analysis, and language and gender. Prerequisite: LING 3311.

**LING 4318. LANGUAGE AND GENDER. 3 Hours.**

The role of language in the expression and creation of gender identities. Gender differences in language structure and use, women's and men's language in other cultures, the acquisition of gendered ways of speaking, and sexism in language. Offered as LING 4318 and GWSS 4318; credit will be granted only once. Prerequisite: LING 3311.

**LING 4320. HISTORICAL AND COMPARATIVE LINGUISTICS. 3 Hours.**

(Also taught as LING 5314). Language development and change; the comparative method and its use in linguistic reconstruction; laws of language change. Prerequisite: LING 3311.

**LING 4325. SLA THEORIES AND THE TEACHING OF LANGUAGE. 3 Hours.**

An examination of a variety of theories in Second Language Acquisition, with a focus on how this knowledge informs classroom practice for teachers of ESL and other languages. Prerequisite: LING 3309 or LING 3311.

**LING 4326. BILINGUALISM. 3 Hours.**

An examination of issues related to bilinguals and bilingualism. The areas that will be covered include different types of bilinguals/bilingualism, bilingual education, the cognitive benefits or disadvantages of being a bilingual, and language processing in bilinguals. Prerequisite: LING 3311 with a grade of C or better.

**LING 4327. SECOND LANGUAGE ACQUISITION. 3 Hours.**

This course focuses on second language acquisition. Topics include the similarities and differences between first and second language acquisition, perception and production in native and non-native languages, and the implications of second language acquisition and processing research for theoretical linguistics and language teaching. Prerequisite: LING 2301, LING 2371, LING 3309, or LING 3311.

**LING 4328. PSYCHOLINGUISTICS. 3 Hours.**

This course will focus on the cognitive processes involved in the comprehension and production of language. The class will involve opportunities for hands-on experience using psycholinguistics research methods. Prerequisite: LING 3370 or LING 3311 with a grade of C or better, or instructor approval.

**LING 4330. CORPUS LINGUISTICS. 3 Hours.**

Applications of the ways computer science and linguistics inform each other. Corpus linguistics focuses on how computers can be used to both obtain the data that we examine and to provide the tools we use for analysis. Introduces practical experience with concordancing and OCR software, using regular expressions, and sources of online corpora. Prerequisite: LING 3311.

**LING 4334. MORPHOLOGY. 3 Hours.**

A theoretical and typological investigation into the nature of word-structure and word-formation processes in human languages. Prerequisite: LING 4301 or LING 4303.

**LING 4335. LANGUAGE UNIVERSALS & LINGUISTIC TYPOLOGY. 3 Hours.**

Consideration of universals in human language, their explanation and description, and language types. Prerequisite: LING 4301.

**LING 4345. FORMAL SEMANTICS. 3 Hours.**

Examination of empirical facts, fundamental goals, and current techniques of formal semantic theory with a goal toward independent research. Topics include basic tools of current semantic theory and various core topics concerning meaning in English and other languages. Prerequisite: LING 3311 with a grade of C or higher.

**LING 4347. PRAGMATICS. 3 Hours.**

Analysis of how context and form interact with meaning. Topics may include deixis, reference, speech acts, presupposition, implicature, information structure and intonation.

**LING 4353. TEACHING ENGLISH AS A SECOND OR FOREIGN LANGUAGE. 3 Hours.**

Presentation and critique of methodologies of teaching English to speakers of other languages, with emphasis on teaching techniques of aural comprehension; speaking, reading, and writing skills; testing, language laboratory, and linguistic-cultural differences.

**LING 4354. METHODS AND MATERIALS TO TEACH ENGLISH AS A SECOND OR FOREIGN LANGUAGE. 3 Hours.**

Systematic study of how to teach English to second/foreign language learners. Topics covered include the teaching of grammar, vocabulary, reading, writing, pronunciation, speaking, and listening. Prerequisite: LING 2301 or LING 2371; LING 4353.

**LING 4360. NON-WESTERN LINGUISTIC STRUCTURES. 3 Hours.**

Study of a selected non-Western language, language family or language area based on descriptive linguistic analysis. May be repeated once for credit as the topic varies. Prerequisite: LING 3330 and LING 3340.

**LING 4362. LANGUAGE DOCUMENTATION. 3 Hours.**

The course discusses fundamental issues that are part of language documenting and description. These include project design, research ethics and intellectual property, researcher and community rights and responsibilities, world language ecology, technology and software, archiving issues, grant-writing fundamentals, and related issues that form best practices for language documentation projects. (Also offered as LING 5362. Credit will be granted only once for LING 4362 or LING 5362.) Prerequisite: LING 3311.

**LING 4363. LANGUAGE ENDANGERMENT AND REVITALIZATION. 3 Hours.**

This course examines language endangerment and what it means for a language to become endangered, and studies language revitalization. Case studies are presented where communities seek to maintain the number of speakers or revive the language. (Also offered as LING 5363. Credit will be granted only once for LING 4363 or LING 5363.) Prerequisite: LING 3311.

**LING 4370. HISTORY OF LINGUISTICS. 3 Hours.**

Surveys the recent history of the field of linguistics and familiarizes students with the key figures and theories in recent linguistic history, with special attention to the development and emergence of generative theories of syntax, semantics, and phonology. Prerequisite: LING 3330 and LING 3340 and either LING 4301 or LING 4303.

**LING 4389. TOPICS IN LINGUISTICS. 3 Hours.**

Current topics in linguistics research. May be repeated if topic changes. Prerequisite: Either LING 3330, LING 3340, or LING 4317, and permission of undergraduate advisor.

**LING 4391. CONFERENCE COURSE IN LINGUISTICS. 3 Hours.**

Independent study in the preparation of a paper on a research topic; consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: Either LING 3311, LING 3330, or LING 3340, and permission of undergraduate advisor.

**LING 4393. INTERNSHIP IN LINGUISTICS. 3 Hours.**

Internship (paid or unpaid) in Linguistics, supervised by a faculty internship coordinator, with the student performing duties related to the academic curriculum of Linguistics. Students are required to perform and report on designated career-related duties in a professional environment and submit assignments related to the work performed. May be repeated with the approval of the Undergraduate Advisor. May be repeated for credit once, as internship experience changes. Prerequisite: LING 3311 and permission of the instructor.

**LING 4394. LING 4394 HONORS THESIS/SENIOR PROJECT. 3 Hours.**

Required of all students in the University Honors College. During the senior year, the student must complete a thesis or project of equivalent difficulty under the direction of a faculty member in the major department. Approval of instructor required.

**LING 4395. INTERNSHIP IN TESOL. 3 Hours.**

Internship (paid or unpaid) in TESOL, supervised by a faculty internship coordinator, with the student performing duties related to the academic curriculum of TESOL and/or the application of this knowledge. Students are required to perform significant teaching-related duties in an ESL/EFL environment and submit assignments related to the work performed. May be repeated with the approval of the Undergraduate Advisor, as internship experience changes. Prerequisite: LING 4353 and LING 4354 (may be concurrently enrolled in 4354).

**LING 5100. THESIS WRITING SEMINAR. 1 Hour.**

Techniques for researching and writing a thesis/dissertation in linguistics. Required of all students who have elected the Thesis or Thesis Substitute degree option in Linguistics. Prerequisite: completion of at least 9 hours of LING courses.

**LING 5110. TESOL PRACTICUM. 1 Hour.**

In this class, students will apply the principles presented in the TESOL Certificate coursework through observing and teaching ESOL classes. Prerequisite: Permission of adviser.

**LING 5190. CONFERENCE COURSE IN LINGUISTICS. 1 Hour.**

Graded P/F. Prerequisite: Permission of instructor.

**LING 5300. LINGUISTIC ANALYSIS. 3 Hours.**

This course introduces students to the field of linguistics, the systematic study of human language. Drawing on data from a range of languages, it will examine the sound patterns of language (phonetics and phonology), words and word formation (morphology), sentence structure (syntax), meaning (semantics), and language in context (pragmatics). Emphasis will be placed on methods of linguistic analysis to solve problems in phonology, morphology, syntax, and semantics. May be repeated for credit as the focus of the course or instructor changes. May not be used to fulfill Ph.D. degree requirements in linguistics.

**LING 5301. INTRO TO COMMUNICATIVE LANGUAGE TEACHING. 3 Hours.**

Presentation and critique of methodologies of teaching English to speakers of other languages, with emphasis on techniques of teaching aural comprehension; speaking, reading, and writing skills; attention to testing, language laboratory, and linguistic-cultural differences. Course includes a practical teaching requirement.

**LING 5302. METHODS IN TEACHING READING AND WRITING. 3 Hours.**

This course is an in-depth study of how to design ESL/EFL reading and writing classes and how to create instruction and assessment materials for these classes based on sound pedagogical principles.

**LING 5303. ERROR ANALYSIS IN THE TEACHING OF ENGLISH AS A SECOND OR FOREIGN LANGUAGE. 3 Hours.**

A study of error analysis as a means to diagnose particular patterns in language production of ESL/EFL students. Emphasis on current research and application to specific problems and contexts. Prerequisite: LING 5300 or LING 5309.

**LING 5304. PEDAGOGICAL GRAMMAR OF ENGLISH. 3 Hours.**

This course is a study of English sentence structure. Topics include article use, phrase structure, verb tense, agreement, pronouns, question forms, and embedded clauses. The course will focus on the second-language acquisition and processing of these structures as well as on ways that they can be addressed during ES/FL grammar instruction. Prerequisite: LING 5300 or LING 5309; LING 5301 or LING 5302.

**LING 5305. SECOND LANGUAGE ACQUISITION. 3 Hours.**

This course is the study of the processes of first and second language acquisition, their similarities and differences, language disorders, language perception and production, and implications of language acquisition research for linguistic theory and language teaching. May be repeated for credit as topic changes. Prerequisite: LING 5300 or permission of instructor.

**LING 5306. TESOL CURRICULUM DESIGN. 3 Hours.**

Systematic presentation of elements in development, management and evaluation of TESOL programs. Attention to needs analysis, syllabus design, materials selection and adaptation, teaching and evaluation in language curriculum design. Prerequisite: LING 5301.

**LING 5307. PEDAGOGICAL PHONOLOGY OF ENGLISH. 3 Hours.**

A study of the sound system of English. Topics include segmental phonemes, stress, length, intonation and variation at the lexical and utterance levels. Application to teaching English as a second or foreign language. Problems of description; means of application; adaptation to current pedagogical methods. Prerequisite: LING 5300; LING 5301 or LING 5302.

**LING 5308. LANGUAGE ASSESSMENT. 3 Hours.**

This is an introductory testing course. Topics will include different types of language assessment, issues related to language testing, measurement and evaluation of achievement and proficiency in a second language, and developing language tests of various language skills. Prerequisite: LING 5301, LING 5302, or permission of the instructor.

**LING 5309. LINGUISTICS FOR LANGUAGE PROFESSIONALS. 3 Hours.**

This course is an introduction to Applied Linguistics. It includes examination and analysis of the linguistic structures of English, with a focus on how this knowledge can inform language teaching.

**LING 5310. SOCIOLINGUISTICS. 3 Hours.**

The study of language and social context (made up of society and individuals). Content includes language as a social phenomenon, theoretical perspectives on relationship between language, society and individuals, basic concepts in sociolinguistics; and may include topics in macro- and micro-sociolinguistics such as multilingualism, language planning and standardization, linguistic variation, code switching, conversational analysis, and language and gender. May be repeated for credit as the topic changes.

**LING 5311. SOCIOLINGUISTICS OF SOCIETY. 3 Hours.**

The study of macro-sociolinguistics, including topics such as multilingualism, language standardization and planning, literacy, language dominance, maintenance and death, language and identity, diglossia, and pidgins and creoles. May be repeated for credit as the topic changes. Prerequisite: LING 5310.

**LING 5312. LANGUAGE AND GENDER. 3 Hours.**

The role of language in the expression and creation of gender identities. Gender differences in language structure and use, men's and women's languages in other cultures, the acquisition of gendered ways of speaking, and sexism in language. May be repeated for credit as the topic changes. Prerequisite: LING 5310.

**LING 5313. TOPICS IN SOCIOLINGUISTICS. 3 Hours.**

Selected topics relating the scientific methodologies of linguistics to larger concerns of society and culture including cognition, motivation, description and analysis. May be repeated for credit when topic changes. Prerequisite: LING 5310.

**LING 5314. HISTORICAL AND COMPARATIVE LINGUISTICS. 3 Hours.**

The study of language development and change; comparative method and its use in linguistic reconstruction; laws of language change. May be repeated for credit as the topic changes. Prerequisite: LING 3330 or permission of instructor.

**LING 5315. READINGS AND RESEARCH IN PEDAGOGY AND PRACTICE. 3 Hours.**

This course focuses on selected readings for classroom practitioners, with a focus on work that connects current theory with classroom practice. Prerequisite: LING 5301 or LING 5302.

**LING 5316. TEACHING WITH TECHNOLOGY. 3 Hours.**

This course focuses on the integration of effective technology tools in linguistics and TESOL-focused courses and topics. Course topics will cover effectively and meaningfully incorporating a wide variety of digital platforms, communication channels, and tools to curate and create quality digital content and develop technology-focused lesson plans. Students will learn to use robust theoretical frameworks such as Open Educational Resources, open pedagogy, Community of Inquiry, networked and connected learning, and constructivist pedagogies to foster authentic student engagement and active learning with technology and course content. After the course, students will have created several concrete artifacts to add to their teaching dossier for future teaching, potentially adding to being more marketable in a dynamically changing world. Emerging tools such as virtual reality, augmented reality, automation, data analytics, and mobile learning will be also be explored.

**LING 5318. APPLIED PSYCHOLINGUISTICS. 3 Hours.**

This course examines the psychological processes involved in language development and language use in native and non-native speakers, as well as in those who have language disorders. It also covers how psycholinguistic tasks can be used for language teaching and assessment. Students will learn current theories and research methods related to this area through in-depth discussion of primary literature and by developing research projects based on this literature. Prerequisite: LING 5300 or LING 5309, or equivalent, or approval from the instructor.

**LING 5319. PHONETICS AND PHONOLOGY. 3 Hours.**

Human speech sounds from both physiological and cognitive perspectives; the range of speech sounds in language and the patterning of such sounds within particular language systems. This course does not fulfill core PHD requirements for phonology.

**LING 5320. PHONOLOGICAL THEORY. 3 Hours.**

Ling 5320 is a foundations course for the study of the principles that govern sound systems in human languages. Students will work with sound patterns from a variety of languages in order to understand the fundamental aspects of phonological phenomena, and course assignments will require application of the descriptive and theoretical tools in working with sound pattern data. Lectures will further develop this description, analysis, and argumentation for phonological data. May be repeated for credit as the topic changes. Prerequisite: Permission of Advisor.

**LING 5321. ADVANCED PHONOLOGICAL THEORY. 3 Hours.**

A continuation of LING 5320. Topics include autosegmental analysis, lexical phonology, metrical phonology and phonological feature geometry. May be repeated for credit when topic changes. Prerequisite: LING 5320.

**LING 5322. LABORATORY PHONOLOGY. 3 Hours.**

An investigation into the physical properties of human speech. Students will gain hands-on experience with computer-assisted speech analysis. No prior computer experience is assumed. Prerequisite: LING 5320.

**LING 5325. SLA AND CLASSROOM PRACTICE. 3 Hours.**

An examination of a variety of theories in Second Language Acquisition, with a focus on how this knowledge informs classroom practice for teachers of ESL and other languages.

**LING 5326. BILINGUALISM. 3 Hours.**

This course introduces students to issues related to bilinguals and bilingualism. The areas that will be covered include different types of bilinguals/ bilingualism, bilingual education, the cognitive benefits (or disadvantages) of being a bilingual, and language processing in bilinguals. May be repeated for credit as the topic changes. Prerequisite: LING 5300.

**LING 5328. PSYCHOLINGUISTICS: SENTENCE PROCESSING. 3 Hours.**

This course examines the cognitive processes involved in sentence comprehension. Students will learn current theories and research methods related to this area of psycholinguistics through in-depth discussion of the primary literature and by developing research projects based on this literature. May be repeated for credit as the specific topics dealt with in the course change. Prerequisite: LING 5300.

**LING 5329. SYNTAX. 3 Hours.**

An examination of syntactic investigation, developed primarily through the study of central aspects of English syntax. A major purpose is to introduce students to the study of language as an empirical science. This course does not fulfill core PHD requirements for syntax.

**LING 5330. FORMAL SYNTAX. 3 Hours.**

Introduction to syntactic theory. Major topics include phrase structure, subcategorization, lexical entries, and passive and infinitival constructions. May be repeated for credit as the topic changes. Prerequisite: Permission of advisor.

**LING 5331. ADVANCED FORMAL SYNTAX. 3 Hours.**

Continuation of Ling 5330. Topics may include the syntax of unbounded dependencies, constraints on extraction, unbounded versus successive cyclic movement, and the licensing of gaps. May be repeated for credit as the topics change. Prerequisite: LING 5330.

**LING 5334. MORPHOLOGY. 3 Hours.**

A theoretical and typological investigation into the nature of word-structure and word-formation processes in human languages. May be repeated for credit as the topics of focus change. Prerequisite: LING 5320 or LING 5330.

**LING 5335. LANGUAGE UNIVERSALS AND LINGUISTIC TYPOLOGY. 3 Hours.**

Consideration of universals in human language, their explanation and description, and language types. May be repeated for credit as the topics of focus change. Prerequisite: LING 5330.

**LING 5338. PSYCHOLINGUISTICS: VISUAL WORD RECOGNITION. 3 Hours.**

This course examines the cognitive processes involved in visual word recognition. Students will learn current theories and research methods related to this area of psycholinguistics through in-depth discussion of the primary literature and by developing research projects based on this literature. May be repeated for credit as the specific topics dealt with in the course change. Prerequisite: LING 5300.

**LING 5345. SEMANTICS. 3 Hours.**

Graduate-level introduction to formal semantics, designed to prepare students for research with basic tools in Model-theoretic semantics and compositionality, including core topics such as negation, quantification, mood and modality, noun phrases, indefinites, definiteness, tense, aspect, and events, from a semantic and cross-linguistic perspective. May be repeated for credit as the topics of focus change. Prerequisite: LING 3340 or permission of instructor.

**LING 5346. TOPICS IN APPLIED LINGUISTICS. 3 Hours.**

This is a special topics course in Applied Linguistics. Topics may change semester-by-semester, based on instructor and other factors; may be repeated for credit as the topics of focus change.

**LING 5347. PRAGMATICS. 3 Hours.**

Analysis of how context and form interact with meaning. Topics may include deixis, reference, speech acts, presupposition, implicature, information structure and intonation. May be repeated for credit as the topics of focus change.

**LING 5350. TEXT ANALYSIS. 3 Hours.**

Methods of charting and analyzing texts to reveal the systematic contributions of pragmatic choices to their organization and meaning. May be repeated for credit as the topics of focus change. Prerequisite: LING 3340.

**LING 5353. TEACHING ENGLISH AS A SECOND OR FOREIGN LANGUAGE. 3 Hours.**

Presentation and critique of methodologies of teaching English to speakers of other languages, with emphasis on techniques related to Communicative Language Teaching.

**LING 5354. METHODS AND MATERIALS TO TEACH ENGLISH AS A SECOND OR FOREIGN LANGUAGE. 3 Hours.**

Systematic study of how to teach English to second/foreign language learners. Topics covered include the teaching of grammar, vocabulary, reading, writing, pronunciation, speaking, and listening.



**LING 5360. NON-WESTERN LINGUISTIC STRUCTURES. 3 Hours.**

Study of a selected non-Western language, language family or language area based on descriptive linguistic analysis. May be repeated for credit as the topic varies. Prerequisite: LING 3330 and LING 3340.

**LING 5361. READINGS IN NON-WESTERN LINGUISTIC STRUCTURES. 3 Hours.**

Readings in the linguistic structures of non-Western languages. Enrollment in the course is not sufficient to fulfill the non-Western language requirement. May be repeated for credit as the readings and topics of focus change.

**LING 5362. LANGUAGE DOCUMENTATION. 3 Hours.**

The course discusses fundamental issues that are part of language documenting and description. These include project design, research ethics and intellectual property, researcher and community rights and responsibilities, world language ecology, technology and software, archiving issues, grant-writing fundamentals, and related issues that form best practices for language documentation projects. May be repeated for credit as the topics of focus change. Prerequisite: LING 5300.

**LING 5363. LANGUAGE ENDANGERMENT AND REVITALIZATION. 3 Hours.**

This course examines language endangerment and what it means for a language to become endangered, and studies language revitalization. Case studies are presented where communities seek to maintain the number of speakers or revive the language. May be repeated for credit as the topics of focus change. Prerequisite: LING 5300.

**LING 5370. HISTORY OF LINGUISTICS. 3 Hours.**

Surveys the recent history of the field of linguistics and familiarizes students with the key figures and theories in recent linguistic history, with special attention to the development and emergence of key generative theories such as those of syntax, semantics, and phonology. May be repeated for credit as the topics of focus change. Prerequisite: LING 5320 or LING 5330.

**LING 5371. SURVEY OF THEORIES IN APPLIED LINGUISTICS. 3 Hours.**

A comparison and contrast of various linguistic theories, with consideration of their implications for application to real-world problems involving language. May be repeated for credit as the topics of focus change. Prerequisite: LING 5305.

**LING 5372. READINGS IN LINGUISTICS. 3 Hours.**

Readings in linguistics, tailored to student's areas of interest and instructor's expertise. May be repeated for credit when topic changes. Prerequisite: LING 5330.

**LING 5380. FIELD METHODS. 3 Hours.**

The principles, techniques and practical aspects of linguistic field research. The course includes extensive practice in eliciting data (phonological, morpho-syntactic, textual and lexical) directly from a native speaker, as well as in managing, analyzing and describing the data obtained. Course may be repeated for credit when topic changes. Prerequisite: LING 5300. Permission of the Graduate Advisor.

**LING 5381. CORPUS LINGUISTICS. 3 Hours.**

Applications of ways in which computer science and linguistics inform each other. Corpus linguistics focuses on how computers can be used to both obtain the data that we examine and to provide the tools we use for analysis. Includes readings, practical experience with several different software programs, and using sources of online corpora. May be repeated for credit as the topics of focus change.

**LING 5391. CONFERENCE COURSE IN LINGUISTICS. 3 Hours.****LING 5392. THESIS SUBSTITUTE. 3 Hours.****LING 5393. TESOL TEACHING AND OBSERVATION. 3 Hours.**

In this course, students will work regularly and consistently with an organization where English is taught. Students will observe, teach, guide, and participate in activities in order to demonstrate ability to apply the principles of Communicative Language Teaching in an English Language Learning environment. Prerequisite: Permission of the graduate advisor.

**LING 5395. GRADUATE INTERNSHIP. 3 Hours.**

Employment (paid or unpaid) supervised by a faculty internship coordinator, with the student performing duties related to the academic curriculum of linguistics and/or TESOL. Students are required to submit an approved academic project related to the work performed. May be repeated with approval of Graduate Advisor.

**LING 5398. THESIS. 3 Hours.****LING 5691. CONFERENCE COURSE IN LINGUISTICS. 6 Hours.**

Independent study in the preparation of a paper on a research topic; consultation with instructor on a regular basis. May be repeated for credit.

**LING 5698. THESIS. 6 Hours.****LING 5998. THESIS. 9 Hours.****LING 6100. LINGUISTICS GRADUATE PROGRAM SUCCESS. 1 Hour.**

This course introduces PhD students in Linguistics to the expectations of graduate school, including being a good TA, recognizing the importance of research and revision, and general academic success skills to aid the transition into a graduate program.

**LING 6191. RESEARCH IN LINGUISTICS. 1 Hour.**

Prerequisite: permission of instructor.

**LING 6199. DISSERTATION. 1 Hour.****LING 6291. RESEARCH IN LINGUISTICS. 2 Hours.**

Prerequisite: permission of instructor.

**LING 6300. PROFESSIONAL WRITING SEMINAR. 3 Hours.**

Workshop in producing the writing genres expected of professional academic linguists. May be repeated for credit as the topics of focus change.

Prerequisite: Completion of at least 9 hours of graduate LING courses.

**LING 6360. DISCOURSE THEORY SEMINAR. 3 Hours.**

Seminar on the theory of discourse in linguistics. May be repeated for credit as the instructor and topics of focus change. Prerequisite: permission of instructor.

**LING 6380. FIELD METHODS SEMINAR. 3 Hours.**

Second part of field methods sequence. May be repeated for credit as the student's topic of focus changes. Prerequisite: LING 5380.

**LING 6381. STATISTICS FOR LINGUISTS. 3 Hours.**

In this course, students learn the fundamentals of quantitative research in linguistics and language-related fields. Students learn how to develop viable research hypotheses, how to collect and manage the data necessary to evaluate these hypotheses, and how to analyze data using standard statistical tests. May be repeated for credit as the topics of focus change.

**LING 6390. LINGUISTICS SEMINAR. 3 Hours.**

Seminar in linguistics. Course may be repeated for credit when topic or instructor changes. Prerequisite: permission of instructor.

**LING 6391. RESEARCH IN LINGUISTICS. 3 Hours.**

Designed for doctoral students pursuing dissertation proposal research under the direction of a faculty supervisor. Prerequisite: Permission of instructor.

**LING 6392. SEMINAR IN PHONETICS AND PHONOLOGY. 3 Hours.**

In-depth investigation of research into a specialized area of phonetics and/or phonology. Course registrants will develop original research focusing on topic at-hand, with results exchanged through discussion, presentations/reports, and/or papers. Prerequisites: LING 5321 or permission of the instructor.

**LING 6393. SEMINAR IN SYNTAX. 3 Hours.**

In-depth investigation of research into a specialized area of syntax. Course registrants will develop original research focusing on topic at-hand, with results exchanged through discussion, presentations/reports, and/or papers. Prerequisites: LING 5331 or permission of instructor.

**LING 6394. SEMINAR IN SEMANTICS AND PRAGMATICS. 3 Hours.**

In-depth investigation of research into a specialized area of meaning: semantics and/or pragmatics. Course registrants will develop original research focusing on topic at-hand, with results exchanged through discussion, presentations/reports, and/or papers. Prerequisites: LING 5345 or LING 5347 or permission of instructor.

**LING 6395. SEMINAR IN SECOND LANGUAGE ACQUISITION. 3 Hours.**

In-depth investigation of research into a specialized area of second language acquisition. Course registrants will develop original research focusing on topic at-hand, with results exchanged through discussion, presentations/reports, and/or papers. Prerequisites: LING 5305 or permission of the instructor.

**LING 6399. DISSERTATION. 3 Hours.****LING 6491. RESEARCH IN LINGUISTICS. 4 Hours.**

Prerequisite: permission of instructor.

**LING 6591. RESEARCH IN LINGUISTICS. 5 Hours.****LING 6691. RESEARCH IN LINGUISTICS. 6 Hours.**

Designed for doctoral students pursuing dissertation proposal research under the direction of a faculty supervisor. Prerequisite: Permission of instructor.

**LING 6699. DISSERTATION. 6 Hours.****LING 6991. RESEARCH IN LINGUISTICS. 9 Hours.**

Designed for doctoral students pursuing dissertation proposal research under the direction of a faculty supervisor. Prerequisite: Permission of instructor.

**LING 6999. DISSERTATION. 9 Hours.****LING 7399. DOCTORAL DEGREE COMPLETION. 3 Hours.**

This course may be taken during the semester in which a student expects to complete all requirements for the doctoral degree and graduate. Enrolling in this course meets minimum enrollment requirements for graduation, for holding fellowships awarded by The Office of Graduate Studies and for full-time GTA or GRA positions. Students should verify that enrollment in this course meets other applicable enrollment requirements. To remain eligible in their final semester of study for grants, loans or other forms of financial aid administered by the Financial Aid Office must enroll in a minimum of 5 hours as required by the Office of Financial Aid. Other funding sources may also require more than 3-hours of enrollment. Additional hours may also be required to meet to requirements set by immigration law or by the policies of the student's degree program. Students should contact the Financial Aid Office, other sources of funding, Office of International Education and/or their graduate advisor to verify enrollment requirements before registering for this course. This course may only be taken twice. Students who do not complete all graduation requirements while enrolled in this course must enroll in a minimum of 6 dissertation hours (6699 or 6999) in their graduation term. Graded P/F/R.

## COURSES

### **LIST 4326. SECONDARY READING. 3 Hours.**

This course focuses on the scope of reading instruction in the secondary schools and the processes and skills for reading. Students explore programs, trends, and issues related to secondary reading instruction along with comprehension and word study instruction, the integration of reading with writing and oral communication, selection of print materials competency, and an examination of visual literacy and the media.

### **LIST 4343. CONTENT AREA READING AND WRITING. 3 Hours.**

Explores methods of teaching reading, writing, and study skills across the curriculum. Emphasis on text structure and the differences between narrative and expository text, graphic organizers, and the reading/writing process as applied to informational text. Classroom adaptations for culturally and linguistically diverse populations in the content areas are also addressed.

### **LIST 4373. LITERACY LEARNING FOR EC-6 STUDENTS: READING AND WRITING. 3 Hours.**

Comprehensive literacy approach to teaching with an emphasis on guided reading and writing. Theoretical models, principles of teaching reading and writing using a variety of instructional strategies, the role of foundational literacy learning, effective program organization, assessment, and classroom management.

### **LIST 4374. LITERACY LEARNING FOR EC-6 STUDENTS: LITERATURE AND LANGUAGE. 3 Hours.**

Comprehensive approach to literacy instruction. Emphasis on using genres of children's literature to promote language and literacy development. Instructional models and techniques for using children's literature across the curriculum. Use of appropriate media and non-print materials, selection and evaluation of literature, and strategies for stimulating and expanding children's response to literature.

### **LIST 4376. ASSESSMENT IN LITERACY LEARNING. 3 Hours.**

Examines a variety of formal and informal literacy assessment tools and techniques. Also focuses on diagnostic procedures for identifying literacy learning strengths and needs. Students will apply reading and writing assessment and instructional strategies with children.

### **LIST 4378. TEACHING READING, WRITING, AND LITERATURE IN THE MIDDLE LEVEL GRADES. 3 Hours.**

Theory and practice in the teaching of literacy for the middle level grades, including various instructional approaches to reading, writing, listening, and speaking; motivating student readers and writers; vocabulary; comprehension, strategies for various writing modes, purposes, and audiences; and the basic components of assessment. This course includes a field experience component, which requires students to work with middle grade students during normal school hours.

### **LIST 4390. SELECTED TOPICS IN LITERACY. 3 Hours.**

An examination of different topics related to literacy. This seminar may be repeated for credit as the topic changes.

### **LIST 4391. CONFERENCE COURSE. 3 Hours.**

Independent study in the preparation of a project in a paper on a research topic; consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: Consent of instructor.

### **LIST 5315. LITERACY THEORY TO PRACTICE. 3 Hours.**

Designed as an introduction to comprehensive literacy education. Provides students the opportunity to explore theory, research, and knowledge in the field of literacy, including teaching diverse learners and students for whom English is an additional language.

### **LIST 5316. LITERACY THEORY TO PRACTICE - PRACTICUM I. 3 Hours.**

Designed as an introduction to comprehensive literacy education. Provides students the opportunity to explore the theory, research, and knowledge in the field of literacy, including teaching diverse learners and students for whom English is an additional language, with application through field experiences in schools and classrooms.

### **LIST 5317. LITERACY LEADERSHIP AND COACHING: PRACTICUM III. 3 Hours.**

This practicum is the capstone experience for students in the M.Ed. with Literacy Studies Emphasis. The course provides an opportunity to synthesize the theory and research related to literacy that has been presented in the program, to explore literacy program development and the implementation of technology in literacy programs, and to participate in professional leadership.

### **LIST 5325. UNDERSTANDING LITERACY RESEARCH. 3 Hours.**

Designed as an introduction and exploration of literacy research. Provides the opportunity to read broadly in the area of literacy research to become aware of current trends and methodologies. Emphasizes the tools for critically consuming literacy research and utilizing existing research in personal examinations of literacy topics and questions.

### **LIST 5326. PRE-ADOLESCENT & ADOLESCENT LITERACY. 3 Hours.**

Focuses on literacy theory, research, and practice as it relates to pre-adolescents and adolescents. Addresses sociocultural, cognitive, linguistic, psychological, and developmental influences on literacy. Explores the development of curricular designs for teaching reading/language arts in middle and secondary schools including reading, writing, oral communication, literature, and digital literacy.

### **LIST 5345. CONTENT AREA READING AND WRITING. 3 Hours.**

Explores methods of teaching reading, writing, and study skills across the curriculum. Emphasis on text structure and the difference between narrative and expository text, graphic organizers, and the reading/writing process as applied to informational text. Classroom adaptations for culturally and linguistically diverse populations in the content areas also will be addressed.

### **LIST 5346. TEACHING THE WRITING PROCESS. 3 Hours.**

Current research and theory on the writing process, how children develop as writers, the teacher's role, the learning environment, and motivation, assessment, and evaluation in writing. Current approaches to digital writing and multimodal writing will be explored.

**LIST 5350. LITERACY ASSESSMENT. 3 Hours.**

Formal and informal assessment of student literacy learning, and diagnosis of student literacy learning strengths and needs.

**LIST 5353. LITERATURE FOR CHILDREN AND YOUNG ADULTS. 3 Hours.**

Selection, evaluation, and use of current literature published for children and young adults.

**LIST 5354. MULTICULTURAL LITERATURE FOR CHILDREN AND YOUNG ADULTS. 3 Hours.**

Study of literature for children and young adults which reflects the experiences representing cultural, ethnic, geographic, linguistic, gender, ability, and other dimensions of diversity. Consideration of selection guidelines, evaluation of literary quality as well as cultural authenticity and teaching applications, including adaptations for culturally and linguistically diverse populations.

**LIST 5361. EDUCATIONAL PERSPECTIVES IN LANGUAGE AND LITERACY LEARNING-PRACTICUM II. 3 Hours.**

This practicum-based course bridges theory to practice, addressing how to support student diversity through culturally relevant and equitable teaching frameworks. The course will introduce strategies to support multilingual students and students experiencing reading difficulties. Provides opportunities to apply effective, equity-based instructional practices to classroom practice.

**LIST 5362. LITERACY INSTRUCTION IN ESL/BILINGUAL SETTINGS. 3 Hours.**

This course bridges theory to practice, stressing how the relationship between first and additional language acquisition and development can inform teaching ESL/bilingual students. Provides opportunities to apply effective instructional practices in teaching students to foster development in speaking, listening, reading, and writing within a framework of cultural understanding.

**LIST 5373. FOUNDATIONS OF LITERACY LEARNING IN EC-6 CLASSROOMS. 3 Hours.**

Comprehensive approach to literacy instruction in EC-6 classrooms with an emphasis on reading and writing including the critical areas of phonics, phonemic awareness, word study, vocabulary, fluency, comprehension, and writing. In addition, the course examines various theoretical models of literacy along with the principles of teaching reading and writing using a variety of instructional strategies, effective program organization, assessment, and classroom management.

**LIST 5381. NATIONAL WRITING PROJECT PART I. 3 Hours.**

An intensive institute in which teachers learn ways to improve student writing abilities by improving their own teaching and learning of writing. Students participate in an intensive literature review related to the area of writing instruction. Prerequisite: Students must apply and be invited to participate in this course. Concurrent enrollment in LIST 5382.

**LIST 5382. NATIONAL WRITING PROJECT PART II. 3 Hours.**

An intensive institute in which teachers learn ways to improve student writing abilities by improving their own teaching and learning of writing. For this part of the workshop, students build on their literature review by writing a research proposal and developing research-based writing instruction. In addition, professional development training for classroom teachers is provided. Prerequisite: Students must apply and be invited to participate in this course. Concurrent enrollment in LIST 5381.

**LIST 5383. WRITING FOR PROFESSIONAL PUBLICATION. 3 Hours.**

This course focuses instructor and peer interaction as students conduct literacy-related research, analyze data, write up the results, and disseminate their completed study to a professional journal. A comprehensive study of professional journals and their requirements for submission is included in this course. Prerequisite: LIST 5385 or program advisor approval.

**LIST 5384. ADVANCED PEDAGOGY OF WRITING. 3 Hours.**

This course focuses on strategies for teaching prewriting, drafting, revising, editing, and publishing through writing workshop, literature focus units, and thematic units as well as through the content areas. Both writing assessment with rubrics and evaluation with portfolios are studied. Students compose both expository and expressive pieces as well as design and micro teach mini lessons and a web-based integrated writing unit. Prerequisite: LIST 5346, or LIST 5381, and LIST 5382, or program advisor approval.

**LIST 5385. DESIGNING LITERACY RESEARCH. 3 Hours.**

This course is designed to build on the LIST 5325, Understanding Literacy Research, by providing an exploration of the process for quantitative, mixed methods or qualitative research design. Includes an examination of various research designs related to language and literacy development including models such as case studies, ethnography, observations and interviews. Students are lead through the research process including forming a theoretical epistemology, formulating research questions, reviewing literature, selecting methods of data collection, interpretation and analysis of data and writing a research proposal. Students will be expected to complete this research focus in the program capstone experience, LIST 5317. Prerequisite: LIST 5325.

**LIST 5390. SELECTED TOPICS IN READING. 3 Hours.**

An examination of different topics each semester, with a focus on subjects related to reading, writing, oral language, and literacy.

**LIST 5391. INDEPENDENT RESEARCH IN READING. 3 Hours.**

Individual or small group research project on a literacy-related topic agreed upon between student(s) and instructor. May be repeated for credit with permission.

## COURSES

**LISTIR 5391. INDEPENDENT RESEARCH IN READING. 3 Hours.**

Individual or small group research project on a literacy-related topic agreed upon between student(s) and instructor. May be repeated for credit with permission.

## COURSES

### **LSHP 1101. INTRODUCTION TO LEADERSHIP. 1 Hour.**

A continuation of the Goolsby BNSF Early Leader Freshman Interest Group that will strengthen students' skills that lead to success in business. Faculty and staff will assist in implementing individualized corrective measures. Technical writing will be taught and evaluated. Elective only; does not count as a part of the professional certification requirements. Pass-fail grades will be awarded. For entering freshmen or entering transfer students.

### **LSHP 2302. LEADERSHIP AND COMMUNICATION IN ORGANIZATIONS. 3 Hours.**

This course focuses on the development of leadership and interpersonal business communication skills. The following topics are also addressed: verbal and nonverbal communication, dyadic and organizational communications, communication roles and relationships, small-group work, networking, and the diagnosis and improvement of organizational communications. Credit will not be granted for both MANA 2302 and LSHP 2302. Prerequisite: Admission to the BNSF Early Leaders Program of the Goolsby Leadership Academy.

### **LSHP 3319. CONTEMPORARY MANAGERIAL & LEADERSHIP CHALLENGES. 3 Hours.**

This course will provide students the opportunity to evaluate and provide solutions for some of the most challenging managerial and leadership issues facing organizations today, based on direct input from area employers. Students will engage in discussion, analyze cases, conduct verbal and written presentations, and participate in other experiential activities to explore topics and develop competencies that help organizations effectively lead people to meet these challenges. Emphasis on developing applied skills required in contemporary organizations. Credit will not be granted for both MANA 3319 and LSHP 3319. Prerequisite: Admission to the Goolsby Leadership Academy.

### **LSHP 4191. STUDIES IN LEADERSHIP. 1 Hour.**

Advanced studies, on an individual basis, in the various fields of leadership and management. Prerequisite: MANA 4322; LSHP 4313.

### **LSHP 4311. LEADER AS COMMUNICATOR. 3 Hours.**

Helps students excel in written and oral communication skills. Assignments include writing short papers, making oral presentations, and learning to critique one another. This course provides a perspective on leadership in formal organizations with emphasis on communication, exercising influence, decision-making, and conflict management. Prerequisite: Admission to the Goolsby Leadership Academy.

### **LSHP 4312. LEADER ETHICS. 3 Hours.**

Addresses rule-based, consequential, and virtue ethics by examining intentions, actions, and consequences of individual behavior. The course emphasizes the development of character and personal integrity. Prerequisite: Admission to the Goolsby Leadership Academy or permission of the Goolsby Leadership Academy Director.

### **LSHP 4313. SENIOR & EXECUTIVE LEADERSHIP. 3 Hours.**

This course introduces and compares the traditional levels of leadership within organizations-front line, middle, senior, and executive. Primary focus is on senior and executive leadership, including a series of lectures by senior leaders and executives who provide insight into their respective roles and unique leadership skills and development. Prerequisite: Admission to the Goolsby Leadership Academy.

### **LSHP 4314. GLOBAL MARKETPLACE. 3 Hours.**

Designed to assist Goolsby Scholars become competent in an intercultural world. The heart of the course is aimed at preparing for and participating in a study abroad experience to understand and appreciate cultural, business, and human diversity. Prerequisite: Admission to the Goolsby Leadership Academy or permission of the Goolsby Leadership Academy Director.

### **LSHP 4315. EXECUTIVE INTERNSHIP. 3 Hours.**

This internship experience places Goolsby Fellows in field settings with executives from the college's Advisory Council and other executive leaders in specialized areas for students. Prerequisite: Admission to the Goolsby Leadership Academy or permission of the Goolsby Leadership Academy Director.

## COURSES

### **MAE 1106. INTRODUCTION TO AEROSPACE ENGINEERING. 1 Hour.**

An introduction to human flight and to the field of aerospace engineering through a combined theoretical and hands-on approach. Topics covered include history of flight and aerospace engineering and introductions to aerostatics and aerodynamics, aerospace structures, stability and control, and propulsion. Some College of Engineering requirements are satisfied by the content of this course. Prerequisite: C or better in MATH 1426 (or concurrent enrollment) or MATH 1426 qualifying score in Math Placement Test; or student group.

### **MAE 1107. INTRODUCTION TO MECHANICAL ENGINEERING. 1 Hour.**

Introduction to basic engineering concepts. Opportunities are provided to develop skills in oral and written communication, in engineering design teamwork, as well as in department-specific material. Some College of Engineering requirements are satisfied by the content of this course. Prerequisite: C or better in MATH 1426 (or concurrent enrollment) or MATH 1426 qualifying score in Math Placement Test; or student group.

### **MAE 1140. PROBLEMS IN MECHANICAL AND AEROSPACE ENGINEERING. 1 Hour.**

This course introduces students to units, 2D and 3D coordinate geometry, vector algebra and scientific problem solving, in preparation for higher level courses. Prerequisite: C or better in MATH 1426 (or concurrent enrollment); or student group.

### **MAE 1312. ENGINEERING STATICS. 3 Hours. (TCCN = ENGR 2301)**

A study of forces and force systems, resultants and components of force systems, forces due to friction, conditions of equilibrium, forces acting on members of trusses and frame structures, centroids and moments of inertia. Vector and index notation introduced. Prerequisite: C or better in each of the following, MAE 1140 (or ENGR 1250 or REE 1301), MATH 1426 (or HONR-SC 1426), and PHYS 1443; or student group.



**MAE 1351. INTRODUCTION TO ENGINEERING DESIGN. 3 Hours.**

Foundational course in product design and manufacturing using computer-based methodologies. 3D parametric solid modeling of parts and assemblies. Technical sketching, and ASME Y14 engineering drawing standards. Industrial practices for product design and fabrication. Introduction to 3D product analysis tools. Prerequisite: C or better in MATH 1426 (or concurrent enrollment) or HONR-SC 1426 (or concurrent enrollment) or MATH 1426 qualifying score in Math Placement Test; or student group.

**MAE 2000. UNDERGRADUATE RESEARCH. 0 Hours.**

Sophomore level undergraduate research. Prerequisite: Departmental good standing and permission of instructor. May be taken a maximum of 3 times.

**MAE 2010. AUTOMOTIVE ENGINEERING PRACTICUM I. 0 Hours.**

Practical design experience as full team member of automotive design competition team. Prerequisite: Permission of Director of the Arnold E. Petsche Center for Automotive Engineering.

**MAE 2312. SOLID MECHANICS. 3 Hours.**

The relationship between stresses and strains in elastic bodies and the tension, compression, shear, bending, torsion, and combined loadings which produce them. Deflections and elastic curves, shear and bending moment diagrams for beams, and column theory. Prerequisite: C or better in each of the following, MAE 1140 (or ENGR 1250 or REE 1301) and MAE 1312; or student group.

**MAE 2323. DYNAMICS. 3 Hours. (TCCN = ENGR 2302)**

The relation between forces acting on particles, systems of particles and rigid bodies, and the changes in motion produced. Review of kinematics and vector analysis, Newton's Laws, energy methods, methods of momentum, inertia tensor and Euler's equations of motion. Prerequisite: C or better in each of the following, MAE 1140 (or ENGR 1250 or REE 1301), MAE 1312 and MATH 2425 (or HONR-SC 2425); or student group.

**MAE 2360. NUMERICAL ANALYSIS & PROGRAMMING. 3 Hours.**

Utilization of digital computers in mechanical and aerospace engineering. Computational algorithms and their representation in FORTRAN, C, and Matlab. Introduction to linear algebra and numerical methods. Prerequisite: C or better in MATH 1426; or student group.

**MAE 2381. EXPERIMENTAL METHODS AND MEASUREMENTS. 3 Hours.**

Introduction to data analysis, incorporating statistics and probability, design and planning of engineering experiments for error prediction and control. Measurement and instrumentation, basic instruments, their calibration and use. Prerequisite: C or better in each of the following, MAE 1351 and MATH 2425 (or HONR-SC 2425) and PHYS 1443 (or HONR-SC 1443); or student group.

**MAE 2391. SPECIAL PROBLEMS IN MECHANICAL AND AEROSPACE ENGINEERING. 3 Hours.**

Special problems in mechanical and aerospace engineering for preprofessional students in mechanical or aerospace engineering. Prerequisite: Instructor permission.

**MAE 3000. UNDERGRADUATE RESEARCH. 0 Hours.**

Junior level undergraduate research. Prerequisite: Departmental good academic standing and permission of instructor. May be taken a maximum of 3 times.

**MAE 3181. MATERIALS AND STRUCTURES LAB. 1 Hour.**

Experiments to study materials behavior and deformation of structural elements. Prerequisite: Must be in the professional ME or AE program and C or better in MAE 2381 and C or better in MAE 3315 (or concurrent enrollment) or MAE 3242 (or concurrent enrollment); or student group.

**MAE 3182. AERODYNAMICS AND FLUIDS LAB. 1 Hour.**

Wind tunnel experiments to study flow phenomena of aerodynamics interest, including scale testing of airfoils, wings, and aircraft. Prerequisite: C or better in each of the following, MAE 2381, MAE 3302 (or concurrent enrollment), and MAE 3303 (or concurrent enrollment); or student group.

**MAE 3183. MEASUREMENTS LABORATORY II. 1 Hour.**

Fundamental measurement techniques and experimental data analysis in mechanical engineering in the fields of thermal, fluid, structures, design, and dynamic systems. Introduction to sensor calibration, digital data acquisition, uncertainty analysis, and report writing. Prerequisite: Must be in the professional ME program and C or better in each of the following, MAE 2381, MAE 3314, and MAE 3319; or student group.

**MAE 3185. INTRODUCTION TO MECHATRONICS. 1 Hour.**

Project based introduction to the application of software and hardware required to build functioning electromechanical systems. Integrates the theory of electrical circuits, electromechanics, electronics, mechanics, and mechanical devices, along with computer and microprocessor programming and the software-hardware interface, for practical applications. Prerequisite: Professional AE or ME program and C or better in each of MAE 2360, MAE 2381, MAE 3360 and EE 2320; or student group.

**MAE 3242. MECHANICAL DESIGN I. 2 Hours.**

The overall nature of design as a process is presented along with various models, methods, techniques, and tools for the various phases of the process provide the student with an excellent understanding of how to design. Students learn to design mechanical components based on stress/deflection and the associated failure theories. Prerequisite: Must be in the professional ME or AE program and C or better in each of the following, MAE 2312, MAE 2323, and MAE 3324; or student group.

**MAE 3301. FLUID DYNAMICS. 3 Hours.**

Introduction to Fluid Dynamics and low speed aerodynamics; fluid properties; dimensional analysis; conservation equations in integral and differential form; potential flow theory and viscous flow. Prerequisites: C or better in each of the following, MAE 1106, MAE 2323 (or concurrent enrollment), MAE 3309 (or concurrent enrollment) or MAE 3310 (or concurrent enrollment), and MAE 3360 (or concurrent enrollment); or student group.

**MAE 3302. INCOMPRESSIBLE AERODYNAMICS. 3 Hours.**

Introduction to and application of the methods used to determine the low speed aerodynamic forces on aerodynamic components such as wings and airfoils. Topics include potential flow theory for lifting flows; airfoil and finite wing theory; panel and vortex-lattice methods. Prerequisite: Must be in the professional ME or AE program and C or better in each of the following, MAE 3301, MAE 2323, MAE 3309 (or MAE 3310), and MAE 3360; or student group.

**MAE 3303. COMPRESSIBLE FLOW. 3 Hours.**

Fundamental thermodynamic concepts of compressible flow, isentropic flow, normal and oblique shock waves; expansion waves; quasi-one dimensional flows within nozzles and diffusers, linearized compressible flow theory, the method of characteristics and supersonic nozzle design. Prerequisite: Must be in the professional ME or AE program and C or better in each of the following MAE 3301, MAE 2323, MAE 3309 (or MAE 3310), and MAE 3360; or student group.

**MAE 3304. ASTRONAUTICS I. 3 Hours.**

Introduction to astronautics, the solar system, and the two-body problem. Orbit shaping and orbit transfers. Patched conic approximations for interplanetary transfers. Introduction to the three-body problem and relative motion. Rigid spacecraft equation of motion. Active and passive attitude stabilization techniques for spacecraft. Prerequisite: Must be in the professional ME or AE program and C or better in each of the following: Math 3330 (or MATH 3319), PHYS 1443, PHYS 1444, and MATH 2326; or student group.

**MAE 3305. SPACECRAFT SYSTEMS ENGINEERING. 3 Hours.**

Overview of the engineering and design of launch vehicles and spacecraft systems. Spacecraft subsystems including guidance, navigation, and control; attitude determination and control; propulsion; structures; power production and storage; thermal determination and control; communications; and command and data handling. Systems engineering models and their application to space mission development. Prerequisite: C or better in MAE 3304.

**MAE 3306. FLIGHT PERFORMANCE, STABILITY & CONTROL. 3 Hours.**

Review of aerodynamics. Introduction to aircraft performance and the assessment of aircraft static stability and control characteristics. Performance topics covered include cruise, climb, gliding flight, turns, range and endurance. Static stability and control topics covered include longitudinal, lateral and directional stability and control power calculations. Prerequisite: Must be in the professional ME or AE program and C or better in each of the following: MAE 3302 and MAE 3303.

**MAE 3307. SPACECRAFT DYNAMICS AND CONTROL. 3 Hours.**

Fundamental principles and techniques of spacecraft rigid-body dynamics and control. Spacecraft attitude analysis using Euler angles and quaternions. Attitude disturbance torques, attitude determination methods, and basic concepts in feedback control, stability analysis, and hardware used in spacecraft attitude subsystem design. Modeling and simulation are key components in this course. Prerequisite: C or better in MAE 3304.

**MAE 3308. SPACE ENVIRONMENT. 3 Hours.**

Introduction to the Sun-Earth relationship and its impact on space missions. Radiation, solar structure, the heliosphere, the solar corona, the solar wind, the interplanetary magnetic field, cosmic rays, the Earth-orbit space environment, and the upper atmosphere. The technological impacts of space storms, the perils of living in space, and the impact of space weather on space mission and spacecraft design decisions. Prerequisite: C or better in MAE 3304.

**MAE 3309. THERMAL ENGINEERING. 3 Hours.**

Basic concepts and definitions, properties of pure substances, work and heat, first law of thermodynamics, second law of thermodynamics, entropy, and introduction to conductive, convective, and radiative transfer. Prerequisite: Must be in an EE or MAE department degree program and C or better in each of the following, CHEM 1465 or both CHEM 1441 and CHEM 1442; MATH 2425 (or HONR-SC 2425) and PHYS 1444; or student group.

**MAE 3310. THERMODYNAMICS I. 3 Hours.**

Basic concepts and definitions, properties of pure substances, work and heat, first law of thermodynamics, second law of thermodynamics, entropy, thermodynamics of gases, vapors, and liquids in various nonflow and flow processes, and irreversibility and availability. Prerequisite: Must be in an MAE department degree plan and C or better in each of the following, CHEM 1465 or both CHEM 1441 and CHEM 1442; MATH 2425 (or HONR-SC 2425), and PHYS 1444; or student group.

**MAE 3311. THERMODYNAMICS II. 3 Hours.**

Availability, power, refrigeration and heat pump cycles (both gas and vapor), property relations and equations of state, ideal gas mixtures, mixtures of gases and vapors, psychrometrics, adiabatic flame temperature, thermochemical equilibrium, and compressible flow. Emphasis is on applying these topics to thermal systems design. Prerequisite: Must be in the professional ME or AE program and C or better in each of the following, MAE 3313 (or concurrent enrollment) and MAE 3310; or student group.

**MAE 3313. FLUID MECHANICS. 3 Hours.**

Fundamental concepts of fluid mechanics leading to the development of both the integral and differential forms of the basic conservation equations. Application of the integral conservation equations to engineering problems in fluid dynamics including buoyancy and other hydrostatics problems. Dimensional analysis and similitude are also discussed. Prerequisite: Must be in the professional ME program and C or better in each of the following, MAE 2323, MAE 2360, MAE 3360, and MAE 3310 (or concurrent enrollment); or student group.

**MAE 3314. HEAT TRANSFER. 3 Hours.**

Topics cover the fundamental laws of heat and mass transfer, including steady and unsteady conduction, forced and free convection, and radiation as well as heat transfer in phase change. Applications of heat transfer to thermal systems design are included. Prerequisite: Must be in the professional ME or AE program and C or better in MAE 3313 or C or better in MAE 3302.

**MAE 3315. AEROSPACE STRUCTURAL STATICS. 3 Hours.**

Overview of aircraft basic structural elements and materials; introduction to elasticity; equations of equilibrium; constitutive equations of isotropic solids; bending and torsion analysis of thin-walled beams; flexure shear of thin-walled beams with stringer reinforcement; introduction to fatigue and fracture analysis; failure criteria; energy method to find strain energy release rate; elastic column buckling. Prerequisite: Must be in the professional ME or AE program and C or better in MAE 2312; or student group.

**MAE 3318. KINEMATICS AND DYNAMICS OF MACHINES. 3 Hours.**

The motion and interaction of linkage and mechanisms. Fundamental concepts of kinematics and dynamics applied to the determination of degree of freedom mechanisms and forces acting on joints of mechanisms. Specific mechanisms and applications such as multi-body mechanisms, linkage synthesis, cam design, and balancing. Prerequisite: Must be in the professional ME or AE program and C or better in MAE 2323, or student group.

**MAE 3319. DYNAMIC SYSTEMS MODELING AND SIMULATION. 3 Hours.**

Introduction to modeling and prediction of behavior of engineering systems. Analytic and numerical simulation, state-space differential equations, and Laplace transform methods. Effects of physical characteristics of system elements on system design and dynamic performance. Prerequisite: Must be in the professional ME or AE program and C or better in each of the following, MAE 3314 (or concurrent enrollment), EE 2320, and MATH 3330; or student group.

**MAE 3324. STRUCTURE & MECHANICAL BEHAVIOR OF MATERIALS. 3 Hours.**

Crystal structure and defects in materials. Diffusion, phase diagrams and phase transformations in metallic systems. The inter relationships between processing, structure, and properties of engineering materials with emphasis on the mechanical behavior of metals, polymers, and composite materials. Prerequisites: Must be in an MAE department degree program and C or better in each of the following, CHEM 1465 (or CHEM 1441 and CHEM 1442), MAE 2312 (or concurrent enrollment), and PHYS 1444; or student group.

**MAE 3344. INTRODUCTION TO MANUFACTURING ENGINEERING. 3 Hours.**

Introduction to casting, forming, machining, and joining processes for metals and nonmetals. Prerequisite: Must be in the professional ME program and C or better in each of the following, MAE 2312 and MAE 3324; or student group.

**MAE 3360. ENGINEERING ANALYSIS. 3 Hours.**

Mathematical analysis with emphasis on solution techniques and engineering applications. Topics include: ordinary differential equations (ODE), Laplace Transform, numerical solutions of ODE, boundary value problems, Fourier series, Sturm-Liouville problem and vector calculus. Prerequisite: Must be in an MAE department degree program and C or better in each of the following, MATH 2326 and MAE 2360 (or concurrent enrollment); or student group.

**MAE 3405. FLIGHT DYNAMICS. 4 Hours.**

Derivation of equation of motion (EOM) of a flight vehicle. Trimmed flight condition analysis based on the nonlinear EOM. Linearization of EOM for a given trimmed flight condition. State-space and transfer-function representations of the linear EOM. Aircraft stability and dynamic performance analysis based on the linear EOM. Prerequisite: Must be in the professional ME or AE program and C or better in each of the following, MAE 3306 and MATH 3330; or student group.

**MAE 4000. UNDERGRADUATE RESEARCH. 0 Hours.**

Senior level undergraduate research. Prerequisite: Departmental good academic standing and permission of instructor. May be taken a maximum of 3 times.

**MAE 4010. AUTOMOTIVE ENGINEERING PRACTICUM II. 0 Hours.**

Practical design experience as full team member of automotive design competition team. Prerequisite: Permission of Director of the Arnold E. Petsche Center for Automotive Engineering.

**MAE 4151. AEROSPACE VEHICLE DESIGN II. 1 Hour.**

Analysis and design of an aerospace system such as a complete flight vehicle, a propulsion system, a structural system, or a control system; market analysis, operating studies, mission specification, civil and military certification requirements; design process, methods and tools; configuration concept selection, harmonization of individual design disciplines (aerodynamics, performance, flight mechanics, structures, cost, systems, etc.). Prerequisite: Must be in the professional ME or AE program and C or better in MAE 4350.

**MAE 4188. DESIGN PROJECT LABORATORY II. 1 Hour.**

The design project from MAE 4287 continued. The design is finalized, a physical model (prototype) is manufactured and tested. Redesign and retest is accomplished as desired. The final design is documented by written report and oral presentation. Exit survey forms and exit essays must be submitted to complete the requirements of this course. Prerequisite: Must be in the professional ME program and C or better in MAE 4287.

**MAE 4191. SPECIAL PROBLEMS IN MECHANICAL AND AEROSPACE ENGINEERING. 1 Hour.**

Special problems in mechanical and aerospace engineering for students of professional program standing. Prerequisite: Must be in the professional ME or AE program.

**MAE 4287. DESIGN PROJECT I. 2 Hours.**

Team engineering approach to a design project that integrates engineering knowledge from several courses. Problem definition and creative synthesis of prospective design solutions. Engineering proposals, feasibility studies, trade-off studies, systems models and analysis, decision making, and engineering reports and presentations. Professionalism, ethics, and societal impact issues. Prerequisite: Must be in the professional ME program and C or better in MAE 3319 (or concurrent enrollment) and MAE 4344 (or concurrent enrollment) and must be within two calendar semesters of graduation (possibly including an 11-week summer session). MAE 4287 and MAE 4188 must be taken in consecutive semesters.

**MAE 4291. SPECIAL PROBLEMS IN MECHANICAL AND AEROSPACE ENGINEERING. 2 Hours.**

Special problems in mechanical and aerospace engineering for students of professional program standing. Prerequisite: Must be in the professional ME or AE program.

**MAE 4301. SPECIAL TOPICS IN MECHANICAL AND AEROSPACE ENGINEERING. 3 Hours.**

Topics will vary from semester to semester depending on student interest and the availability of faculty. May be repeated, provided topics are different. Prior approval by the student's advisor required. Prerequisite: Must be in the professional ME or AE program and others that vary by topic.

**MAE 4302. INTRODUCTION TO BEARING DESIGN AND LUBRICATION. 3 Hours.**

The course introduces 1) selection principles and design guidelines for various rolling element bearings, 2) theory of liquid and gas lubrication, 3) various novel fluid film bearings used in modern high speed turbomachinery and energy systems, and 4) fundamental principles of rotordynamics. Prerequisite: Must be in the professional ME or AE program and C or better in MAE 3313.

**MAE 4304. ASTRONAUTICS II. 3 Hours.**

The restricted three-body problem, the n-body problem, and approximations. Interplanetary transfers. Design considerations for both manned and unmanned interplanetary vehicles. Prerequisite: Must be in the professional ME or AE program and C or better in MAE 3304.

**MAE 4305. FUNDAMENTALS OF ELECTRONIC PACKAGING. 3 Hours.**

An introductory treatment of electronic packaging, from single chip to multichip, including materials, electrical design, thermal design, mechanical design, package modeling and simulation, processing considerations, reliability, and testing. Prerequisite: Must be in the professional ME or AE program and C or better in MAE 3314 or MAE 3309; or student group.

**MAE 4306. COMPUTATIONAL TECHNIQUES FOR ELECTRONIC PACKAGING. 3 Hours.**

Characterization of the thermo/mechanical reliability of microelectronics devices using commercial computational heat transfer codes (Icepak, Flotherm, and ANSYS). Industry related problems ranging from first level packages through system level packages analyzed. Formulate and model contemporary problems using commercial CFD codes. Prerequisite: Must be in the professional ME or AE program and C or better in MAE 3314 or MAE 3309; or student group.

**MAE 4307. FINITE ELEMENT METHODS. 3 Hours.**

Static response of complex structures and continua; application to field problems; mesh generation; error estimation and adaptive refinement. Prerequisite: Must be in the professional ME or AE program and C or better in MAE 3242.

**MAE 4308. SPACE MISSION CONCEPTUAL DESIGN. 3 Hours.**

Fundamental principles and methodologies used in space mission concept and feasibility evaluation. Mission objectives and constraints evaluation through modeling, simulation, trade studies, and research. Launch window and mission trajectory family generation. Mission operations planning, risk quantification, and risk mitigation strategies. Prerequisite: C or better in MAE 3305.

**MAE 4310. INTRODUCTION TO AUTOMATIC CONTROL. 3 Hours.**

Block diagram algebra, transfer functions, and stability criteria. The use of transient response, frequency response, and root locus techniques in the performance analysis, evaluation, and design of dynamic systems. Prerequisite: Must be in the professional ME or AE program and C or better in each of the following, (MAE 3314 and MAE 3319) or (MAE 3405 and EE 2320); or student group.

**MAE 4312. CONTROL SYSTEMS COMPONENTS. 3 Hours.**

The components used in mechanical, electronic, and fluid power control systems are studied. Modeling and performance analysis are used to help in the understanding of system behavior. Prerequisite: Must be in the professional ME or AE program and C or better in MAE 4310.

**MAE 4314. MECHANICAL VIBRATIONS. 3 Hours.**

Harmonic and periodic motion including both damped and undamped free and forced vibration. Single and multi-degree-of-freedom discrete systems. Vibration of continuous systems. Introduction of finite element method for structural dynamics. Prerequisite: Must be in the professional ME or AE program and C or better in each of the following, MAE 2312, MAE 2323, MAE 3360, and MATH 3330; or student group.

**MAE 4315. INTRODUCTION TO COMPOSITES. 3 Hours.**

Composite classification, laminate coding, fiber and weight fractions of composite lamina; lamina constitutive equations; structural characteristics of [A], [B], [D] matrices; lamination theory; thermal and moisture induced load and moment; lamina stress analysis and failure prediction; issues in composite structural design. Prerequisite: Must be in the professional ME or AE program and C or better in MAE 2312 (or CE 2313); or student group.

**MAE 4320. HYDRAULIC AND PNEUMATIC SYSTEMS. 3 Hours.**

The fundamentals of fluid mechanics as applied to hydraulic and pneumatic hardware. Mathematical models of pumps, motors, pistons, accumulators, valves, and transmission lines. Design and analysis procedures for implementing total fluid power systems with high operating efficiencies and adequate dynamic response characteristics. Theory is supported by laboratory demonstrations. Prerequisite: Must be in the professional ME or AE program and C or better in each of the following, MAE 3313, MAE 4310, and MAE 3310; or student group.

**MAE 4321. AEROSPACE PROPULSION. 3 Hours.**

Introduction to rocket and air-breathing propulsion systems. Development of thrust and efficiency relations, mission requirements, rocket and gas turbine engine cycle analysis, off-design performance, component design and performance analysis, advanced propulsion system concepts. Prerequisite: Must be in the professional ME or AE program and C or better in MAE 3303 or C or better in each of MAE 3313 and MAE 3311.

**MAE 4322. ROCKET PROPULSION. 3 Hours.**

Examines chemical, nuclear, and electrical propulsion concepts. Development of design and performance analysis methods. Flight performance of rocket powered vehicles. Prerequisite: Must be in the professional ME or AE program and C or better in MAE 3303 (or MAE 3311).

**MAE 4323. ENERGY CONVERSION. 3 Hours.**

Thermodynamics as applied to thermo-mechanical systems such as power cycles, engines, turbines, refrigeration, and air-conditioning systems.

Prerequisite: Must be in the professional ME or AE program and C or better in each of the following, MAE 3311 and MAE 3314.

**MAE 4324. POWER PLANT ENGINEERING. 3 Hours.**

Fundamental thermodynamics and heat transfer principles behind design and optimization of power generation systems with significant emphasis on component and system design. This class will cover a number of power plant types, including coal/gas fired, hydroelectric, nuclear, and solar. Concepts learnt in this class prepare students for an engineering career in power plants, oil, gas and related industries. Prerequisite: Must be in the professional ME or AE program and C or better in MAE 3310 (or MAE 3309); or student group.

**MAE 4325. COMBUSTION. 3 Hours.**

Fundamental treatment of problems involving simultaneous occurrence of chemical reaction and transfer of heat, mass and momentum. Topics include kinetically controlled combustion phenomena; diffusion flames in liquid fuel combustion; combustion of solids; combustion of gaseous fuel jets; flames in premixed gasses. Prerequisite: Must be in the professional ME or AE program and C or better in MAE 3311 or MAE 3303.

**MAE 4326. COMPUTATIONAL AERODYNAMICS I. 3 Hours.**

Solution of engineering problems by finite-difference methods, emphasis on aerodynamic problems characterized by single linear and non-linear equations, introduction to and application of major algorithms used in solving aerodynamics problems by computational methods. Prerequisite: Must be in the professional ME or AE program and C or better in MAE 3314 or MAE 3303.

**MAE 4327. HEATING, VENTILATION, AND AIR CONDITIONING. 3 Hours.**

Application of engineering sciences to design of heating, venting, and air conditioning (HVAC) systems. Humidification and dehumidification, psychrometric charts, heat load, cooling load, degree-days, comfort zones, and air distribution systems. Prerequisite: Must be in the professional ME or AE program and C or better in each of the following, MAE 3311 and MAE 3314.

**MAE 4328. METAL ADDITIVE MANUFACTURING. 3 Hours.**

This course will provide students with essential knowledge and technical skills for metal additive manufacturing (AM), providing a solid foundation for a future career in the field. Primary areas of focus include: metal AM processes and their capabilities, process fundamentals, part design and analysis, build preparation and machine set-up, fabrication and post-processing, inspection and monitoring, microstructure analysis and mechanical testing, and process optimization. Prerequisite: Must be in the professional ME or AE program.

**MAE 4329. ADDITIVE MANUFACTURING. 3 Hours.**

The range of technologies and processes, both physical and digital, used to translate virtual solid model data into physical models using additive layering methods. Emphasis is given to application of these technologies to manufacture end use components and assemblies but rapid prototyping is also discussed. Metal, polymer, ceramic, and composite material applications of additive manufacturing (AM) are included. Discussion includes advantages and limitations of additive methods with respect to subtractive methods and to each other. Principles of design for AM are covered along with discussion of applications. Students complete a project to design and build an engineering component or assembly for additive manufacture. Prerequisite: Must be in the professional ME or AE program and C or better in each of the following, MAE 1351 and MAE 3324; or student group.

**MAE 4331. DESIGN FOR MANUFACTURING. 3 Hours.**

The interaction between design and manufacturing stressed in terms of the design process, customer-focused quality, design specifications versus process capability and tolerances, and redesign for producibility. Topics include material and manufacturing process selection, tolerancing, quality function deployment (QFD), design for assembly (DFA), quality control techniques, reliability, and robust design. Prerequisite: Must be in the professional ME or AE program and C or better in each of the following, MAE 3242 and MAE 3344.

**MAE 4335. ANALYTICAL & COMPUTATIONAL DYNAMICS. 3 Hours.**

The course focuses on developing the equations of motion for dynamic systems composed of multiple, connected and unconnected, rigid bodies using Kane's method and the Lagrangian approach. The resulting model is used to simulate and visualize the predicted motion. Topics include: kinematics, Euler parameters, kinematic constraints, virtual work, the calculus of variations, energy, momentum, contact, impact, and checking functions. Prerequisite: Must be in the professional ME or AE program and C or better in MAE 3318.

**MAE 4336. ADVANCED MECHANICAL BEHAVIOR OF MATERIALS. 3 Hours.**

Concept of stress and strain; elementary dislocation theory. Deformation of single crystals; strengthening mechanisms including solid solution strengthening, and precipitation hardening. Fracture mechanics; microscopic aspects of fracture, fatigue, and creep of materials; design and processing of materials for improved mechanical properties. Prerequisite: Must be in the professional ME or AE program and C or better in each of the following, MAE 2312 and MAE 3324; or student group.

**MAE 4338. FAILURE ANALYSIS. 3 Hours.**

Theory and practice of techniques for determining modes of failure and fracture of engineering materials. Prerequisite: Must be in the professional ME or AE program and C or better in each of the following, MAE 2312 and MAE 3324; or student group.

**MAE 4339. FRACTURE MECHANICS. 3 Hours.**

Theory and applications of fracture mechanics. Stress analysis of cracks, crack-tip plasticity, fatigue crack growth, and stress corrosion cracking. Applicability to materials selection, structural design, failure analysis, and structural reliability. Prerequisite: Must be in the professional ME or AE program and C or better in MAE 3242.



**MAE 4342. MECHANICAL DESIGN II. 3 Hours.**

Analysis for the design and manufacture of basic mechanical elements, and their role in the design of machines. A brief review of relevant topics including stress/deflection, failure theories, and contact stress is initially conducted. It is then extended to the design of fundamental mechanical components including shafts, gears, springs, bearings, fasteners, and clutches/brakes. Prerequisite: Must be in the professional ME or AE program and C or better in each of the following, MAE 3242 and MAE 3318 (or concurrent enrollment).

**MAE 4344. COMPUTER-AIDED ENGINEERING. 3 Hours.**

A study of the principles of computer-aided engineering in mechanical and aerospace engineering. Applications in mechanical, structural, and thermal systems. Prerequisite: Must be in the professional ME or AE program and C or better in each of the following, MAE 3242, MAE 3314 (or concurrent enrollment), and MAE 3318.

**MAE 4345. INTRODUCTION TO ROBOTICS. 3 Hours.**

Overview of industrial robots. Study of principles of kinematics, dynamics, and control as applied to industrial robotic systems; robotic sensors and actuators; path planning; guidelines to robot arm design and selection; introduction to mechatronics; laboratory exercise in designing, building, and controlling a 3D-printed robotic manipulator. Prerequisite: Must be in the professional ME or AE program.

**MAE 4347. HEAT EXCHANGER DESIGN. 3 Hours.**

Design procedure system evaluation; design parameters in heat exchangers. The course considers various heat exchanger configurations and includes student design projects. Prerequisite: Must be in the professional ME or AE program and C or better in MAE 3314.

**MAE 4348. COOLING OF ELECTRONIC PACKAGES. 3 Hours.**

The calculation of heat loads and temperature fields using different cooling techniques. Includes parameter evaluation and design studies. Prerequisite: Must be in the professional ME or AE program and C or better in, MAE 3314 (or MAE 3309); or student group.

**MAE 4350. AEROSPACE VEHICLE DESIGN I. 3 Hours.**

Analysis and design of an aerospace system such as a complete flight vehicle, a propulsion system, a structural system, or a control system; market analysis, operating studies, mission specification, civil and military certification requirements; design process, methods and tools; configuration concept selection, integration of design disciplines (aerodynamics, performance, flight mechanics, structures, cost, systems, etc.). Prerequisite: Must be in the professional ME or AE program and C or better in each of the following: MAE 3405 (or concurrent enrollment) and MAE 3306.

**MAE 4352. SPACE VEHICLE AND MISSION DESIGN. 3 Hours.**

Space vehicle design; influence of space environment, astrodynamics, and atmospheric reentry. Space vehicle sub system design; propulsion, attitude determination and control, structural design, thermal control, power and telecommunications. Investigation into mission design concepts and considerations. Prerequisite: Must be in the professional ME or AE program and C or better in each of the following, MAE 2323 and MATH 2326; or student group.

**MAE 4357. AUTOMOTIVE ENGINEERING. 3 Hours.**

Introduction to automotive engine types and performance, drive train modeling and vehicle loading characteristics, fueling requirements, fuel injection systems, tire characteristics and modeling, suspension characteristics and handling, braking systems and requirements. Course taught through lecture, student presentations and student design projects. Prerequisite: Must be in the professional ME, AE or EE program and C or better in each of the following, MAE 3360 (or MATH 3319) and MAE 2312 (or EE 3346); or student group.

**MAE 4358. RACECAR ENGINEERING. 3 Hours.**

This course is intended for Formula SAE team members and other interested students to develop new systems or analyze concepts for the Formula SAE or Formula Electric racecar and related equipment. The students will form teams and perform research and development on projects related to automotive or racecar engineering. Prerequisites: Must be in the professional ME, AE or EE program and C or better in each of the following, MAE 3360 (or Math 3319) and MAE 2312 (or EE 3346); or student group.

**MAE 4362. INTRODUCTION TO MICRO AND NANOFLUIDICS. 3 Hours.**

As going down to micro scales, the basic hypothesis in the macro scale fluid mechanics may not be applicable in such scales. The objectives of this course are: to identify dominant forces and their effects in micro scale fluid systems that are different from those in the macro scales; to understand the fundamentals of micro fluidic phenomena; to discuss various microfluidic applications in research and commercial levels; and to explore new possible microfluidic applications in the emerging fields. Topics include overview of microfluidics, scaling laws, violation limit of the Navier-Stokes equations, surface force, surface tension, electrowetting, electrokinetics, dielectrophoresis, and soft lithography. Prerequisite: Must be in the professional ME or AE program and C or better in MAE 3313 and MAE 3310; or student group.

**MAE 4363. INTRODUCTION TO ROTORCRAFT ANALYSIS. 3 Hours.**

History of rotorcraft. Behavior of the rotor blade in hover and forward flight. Rotor configurations, dynamic coupling with the fuselage, elastic and aeroelastic effects.

**MAE 4378. INTRODUCTION TO UNMANNED VEHICLE SYSTEMS. 3 Hours.**

Introduction to UVS (Unmanned Vehicle Systems) such as UAS (Unmanned Aircraft Systems), UGS (Unmanned Ground System) and UMS (Unmanned Maritime System), their history, missions, capabilities, types, configurations, subsystems, and the disciplines needed for UVS development and operation. UVS missions could include student competitions sponsored by various technical organizations. This course is team-taught by engineering faculty. Prerequisite: Admission to a professional engineering or science program.

**MAE 4379. UNMANNED VEHICLE SYSTEM DEVELOPMENT. 3 Hours.**

Introduction to the technologies needed to create an UVS (Unmanned Vehicle System). Integration of these technologies (embodied as a set of sensors, actuators, computing and mobility platform sub-systems) into a functioning UVS through team work. UVS could be designed to compete in a student competition sponsored by various technical organizations or to support a specific mission or function defined by the instructors. This course is team-taught by engineering faculty. Prerequisite: B or better in MAE 4378 and admission to the UVS certificate program.

**MAE 4382. RESEARCH TRENDS IN RENEWABLE ENERGY TECHNOLOGIES. 3 Hours.**

This course is offered to graduate and senior level undergraduate students with engineering and science background to introduce them to micro/nano research and development for energy conversion and storage. This course will include: Scaling laws, MEMS fabrication, Nanomaterial synthesis, Electrochemical energy storage/conversion (Batteries, Fuel Cells & Supercapacitors), Solar energy (photovoltaics and solar thermal energy), Energy harvesting and Solar water splitting and electrocatalysis. Prerequisite: Must be in the professional ME or AE program.

**MAE 4386. WIND & OCEAN CURRENT ENERGY HARVESTING FUNDAMENTALS. 3 Hours.**

A broad senior/graduate first course in wind/wave/ocean current energy harvesting systems, focused on fundamentals, and serving as the basis for subsequent MAE specialized follow-on graduate course offerings focused on structures (conventional and composite), aero/hydro-mechanical response and control, and tailoring and smart material actuation, respectively, as well as for non-MAE, specialized graduate courses. Prerequisite: Must be in the professional ME or AE program and C or better in EE 2320 and C or better in either MAE 3313 or MAE 3301, or student group.

**MAE 4391. SPECIAL PROBLEMS IN MECHANICAL AND AEROSPACE ENGINEERING. 3 Hours.**

Special problems in mechanical and aerospace engineering for students of professional program standing. Prerequisite: Must be in the professional ME or AE program.

**MAE 4392. RESEARCH IN SPACE SYSTEMS. 3 Hours.**

Students engage in projects or study special topics of contemporary importance or of special interest outside the scope of the standard undergraduate curriculum. Interested students seek a faculty advisor in their area of special interest and together prepare a proposal for the work to be undertaken. Enrollment in and use of this course to satisfy requirements in the Space Systems Minor requires advance approval of the Space Systems Minor Program Coordinator. Prerequisite: C or Better in MAE 3305.

## COURSES

**MAED 5351. WHOLE NUMBERS, RATIONAL NUMBERS, & OPERATIONS. 3 Hours.**

In this course students engage in activities and problem solving on concepts related to whole numbers, rational numbers and operations. Students in the course will learn to utilize research-based, problem-based teaching methods to promote K-12 student understanding. Students will experience how K-12 students learn these concepts as they themselves engage in computation and problem solving activities transferrable to classroom practice. In this course, students will engage in experiences to learn and teach their K-12 students on using numbers, number systems and their structure, operations and algorithms, quantitative reasoning, and technology.

**MAED 5352. PATTERNS & ALGEBRA. 3 Hours.**

This course engages students in problem-based teaching and curriculum development to help children learn problem solving and critical thinking with an emphasis on patterns, relations, functions, algebraic reasoning, analysis, and technology. The course incorporates research shown effective in helping children develop necessary skills for algebraic reasoning as a foundation for higher level mathematics learning.

**MAED 5353. PROBABILITY & STATISTICS. 3 Hours.**

In this course students will engage in learning experiences and readily usable curricula for teaching K-12 students concepts of probability and statistics, their applications, and technology. Students will examine K-12 student learning and research-based practices that best help them understand these mathematical concepts and that will promote their development of probabilistic reasoning abilities.

**MAED 5354. PROBLEM SOLVING. 3 Hours.**

In this course, students experience and practice innovative curricula for teaching and learning problem solving. Students engage in hands-on activities and apply various problem solving techniques, using mathematical processes to reason mathematically, to solve mathematical problems, to make mathematical connections within and outside of mathematics, and to communicate mathematically. Students learn to identify relevant and irrelevant variables in problems and work through problems to arrive at meaningful solutions. Students examine research on ways to help K-12 students become effective problem solvers as transferrable to other mathematics topics and subjects across the curriculum.

**MAED 5355. CONCEPTUAL GEOMETRY. 3 Hours.**

In this course students will experience and incorporate active learning curricula that utilize a variety of manipulative materials, diagrams, models, and pictures to study geometry and spatial reasoning. The students will learn effective, research-based practices for teaching geometry and examine ways to best help K-12 students build geometric and spatial understandings as a foundation for later, more complex abstract visualizations.

**MAED 5356. MEASUREMENT. 3 Hours.**

This course focuses on inquiry-based, problem-based curricula that help K-12 students learn concepts of measurement including units of measure, standardization, and error. Students will learn to use teaching techniques that will promote K-12 students' understanding as well as the application of measurement concepts to other subjects and to everyday life experiences.

## COURSES

### **MANA 1301. BUSINESS IN A GLOBAL ENVIRONMENT. 3 Hours.**

This course provides a survey of economic systems, forms of business ownership, and considerations for running a business. Students will learn various aspects of business, management of organizations, leadership, and decision-making. Financial topics are introduced including accounting, money and banking, and securities markets. Also included are discussion of business challenges in the legal and regulatory environment business ethics, social responsibly and international business. Emphasis is the dynamic role of business in everyday life.

### **MANA 2302. COMMUNICATIONS IN ORGANIZATIONS. 3 Hours.**

This course focuses on the development of interpersonal business communication skills in the following areas: group communication, written communication (collaborative writing and business letters, memorandums and reports), oral communication (business presentation, meetings and interviews), and listening. The following topics are also addressed: verbal and nonverbal communication, dyadic and organizational communications, communication roles and relationships, small-group communication, communication networks, and the diagnosis and improvement of organizational communications. MANA 2302 will satisfy the cultural and social studies requirement in the College of Business Administration.

### **MANA 3318. MANAGING ORGANIZATIONAL BEHAVIOR. 3 Hours.**

This course is an introduction to the factors that influence individual and group behavior in organizations. Emphasizing findings from the field of organizational behavior, topics covered include: individual differences and diversity, social information processing, work attitudes, stress, work motivation, power and influence, negotiation, teams, leadership, and organizational research. An OB lab is required. The grade for this course requires the completion of both the lecture component and the OB lab. Prerequisite: 30 credit hours.

### **MANA 3319. CONTEMPORARY MANAGERIAL CHALLENGES. 3 Hours.**

This course will provide students the opportunity to evaluate and provide solutions for some of the most challenging managerial issues facing organizations today. Students will engage in discussion, analyze cases, conduct verbal and written presentations, and participate in other experiential activities to explore topics that help organizations effectively manage people to meet these challenges. Emphasis on developing applied skills required in contemporary organizations. Prerequisite: 60 credit hours.

### **MANA 3321. NONPROFIT AND VOLUNTEER MANAGEMENT. 3 Hours.**

This course focuses on leadership and management of nonprofit staff and volunteers. Nonprofit and philanthropic organizations have unique challenges in strategic staffing and stakeholder management. This course addresses topics related to selection, motivation, and retention of volunteers and staff including development officers. Prerequisite: 30 credit hours.

### **MANA 4191. STUDIES IN MANAGEMENT. 1 Hour.**

Advanced studies, on an individual basis, in the various fields of management. Prerequisite: Senior standing and permission of instructor. May be repeated for credit with consent of department chair.

### **MANA 4291. STUDIES IN MANAGEMENT. 2 Hours.**

Advanced studies, on an individual basis, in the various fields of management. Prerequisite: Senior standing and permission of instructor. May be repeated for credit with consent of department chair.

### **MANA 4321. INTERNATIONAL MANAGEMENT. 3 Hours.**

With greater globalization of economies and industries, managers are being increasingly challenged to manage organizations within a global context. This course seeks to provide students with the skills, knowledge and sensitivity required to be successful managers in organizations and organizational units within a multinational environment. Topics covered include the analysis of environmental forces, the characteristics of international strategies and the importance of organizational design and strategic control in the management of multinational enterprises. Prerequisite: 60 credit hours.

### **MANA 4322. STRATEGIC MANAGEMENT. 3 Hours.**

An integrative learning experience that focuses on the role of top management in integrating an organization's internal functional activities and external environmental forces. Emphasis is placed on defining economic, technological, ethical, political, and social factors affecting an organization and their consideration in setting goal, strategies, and operating policies. This course serves as the capstone offering for the business major. Prerequisite: ACCT 2301 and ACCT 2302, BUSA/STAT/BSTAT 3321, ECON 2305 and ECON 2306, FINA 3313, MANA 3318, MARK 3321, and a declared business major. One of the following junior level courses may be taken concurrently: BSTAT 3321, FINA 3313, MANA 3318 or MARK 3321.

### **MANA 4325. LEADERSHIP IN ORGANIZATIONS. 3 Hours.**

This course provides a managerial perspective on leadership in formal organizations. Emphasis is placed on team-building, exercising influence, decision-making, and conflict management. Prerequisite: MANA 3318.

### **MANA 4326. DIVERSITY IN ORGANIZATIONS. 3 Hours.**

This course examines the implications of employee diversity in organizations, an issue of increasing importance. It includes study of the changing demographics of workers, including multiple demographic groups and areas of difference important to organizational treatment and outcomes. This course examines research on treatment, access, and customer discrimination. Legislation related to diversity is also reviewed. This course also provides suggestions for individuals and organizations to increase opportunities and outcomes for workers of all backgrounds. Offered as MANA 4326, AAST 4326 and GWSS 4326; credit will be granted in only one department. Prerequisite: Junior standing.

**MANA 4329. DISABILITY & WORK. 3 Hours.**

Explores the complex relationship between disability and work within the United States from a current and historical perspective. Topics include study of the Americans with Disabilities Act; research on the diversity, population, and changes in proportions of people with disabilities; employment rates and experiences of people with disabilities; attitudes and perspectives surrounding and affecting the employment opportunities and experiences of people with disabilities; and ways to provide inclusive, non-discriminatory workplaces. Offered as MANA 4329 and DS 4329; credit will only be granted once. Prerequisite: 60 hours or MANA 4326 or Disability Studies permission.

**MANA 4330. TEAM MANAGEMENT. 3 Hours.**

This course examines the critical input, process and outcomes variables in the design of and maintenance of highly effective work teams. Topics include: team composition, team norms, team decision-making strategies, intra-team and inter-team conflict, team building, management of effective work teams, and team-based organizational structures. Prerequisite: MANA 3318.

**MANA 4331. SEMINAR IN MANAGEMENT. 3 Hours.**

Readings and discussion of special topics in management. Prerequisite: Junior or senior standing and consent of instructor. May be repeated for credit with consent of department chair.

**MANA 4340. BUSINESS AND SOCIETY. 3 Hours.**

Explores the roles of business organizations and their relationships with individuals, governments, and other businesses from the perspectives of ethics, ideology, and corporate responsibility. Prerequisite: 60 credit hours.

**MANA 4341. NEGOTIATIONS AND CONFLICT RESOLUTION. 3 Hours.**

This course is designed to better understand the nature of conflict and its resolution through persuasion, collaboration, and negotiation. Students will learn theories of interpersonal and organizational conflict and its resolution as applied to personal, corporate, historical, and political contexts. Students will assess their own styles, skills, and values, and develop techniques to better resolve disputes, achieve objectives, and exert influence. Prerequisite: MANA 3318.

**MANA 4390. CAREER DEVELOPMENT AND PROFESSIONAL SKILLS. 3 Hours.**

Presents practical and theoretical perspectives on career and professional development. Includes self-assessment, career plan development, interviewing skills, readings and exercises designed to lead to a better understanding of yourself and the job market. Prerequisite: 60 credit hours.

**MANA 4391. STUDIES IN MANAGEMENT. 3 Hours.**

Advanced studies, on an individual basis, in the various fields of management. Prerequisite: Senior standing and permission of instructor. May be repeated for credit with consent of department chair.

**MANA 4393. MANAGEMENT INTERNSHIP. 3 Hours.**

Practical training in management. Analysis of theory applied to real life situations. May be used as an advanced business elective only; graded on a pass/fail basis. No credit will be given for previous experience or activities. May not be repeated for credit. Prerequisite: Junior standing, declared major in the College of Business, 2.5 GPA, and permission of undergraduate business advisor.

**MANA 5182. INDEPENDENT STUDIES IN MANAGEMENT. 1 Hour.**

Extensive analysis of a management topic.

**MANA 5199. GRADUATE MANAGEMENT INTERNSHIP. 1 Hour.**

Practical training in management. Analysis of theory applied to real life situations. Course counts as an elective and has a pass/fail grade. No credit will be given for previous experience or activities. Prerequisite: Admission to a College of Business graduate degree program, 9 graduate credit hours, and 3.0 GPA.

**MANA 5299. GRADUATE MANAGEMENT INTERNSHIP. 2 Hours.**

Practical training in management. Analysis of theory applied to real life situations. Course counts as an elective and has a pass/fail grade. No credit will be given for previous experience or activities. Prerequisite: Admission to a College of Business graduate degree program, 9 graduate credit hours, and 3.0 GPA.

**MANA 5312. MANAGING THE ENTERPRISE. 3 Hours.**

Basic exploration of organizations in their environments. The elementary tools of management, which include: organizational objectives, social responsibility and ethics, policies, plans, and decision making; the design of organizations and jobs; the production and technology aspects of organization; the elements of leadership, behavior, and communication; and the elements of control and performance evaluation.

**MANA 5320. ORGANIZATIONAL BEHAVIOR. 3 Hours.**

Systematic study of behavioral problems in the complex organization. Analyzes the interaction of environmental and internal factors and their effects upon organizational behavior. The course is placed within the context of the organization process.

**MANA 5321. COMPLEX ORGANIZATIONS. 3 Hours.**

Provides the foundation for an in-depth knowledge of several important theories of management and organization. Attention to study of organizations, organizational effectiveness, comparative analysis of organizations, and the organization and its environment. Relates empirical findings and theoretical hypotheses with applied management concepts. Prerequisite: MANA 5312.

**MANA 5322. COMPENSATION & REWARD SYSTEMS. 3 Hours.**

Management of compensation systems in business and other organizations; concepts models and practices related to wage and salary levels and structures; perceived equitable pay; individual performance appraisal, rewards and satisfaction; benefits and employee services.

**MANA 5323. TRAINING AND DEVELOPMENT. 3 Hours.**

Introduces employee training and development in organizations from a comprehensive theoretical and applied perspective facilitating skill acquisition. Specific topics discussed generally include needs assessment, learning theory and transfer of learning, various training methods, program design, training evaluation, training methods, career management, and employee development.

**MANA 5324. TEAM AND GROUP BEHAVIOR. 3 Hours.**

A study in team and group dynamics, critical processes and practices. Topics include team composition and development, problem solving strategies and performance, conflict management, leadership process and work team strategies.

**MANA 5325. LABOR AND EMPLOYEE RELATIONS. 3 Hours.**

Examines union-management relations and considers the structure and functioning of the economic and social forces of importance at the policy level within both the firm and the union. Also considers non-union employee relationships.

**MANA 5326. ORGANIZATION DEVELOPMENT AND CHANGE. 3 Hours.**

Theories and applications associated with organization development and change with specific focus on improving organizational effectiveness. Topics include changing organizational culture with an understanding of ethical and value considerations, role of the organization development practitioner; processes associated with organization change, employee empowerment, developing high performance teams and high performing systems, and learning organizations.

**MANA 5327. HUMAN RESOURCE LAW. 3 Hours.**

Coverage of statutory and case law in the employment setting. Emphasis placed on employment discrimination, compensation and benefits law; government agencies which administer and enforce employment laws are also reviewed.

**MANA 5329. HR METRICS AND ANALYTICS. 3 Hours.**

This course focuses on the fundamental logic, metrics, and methods necessary for conducting HR analytics. It provides the analytical and critical thinking skills necessary for HR decision-making. This course does involve the analysis of data and the use of basic statistical techniques, but its emphasis is on application and real-world problem solving.

**MANA 5330. NEGOTIATIONS & CONFLICT MANAGEMENT. 3 Hours.**

This course focuses on developing students negotiating skills in a variety of contexts. Throughout the course students will diagnose negotiation situations, strategize and plan for negotiations, and learn how to engage in more effective negotiations. The course also focuses on developing interpersonal conflict resolution skills and strategies.

**MANA 5331. MANAGEMENT OF MULTINATIONAL ENTERPRISES. 3 Hours.**

Focuses on the international dimensions of strategy and organization and provides a framework for formulating strategies in an increasingly complex global economy. The course seeks to provide students with an understanding of the cultural, political, competitive, technological, legal, and demographic environments in which multinational firms operate. It then examines the nature of global competition by exploring the characteristics of global industries and strategies that have been successful in an international context. Also covered are issues related to organizational design and strategic control in the management of multinational enterprises.

**MANA 5332. MANAGING DIVERSITY IN ORGANIZATIONS. 3 Hours.**

Examines implications of employee diversity in organizations, including human resource and organizational behavior issues related to aspects of diversity. Includes study of the changing demographics of workers, effects of diversity on organizational performance, and ways of effectively managing in organizations having applicants, employees, and customers from diverse backgrounds. Research on diversity issues is examined, as are process of stereotyping and myths and misperceptions about diversity issues. Legislation related to diversity is also reviewed.

**MANA 5333. INNOVATION, CREATIVITY AND ENTREPRENEURSHIP. 3 Hours.**

Waves of innovations are disrupting nearly every sphere of modern life. This course helps you understand and experience just how creative entrepreneurs in either start-up or corporate environments do it. Working with others, using cutting-edge case studies, experiential exercises, and field research, you will consider how innovations across a broad range of emerging technologies meet the market, financial, and environmental demands of a diverse set of current and future stakeholders. You will have an opportunity to put learning into practice.

**MANA 5334. ORGANIZATION CONSULTING & RESEARCH. 3 Hours.**

Explores internal and external consulting to business organizations. Emphasis on the management of the change process through the stages of data gathering, diagnosis, analysis, and recommendation.

**MANA 5336. STRATEGIC MANAGEMENT. 3 Hours.**

Strategic management uses a general management perspective in addressing issues related to the formulation and implementation of corporate and business level strategy. The course involves developing the ability to identify issues, evaluate strategic options and understand the organizational process by which strategies get formed and executed. It builds on the knowledge gained in functional area courses and uses case studies and projects to improve students' analytical and decision-making skills. Prerequisite: Must be taken in last semester or with permission of the Graduate Advisor.

**MANA 5337. ETHICS AND THE BUSINESS ENVIRONMENT. 3 Hours.**

Strategically examines ethical systems and selected ethical issues across a variety of professional settings. Particular emphases are placed on leadership, corporate governance, globalization, diversity, inclusion, sustainability, and emerging technology.

**MANA 5338. CAREERS & MANAGING IN A CHANGING ENVIRONMENT. 3 Hours.**

Presents practical and theoretical perspectives on careers and managing in a changing work environment. Includes self assessment, career plan development, informational interviews, readings and exercises designed to lead to a better understanding of managing self and others.



**MANA 5339. ENTREPRENEURSHIP. 3 Hours.**

New venture opportunity assessment, formation, and development in startup and corporate environments. Students will understand the role of entrepreneurship in the economy and the attributes of entrepreneurial behavior. Students will learn how to assess the market and financial feasibility of a new venture as well as understand how to use equity and debt financing, how to select between starting up, franchising, or buying a business, how to lead the growing company, and how to address family business dilemmas. The cornerstone of the course will be a feasibility assessment project that leads to a business plan for a new venture of the student's choice. For the project, students can explore either an original new venture idea, an already existing venture concept (for example, a franchise), or a new business opportunity in need of assessment for an existing firm or their current employer.

**MANA 5340. STRATEGIC HUMAN RESOURCE MANAGEMENT. 3 Hours.**

Emphasizes strategic perspective of modern human resource management theory and practice. Topics include human resource planning, staffing, training and development, compensation, performance appraisal, and labor and employee relations.

**MANA 5341. STAFFING AND PERFORMANCE MANAGEMENT. 3 Hours.**

This course covers employee recruitment, selection and performance appraisal. Topics include: recruitment strategies and methods, methods of employee selection, performance planning, development and validation of appraisal instruments, implementation and conduct of performance appraisal, and performance feedback and counseling.

**MANA 5342. PREVENTIVE STRESS MANAGEMENT. 3 Hours.**

Examines the organizational demands that cause stress. Identifies the psychophysiology of the stress response and the individual/organizational costs of distress. Emphasis is placed on the principles and methods of preventive stress management, such as social support, exercise, and the relaxation response.

**MANA 5344. EVIDENCE-BASED MANAGEMENT. 3 Hours.**

Evidence-based management is the process of translating principles and findings based on best evidence into organizational practice. This class covers the organizational and interpersonal sides of data and information. You will develop the skills and knowledge necessary to use data and analytics to inform management practice and make better decisions. Through case examples and classroom discussion you will learn skills in internal consulting, issue selling, data interpretation and presentation. While the focus is on the practical application of business intelligence, the skills learned in this course will allow all managers to make evidence based decisions through data collection, analysis and presentation.

**MANA 5345. SOCIAL ENTREPRENEURSHIP. 3 Hours.**

Social entrepreneurship has its roots in the broader field of entrepreneurship, but differs in the fact that social entrepreneurs have a primary goal of creating social impact rather than personal or shareholder wealth. This course is intended for students from any discipline who have an interest in making a difference in communities locally and throughout the world. The course will introduce entrepreneurial concepts including social enterprise, impact investing/SROI, social marketing/movements, behavioral economics, strategic CSR practices and legal formation. This course includes a self-directed project to address a societal problem using the disciplines taught in class.

**MANA 5348. HUMAN RESOURCE BUSINESS STRATEGY. 3 Hours.**

Designed with the human resource professional in mind, this course analyzes the role of human resource management in developing and executing business strategy. Central to this course is an examination of how contemporary organizations use human resource management to enhance organizational capabilities and achieve strategic objectives.

**MANA 5350. EFFECTIVE LEADERSHIP. 3 Hours.**

This graduate course uses self-assessment testing with feedback, case studies, selected readings, and guest lectures from successful leaders and top executive coaches to create a learning laboratory for mature and motivated graduate students of leadership.

**MANA 5360. LEADERSHIP AND TEAMS. 3 Hours.**

One of the most difficult challenges that organizations face is acquiring, developing, and retaining high talent human capital. This course is concerned with effective leadership, team-based work systems, and talent management for building high performance organizations.

**MANA 5382. INDEPENDENT STUDIES IN MANAGEMENT. 3 Hours.**

Extensive analysis of a management topic.

**MANA 5392. SELECTED TOPICS IN MANAGEMENT. 3 Hours.**

In-depth study of selected topics in management. May be repeated when topics vary.

**MANA 5398. THESIS. 3 Hours.**

Thesis MANA 5398 graded "R" (Research) or "P" (Pass) or "F" (Fail) only. Prerequisite: Permission of Graduate Advisor required.

**MANA 5399. GRADUATE MANAGEMENT INTERNSHIP. 3 Hours.**

Practical training in management. Analysis of theory applied to real life situations. Course counts as an elective and has a pass/fail grade. No credit will be given for previous experience or activities. Prerequisite: Admission to a College of Business graduate degree program, 9 graduate credit hours, and 3.0 GPA.

**MANA 5698. THESIS. 6 Hours.**

Thesis MANA 5698 graded "R" (Research) or "P" (Pass) or "F" (Fail) only. Prerequisite: Permission of Graduate Advisor required.

**MANA 6182. INDEPENDENT STUDIES IN MANAGEMENT. 1 Hour.**

Extensive analysis of a management topic.

**MANA 6282. INDEPENDENT STUDIES IN MANAGEMENT. 2 Hours.**

Extensive analysis of a management topic.

**MANA 6318. SEMINAR IN ORGANIZATIONAL THEORY. 3 Hours.**

Advanced study in the theory and research of organizations.

**MANA 6328. SEMINAR IN BUSINESS POLICY. 3 Hours.**

Advanced study in the theory and research bases of business policy and strategic management.

**MANA 6329. ADVANCED RESEARCH METHODS. 3 Hours.**

In-depth coverage of selected topics in the design of research and analysis of data; topics include philosophy of science, theory of measurement, complex experimental and quasi-experimental designs.

**MANA 6338. SEMINAR IN ORGANIZATIONAL BEHAVIOR. 3 Hours.**

Advanced study in the theory and research of organizational behavior.

**MANA 6348. SEMINAR IN HUMAN RESOURCE MANAGEMENT. 3 Hours.**

Advanced study in employee selection, performance appraisal, compensation, training and development, human resource policy and strategy, and other areas of human resource management.

**MANA 6382. INDEPENDENT STUDIES IN MANAGEMENT. 3 Hours.**

Extensive analysis of a management topic.

**MANA 6390. ADVANCED TOPICS IN MANAGEMENT. 3 Hours.**

In-depth study of selected topics in management. May be repeated when topics vary.

**MANA 6392. RESEARCH IN ADMINISTRATION. 3 Hours.**

Independent research under supervision of a faculty member.

## COURSES

**MARK 3321. PRINCIPLES OF MARKETING. 3 Hours.**

Principles of marketing explores the theory and application of marketing concepts. The marketing variables of products, channels, prices, and promotion and how they relate to marketing decisions about assessing the marketing environment, segmentation, targeting, and positioning, new product introduction, managing brands, and social media marketing among others are discussed. Students learn these concepts through a mix of discussions, lectures, and assignments. Prerequisite: 30 credit hours.

**MARK 3322. PROFESSIONAL SELLING. 3 Hours.**

Presents sales principles and skills required by today's professional salesperson, with emphasis on the business-to-business selling environment. Students will enhance development of a variety of skills that will serve for a lifetime. These lifetime skills include the following: communication skills, critical thinking, building relationships with customers, and ethical decision making. Prerequisites: MARK 3321 with a grade of C or better, or Junior Standing.

**MARK 3323. INTEGRATED MARKETING COMMUNICATION / ADVERTISING. 3 Hours.**

A managerial approach to coordinating all promotional activities including advertising, direct marketing, sales promotion, personal selling, public relations/publicity, and internet marketing/social media, to produce a unified, market-focused message. Message development and media analysis/ placement are examined within the context of the role each promotional tool plays in marketing strategy development. Prerequisite: MARK 3321 with grade of C or better.

**MARK 3324. CONSUMER BEHAVIOR. 3 Hours.**

Examine how consumers decide and engage in the acquisition, consumption, and disposition of goods and services. In doing so, develop a better understanding of how a firm's marketing efforts can be optimally deployed to create value for consumers. Understand the role of consumer behavior in your life, business strategy, policy making, and society. Students will learn several internal and external influences of consumer behavior motivation, cognition, and learning. Prerequisite: MARK 3321 with a grade of C or better.

**MARK 3332. PHILANTHROPY, FUNDRAISING, AND PROFESSIONAL SELLING. 3 Hours.**

Presents known and effective selling techniques required by today's development officers in their efforts to cultivate relationships with donors. Students will enhance skills that will serve for a lifetime, including communications skills, critical thinking, building donor relationships, and ethics-based decision making. Students will learn how to address the key differences between for-profit and non-profit organizations' view of their mission and bottom line focus. Prerequisite: MARK 3321 with a grade of C or better and junior standing.

**MARK 3342. MARKETING AND PHILANTHROPIC STRATEGY. 3 Hours.**

This course applies the principles of marketing to the promotion of philanthropic initiatives. Consumer behavior theories are used to explain why individuals and corporations give and help others. Precepts from strategic marketing are also applied as students learn how to design and implement a strategic giving program. Prerequisite: MARK 3321 with a grade of C or better and junior standing.

**MARK 3370. SOCIAL MEDIA MARKETING. 3 Hours.**

Go behind the scenes and discover the marketing side of social media. Learn how to manage your personal and professional brand online. Understand how organizations are utilizing social media platforms to engage in social listening, social media advertising, influencer marketing, social media marketing campaigns, and more. A conceptual foundation and practical approach for developing a social media plan and tracking social media metrics will be presented. Students will gain hands-on experience using social media strategically to achieve desired marketing goals through an immersive-learning simulation project. Students will also earn relevant online certifications to build their resume. Prerequisite: MARK 3321 grade of C or better.

**MARK 4191. STUDIES IN MARKETING. 1 Hour.**

Advanced studies, on an individual basis, in the various fields of marketing. Prerequisite: 90 credit hours and permission of instructor. May be repeated for credit with consent of department chair.

**MARK 4291. STUDIES IN MARKETING. 2 Hours.**

Advanced studies, on an individual basis, in the various fields of marketing. Prerequisite: 90 credit hours and permission of instructor. May be repeated for credit with consent of department chair.

**MARK 4303. RETAIL MARKETING. 3 Hours.**

Students are introduced to the world of retailing through the consumer's perspective and from a managerial viewpoint. Topics studied include types of retailers, consumer buying behavior, retail site locations, merchandising, store layout and design and customer service. Students gain practical knowledge through projects, retail site visits, and relevant case studies. Special attention is paid to the retail mix, multichannel retailing, and retail marketing strategies. Prerequisite: MARK 3321 with grade of C or better.

**MARK 4308. MANAGEMENT AND LEADERSHIP OF THE SALES FORCE. 3 Hours.**

This course covers topics ranging from strategic solutions to tactical sales. It focuses on sales management and leadership targeted toward implementation of complex sales solutions. The course concerns sales managers' roles of planning and executing go-to-market strategy. Hiring, motivation, decision-making, conflict/negotiation strategies, coaching, ethical decision making, and retaining a high-performance team are examined in an interpersonal context with a focus on expanding and retaining long-term profitable customer relations as vital to the impact on firm performance. Prerequisites: MARK 3322 with a grade of C or better.

**MARK 4310. DIGITAL MARKETING. 3 Hours.**

Students will examine how organizations are adapting to new interactive digital strategies for online research, development of digital strategy, and implementation of marketing online. Topics include search engine optimization, online advertising, web analytics, social media, email marketing, web development, mobile marketing, and reputation management. Upon completion, students will be able to understand 1) how consumers utilize digital technology, 2) the impact of digital marketing on the decision-making process, and 3) how to integrate digital marketing and technology with existing marketing practices. Prerequisite: MARK 3321 with grade of C or better.

**MARK 4311. MARKETING RESEARCH. 3 Hours.**

Designed to make students intelligent users of marketing research data. Students will explore the interrelationship between marketing research and marketing management for both the client and supplier. Upon completion of this course, students will understand methods for designing research projects, utilizing secondary data, generating primary data, sampling of human populations, questionnaire design, and data analysis. Prerequisite: MARK 3321 with a grade of C or better and BSTAT 3321.

**MARK 4320. PRODUCT AND BRAND STRATEGY. 3 Hours.**

This course is about understanding product and brand strategy adopted by firms, existing and new. We will begin the journey by understanding new product design and innovation with examples [including prototyping] and culminate in how new products become established brands through the product life cycle by way of strategic components such as price, distribution, packaging, promotion and brand extensions. Prerequisite: MARK 3321 with a grade of C or better.

**MARK 4322. ADVANCED MARKETING MANAGEMENT AND STRATEGY. 3 Hours.**

Advanced marketing management and strategy helps students look at marketing strategy in light of the strategy of the firm. It is helpful for students pursuing careers in marketing and management. Students will learn how to 1) develop marketing strategies for creating customers, 2) evaluate an organization's opportunities for creating customer value, 3) create a defensible position for the organization, and 4) evaluate competitive advantage in terms of financial value. Prerequisite: MARK 3321, MARK 3324 and MARK 4311 with grades of C or better, and 90 credit hours.

**MARK 4325. INTERNATIONAL MARKETING. 3 Hours.**

This class examines the impact of sociocultural, economic, technological, governmental, and demographic factors on the international marketing mix. Students will develop a culturally intelligent perspective of environmental factors that must be taken into consideration when formulating marketing strategies of businesses operating in the global marketplace. Prerequisite: MARK 3321 with a grade of C or better.

**MARK 4331. SEMINAR IN MARKETING. 3 Hours.**

Readings and discussion of special topics in marketing. Prerequisite: Junior or senior standing and consent of instructor. May be repeated for credit with consent of department chair.

**MARK 4335. MULTICULTURAL MARKETING. 3 Hours.**

This course involves readings and discussion of topics related to multicultural marketing. The primary focus will be on how to apply the principles of marketing to identify and reach the growing ethnic subcultures in the U.S. population. Careful consideration will be given to the historical context and ethical implications of these marketing activities. Practical aspects of business development will also be emphasized. Prerequisite: MARK 3321 with a grade of C or better.

**MARK 4391. STUDIES IN MARKETING. 3 Hours.**

Advanced studies, on an individual basis, in the various fields of marketing. Prerequisite: 90 credit hours and permission of instructor. May be repeated for credit with consent of department chair.

**MARK 4393. MARKETING INTERNSHIP. 3 Hours.**

Practical training in marketing. Analysis of theory applied to real life situations. May be used as an advanced business elective only; graded on a pass/fail basis. No credit will be given for previous experience or activities. May not be repeated for credit. Prerequisite: Junior standing and consent of department internship advisor.

**MARK 5142. ADVANCED TOPICS IN MARKETING RESEARCH. 1 Hour.**

Presentation and analysis of cutting edge topics in marketing research.

**MARK 5182. INDEPENDENT STUDIES IN MARKETING. 1 Hour.**

Extensive analysis of a marketing topic.

**MARK 5199. GRADUATE MARKETING INTERNSHIP. 1 Hour.**

Practical training in marketing. Analysis of theory applied to real life situations. Course counts as an elective and has a pass/fail grade. No credit will be given for previous experience or activities. Prerequisite: Minimum nine graduate semester hours completed.

**MARK 5282. INDEPENDENT STUDIES IN MARKETING. 2 Hours.**

Extensive analysis of a marketing topic.

**MARK 5299. GRADUATE MARKETING INTERNSHIP. 2 Hours.**

Practical training in marketing. Analysis of theory applied to real life situations. Course counts as an elective and has a pass/fail grade. No credit will be given for previous experience or activities. Prerequisite: Minimum nine graduate semester hours completed.

**MARK 5311. MARKETING. 3 Hours.**

Survey of activities involved in marketing. Emphasis is on developing a managerial point of view in planning and evaluating marketing decisions of the firm. Analyzes decisions with respect to products, price, channel, and promotional variables and considers questions relating to cost efficiency, demand, social responsibility and regulations.

**MARK 5320. BUYER BEHAVIOR. 3 Hours.**

Marketing begins and ends with the customer. This course introduces students to the study of consumer behavior. It is taught from the perspective of a marketing consultant who requires knowledge of consumer behavior in order to create, implement, and evaluate effective marketing strategies for clients. The course examines many concepts and theories from the behavioral sciences and analyzes their value in crafting marketing strategies. The course combines lecture and discussion of research based literature, both of which are aimed at providing an in-depth understanding of customer marketplace behavior with a focus on application to consumption and marketing decision making situations.

**MARK 5326. INTEGRATED MARKETING COMMUNICATION. 3 Hours.**

A managerial approach to coordinating all promotional activities, including direct marketing, advertising, sales promotion, personal selling, public relations, publicity and packaging to produce a unified market-focused message. Message development, placement and timing are examined within the context of the role each type of promotion plays in marketing strategy development. Additional topics examined include media definition and analysis, the communication process, legal and ethical considerations, and budgeting. Prerequisite: MARK 5311.

**MARK 5327. RESEARCH FOR MARKETING DECISIONS. 3 Hours.**

Overview of information needs of the marketing decision-maker. Emphasis on methods and techniques that may be employed for the collection and analysis of primary data. Major topics include design of research projects, generating primary data, questionnaire design, samplings for survey research, experimental design, controlling data collection, and data analysis.

**MARK 5328. PRODUCT MANAGEMENT. 3 Hours.**

Management of the firm's product or service offerings. Topics include new product development, new product screening, evaluation of existing products, product line and mix analysis, product abandonment decisions, the brand manager's role, the new product planning department, and others. Emphasis on the development of meaningful criteria for decision-making in the product area and on the development of information systems to suggest, screen, and monitor products. Prerequisite: MARK 5311 or MARK 5327 or Consent of the Program Director.

**MARK 5329. SALES AND SALES MANAGEMENT. 3 Hours.**

Examines the skills required for successful personal selling and sales management in today's world, with emphasis on industrial markets. Discusses the links between business trends and the resulting need for new approaches to the sales management challenges of planning, implementing, and evaluating a sales program. Special topics include the strategic importance of the sales force, customer/supplier partnering, multi-function collaboration, technology's role in altering traditional customer-access channels, the organization of the sales function for profitability vs. revenue, and the development of effective major account strategies.

**MARK 5330. SERVICES MARKETING MANAGEMENT. 3 Hours.**

Examines conceptual frameworks and management practices particularly relevant to organizations in service industries, including health care, education, financial services, retailing, non-profit organizations, and others in which the core product is a service instead of a good. The course examines many concepts and theories from the service marketing industry and analyzes their value in crafting marketing strategies. Emphasis is on problem solving unique to these types of organizations. Prerequisite: MARK 5311.

**MARK 5331. INTERNATIONAL MARKETING. 3 Hours.**

Management of marketing in international business. Includes marketing research, pricing, promotion, and distribution in the international environment. Examines marketing problems arising from various degrees of foreign involvement (exports, licensing, foreign subsidiaries). Prerequisite: MARK 5311.

**MARK 5332. BUSINESS-TO-BUSINESS MARKETING. 3 Hours.**

Marketing strategies for businesses targeting other businesses. Included are frameworks for analysis of marketing opportunities. Business-to-business e-commerce is examined. Prerequisite: MARK 5311.

**MARK 5334. STRATEGIC INTERNET MARKETING. 3 Hours.**

Through theoretical investigation, brainstorming, and case analysis, students develop the skills and strategies that are necessary for effective marketing via electronic media. With particular emphasis on Internet-based media, topics include developing an online corporate identity, online market research, interactive and database Web site strategies, creating and maintaining Web site content, proactive marketing tactics, analysis of Web site statistics, measuring online marketing results, and development of a strategic Internet marketing plan. Prerequisite: MARK 5311.

**MARK 5335. RETAILING, FRANCHISING, AND ENTREPRENEURSHIP. 3 Hours.**

Course offers exposure to elements of retail management, franchising, and entrepreneurship, including planning, promotion, pricing, and merchandising. Prerequisite: MARK 5311.

**MARK 5337. MARKETING ANALYTICS AND INFORMATION MANAGEMENT. 3 Hours.**

Course focuses on the fundamental concepts of customer relationship management and application of analytics approaches to solve real-world problems. The course covers topics including marketing data bases and computer-based research systems designed for the collection, storage, usage, and reporting of disaggregated data. Students will be instructed on how to increase customer profitability based on insights gained from customer data. Case studies and data analysis projects are utilized. Prerequisite: MARK 5311 or equivalent or consent of the Program Director.

**MARK 5338. APPLIED QUALITATIVE RESEARCH IN BUSINESS. 3 Hours.**

This hands-on course explores qualitative research techniques to deeply understand the motivators and barriers in buyer and user experiences. Students will master research design, data collection, analysis, and insight generation through practical applications. Learn to conduct and analyze interviews, focus groups, ethnographic studies, usability testing interviews, customer journey mapping, and other emerging qualitative methodologies while developing skills in research planning, execution, analysis, and presentation of findings to business stakeholders. Prerequisite: MARK 5327 or Permission from Program Director.

**MARK 5340. MARKETING STRATEGY. 3 Hours.**

A case course designed to give the student an opportunity to utilize the managerial and analytical tools that he or she has acquired. Uses case studies which require a realistic diagnosis of company problems, development of alternative courses of action, and the formulation of specific recommendations. Prerequisite: MARK 5311 and two additional MARK graduate courses.

**MARK 5341. CONTEMPORARY TOPICS IN MARKETING RESEARCH. 3 Hours.**

Stay ahead in the dynamic field of marketing research through an in-depth exploration of industry-demanded techniques and topics. This course adapts yearly to reflect emerging research methodologies, tools, and best practices. Through a combination of lectures, expert presentations, and detailed case studies, students will gain a thorough understanding of the latest qualitative and quantitative research skills required by leading marketing research organizations and corporate research teams. Prerequisite: MARK 5327.

**MARK 5342. ADVANCED TOPICS IN MARKETING RESEARCH II. 3 Hours.**

This companion course to MARK 5341 focuses on quantitative topics in marketing research. Typical topics include geographical information systems, non-parametric statistics, data mining, measurement issues and questionnaire design and neuro-marketing. Prerequisite: consent of Program Director.

**MARK 5343. MULTIVARIATE MODELS FOR BUSINESS DECISIONS. 3 Hours.**

Gain essential skills for data-driven business and marketing decisions with a focus on analysis techniques such as factor analysis, multiple regression, discriminant analysis, logistic regression, and conjoint analysis. Gain hands-on experience in interpreting results to address complex marketing challenges effectively. Prerequisite: MARK 5327, BSTAT 5325, or permission of the MSMR Program Director.

**MARK 5344. BUSINESS PREDICTION & CLASSIFICATION TOOLS. 3 Hours.**

Master advanced multivariate techniques to solve real-world business challenges. This course covers cluster analysis, MANOVA, multidimensional scaling, correspondence analysis, confirmatory factor analysis, and structural equation modeling, with hands-on software training for effective analysis and interpretation. Equip yourself with essential tools for high-impact decision-making in complex business environments. Prerequisite: MARK 5327, BSTAT 5325, or Permission from Program Director.

**MARK 5350. MULTICULTURAL RESEARCH METHODS. 3 Hours.**

This course extends the student's knowledge beyond traditional survey research concepts to include specific knowledge about the common sources of bias associated with studies of U.S. multicultural populations, such as Blacks, Hispanics and Asians. The topical coverage is multi-disciplinary and focuses on cultural and linguistic biases related to sampling, translations, questionnaire design, data collection methods, weighting, and statistical analysis. Attention is also devoted to issues related to focus group research and GIS analysis. Assignments will include readings, exercises, analysis of survey data files and Census data, and reporting of results. Prerequisite: BSTAT 5301 or equivalent.

**MARK 5370. SOCIAL MEDIA MARKETING. 3 Hours.**

The course studies social media as a tool for listening to engaging with customers and other significant audiences and for delivering marketing communications. Through interactive class projects students will learn best practices for managing social media channels and platforms. The course discusses examines the fundamentals for developing crafting a social media marketing plan and examines including metrics for monitoring and evaluating the effectiveness of social media campaigns. Ethical and legal issues related to privacy, security, content and crowdsourcing are also presented.

**MARK 5382. INDEPENDENT STUDIES IN MARKETING. 3 Hours.**

Extensive analysis of a marketing topic.

**MARK 5396. MARKETING RESEARCH INTERNSHIP I. 3 Hours.**

The internship involves part-time or full-time training and work experience in a company approved by the MSMR program advisor.



**MARK 5397. MARKETING RESEARCH INTERNSHIP II. 3 Hours.**

This is a continuation of Internship I and involves part-time or full-time work experience in a company approved by the MSMR program advisor. The student will be assigned primary responsibility for at least one marketing research project during Internship I or II. At the completion of the course, the student will present a research paper to the MSMR faculty.

**MARK 5398. THESIS. 3 Hours.**

Prerequisite: STAT 5325 and approval of Graduate Advisor.

**MARK 5399. GRADUATE MARKETING INTERNSHIP. 3 Hours.**

Practical training in marketing. Analysis of theory applied to real life situations. Course counts as an elective and has a pass/fail grade. No credit will be given for previous experience or activities. Prerequisite: Minimum nine graduate semester hours completed.

**MARK 5698. THESIS. 6 Hours.**

Prerequisite: STAT 5325 and approval of Graduate Advisor.

**MARK 6302. CONSUMER BEHAVIOR I. 3 Hours.**

Study of current thought and research underlying individual and group marketplace behavior. Theories from the behavioral sciences are applied to consumer behavior from descriptive, predictive and normative perspectives. Topics include consumer knowledge, attitude theory, persuasion, affect, and social influence. The course draws from the literature in marketing, psychology, and behavioral economics. The course will enable students to conceptualize, operationalize, and develop research ideas.

**MARK 6303. CONSUMER BEHAVIOR II. 3 Hours.**

This course complements the Consumer Behavior I doctoral seminar. Building on a portion of that seminar, the course focuses on a few topics (e.g. automaticity in consumer behavior, consumer choice processes) that have the following characteristics: 1) the topics are the subjects of emerging research in consumer behavior, 2) students can gain an in-depth understanding of the theoretical underpinnings of these topics, and 3) the materials are such that students can develop innovative research projects on marketing and consumer behavior related to the topics covered in the class.

Prerequisite: MARK 6302.

**MARK 6305. MARKETING MODELS I. 3 Hours.**

Study of basic models of market and consumer behavior with particular attention to the use of classical statistical methods such as ordinary and generalized least squares, factor analysis, discriminant analysis and correspondence analysis, cluster analysis, and canonical correlation. Applications include perceptual mapping, multiattribute modeling, conjoint analysis, and product planning models. Prerequisite: STAT 5325.

**MARK 6310. MARKETING STRATEGY AND MANAGEMENT. 3 Hours.**

Examination of the latest research and thought in marketing and business strategy. Topics include marketing programming; product, price, promotion, and distribution decisions, marketing audits, and the design, implementation and evaluation of marketing strategies and tactics. An objective of the course is the development of innovative research ideas on marketing strategy related to the topics covered in the class.

**MARK 6311. MARKETING STRATEGY AND MANAGEMENT II. 3 Hours.**

In increasingly global and competitive markets, sustainable competitive advantage takes on increasing importance. Further, in many industries, product differentiation no longer provides a decisive edge over competition. This course complements the Marketing Strategy and Management I doctoral seminar. Building on a portion of that seminar, the course focuses on a few topics (e.g. transformation of a product-centric organization to a customer centric organization, organizational change, organizational agility, and technology-enabled relationship management) that will allow students to examine areas of emerging research in marketing strategy, gain an in-depth understanding of the theoretical underpinnings of the selected topics, and develop innovative research projects on marketing strategy related to the topics covered in the class. Prerequisite: MARK 6310.

**MARK 6327. ADVANCED MARKETING RESEARCH METHODS. 3 Hours.**

Major topics include design of research projects, generating primary data, questionnaire design, sampling for survey research, experimental design, controlling data collection, and data analysis. Coverage of scientific techniques for collecting and analyzing data; includes research paradigms, measurement, and design. Emphasis on theory and application of survey research including classical test theory, item response theory, sampling, questionnaire construction, validity and reliability assessment and data reduction.

**MARK 6331. ADVANCED GLOBAL MARKETING THEORY. 3 Hours.**

Examines the antecedents and consequences of global marketing. Includes the politics of global marketing, emerging global strategies, the latest concepts of market entry and development, and global marketing performance and evaluation.

**MARK 6390. TOPICS IN MARKETING. 3 Hours.**

Advanced doctoral level work in special topics in marketing. May be repeated when topics vary.

**MARK 6392. INDEPENDENT STUDY IN MARKETING. 3 Hours.**

Doctoral level analysis of marketing topic.

## COURSES

**MAS 2300. INTRODUCTION TO MEXICAN AMERICAN STUDIES. 3 Hours. (TCCN = HUMA 1305)**

A multidisciplinary introduction to the Mexican American/Latino experience. Emphasis on history, culture, and contemporary socioeconomic and policy issues. Required for completion of the Mexican American Studies minor. This course satisfies the University of Texas at Arlington core curriculum requirement in Language, Philosophy, and Culture.

**MAS 3301. INTRODUCTION TO LATINA/HISPANIC FEMINISM. 3 Hours.**

This interdisciplinary course explores Latina/Hispanic feminism through the intersection of race, class, gender, and sexuality. This course is organized around the following issues: colonization, immigration, globalization, sexism, health, and violence. Through an analysis of cultural production, politics, socio-economics, literary texts, and feminist methodology, the goal of this course is to develop a robust understanding of how Latina/Hispanic feminist methodologies can be used as tools for social change and social justice. Offered as GWSS 3301, MAS 3301, and DIVR 3301. Credit will only be granted in one department.

**MAS 3310. LATINOS IN THE U.S.. 3 Hours.**

Examines the Latino experience in the U.S. from an interdisciplinary perspective. Discusses the commonalities and cultural differences among various Latino groups, and focuses on important contemporary Latino issues such as education, employment, family and gender, identity, immigration, and politics. May receive credit for either MAS 3310 or ANTH 3310.

**MAS 3312. LATIN AMERICAN CULTURE AND CIVILIZATION. 3 Hours.**

An interdisciplinary introduction to Latin American society, history and culture. Offered as MAS 3312 and SPAN 3312; credit will be granted for either MAS or SPAN. Prerequisite: SPAN 2314 or SPAN 2315 with a grade of C or better.

**MAS 3314. THE LATINA EXPERIENCE. 3 Hours.**

A course on the social, cultural, and economic experiences of Latina and Latin American origin women in the United States. Offered as MAS 3314, SOCI 3314, SOCW 3314, GWSS 3314, and AAST 3321. Credit will be granted in only one department.

**MAS 3316. LATINO HEALTH ISSUES. 3 Hours.**

A cross-cultural examination of issues in Latino health and relevant health practices in the United States through the lenses of social sciences. Themes include the Latino Threat Narrative, acculturation histories and health care status of major Latino ethnic enclaves in the U.S. Listed as SOCI 3316, MAS 3316 and ANTH 3316; may receive credit for either SOCI 3316, MAS 3316, or ANTH 3316.

**MAS 3317. MEXICAN POLITICS AND U.S.-MEXICO RELATIONS. 3 Hours.**

Current economic and political systems of Mexico and relevant issues in U.S.-Mexico relations. Trade, immigration, economic dependency, energy, contraband, and other topics. Offered as MAS 3317 and POLS 3317; credit will be given in only one department. Prerequisite: POLS 2311 and POLS 2312.

**MAS 3318. BORDERS, CULTURES, AND CARTELS. 3 Hours.**

Critically examines life on the Mexico-U.S. border through ethnography, taking into account the impact of the U.S. war on drugs and the influence of cartels on the lives of those living in the southern border region. Topics may include impacts and influences of drugs and narco life on religion, crime, music, and daily life at the nexus of US-Mexico relations. Listed as ANTH 3318 and MAS 3318; may receive credit for either ANTH 3318 or MAS 3318.

**MAS 3319. DIVERSE POPULATIONS. 3 Hours.**

Introduction to theoretical, practical, and policy issues related to diverse populations. Historical, political, and socioeconomic forces are examined that maintain discriminatory and oppressive values, attitudes, and behaviors in society in diverse populations and in all levels of organizational behavior. This course is required for admission to the Bachelor of Social Work (BSW) program. Offered as AAST 3317, SOCW 3307 and MAS 3319; credit will be granted in only one department.

**MAS 3320. U.S. IMMIGRATION POLICY AND THE AMERICAN DREAM. 3 Hours.**

This course focuses on diverse ethnic and racial identities in America through the examination of immigration to the United States, past and present, and the evolution of U.S. immigration policy. Topics include U.S. attitudes and policy responses to European, Asian, and Latin American immigration and to the incorporation of the descendants of African slaves and Native Americans. Emphasis on the decline of the melting pot idea and the incorporation of recent immigrants. Offered as MAS 3320, AAST 3319, and SOCW 3320. Credit will be granted only once.

**MAS 3321. MEXICAN-AMERICAN HISTORY. 3 Hours.**

The role of the Mexican American in the cultural and historical development of the United States with special emphasis on the Southwest. Offered as HIST 3321 & MAS 3321; credit will be granted only once.

**MAS 3322. RACE, LATINOS, AND THE AMERICAN NARRATIVE. 3 Hours.**

Adopts race and ethnicity as a central platform to examine how sociocultural and structural processes intersect to shape an American narrative of Latinos in the United States. Assesses topics like ethnic capital, socioeconomic mobility, and the digital age to broaden a sociological understanding of Latino group progress in relation to widening inequality gaps. Offered as SOCI 3322 and MAS 3322; credit will be granted in only one department.

**MAS 3330. CULTURAL DIVERSITY AND IDENTITY. 3 Hours.**

The ways identity is constructed in contemporary societies in an increasingly complex and multicultural world. Ethnic, racial, gender, and class identities. How and when identity is asserted and assigned, and how it can both draw boundaries and forge ties between peoples. Formerly listed as ANTH 2350. Credit cannot be given for both ANTH 2350 and ANTH 3330. Also listed as MAS 3330; credit cannot be granted for both ANTH 3330 and MAS 3330. Offered as AAST 3330 and ANTH 3330; credit will be granted in only one department.

**MAS 3337. RACIAL & ETHNIC GROUPS IN US. 3 Hours.**

Compares the immigration, acculturation, and adjustment processes of various racial/ethnic groups in the U.S. Examines historical and contemporary discrimination in relation to the social conditions of racial/ethnic minority groups in the U. S. Topics include classical and contemporary theory; individualistic, cultural, and structural arguments about social arrangements; and conflict among majority and minority groups. Offered as AAST 3337, MAS 3337, and SOCI 3337; credit will be granted in only one department. Credit will not be granted for both SOCI 3337 and SOCI 4310 or for MAS 3337 and MAS 4310.

**MAS 3343. LATINO/A LITERATURE. 3 Hours.**

Explores Latino/a literature of the United States from the nineteenth century through the present as conditioned by the intersections of race, class, gender, sexuality, and regional variation. Texts may include novels, poetry, drama, short fiction, and non-fiction by and about peoples in the U.S. with heritage from South America, Central America, the Caribbean, and Mexico. Offered as ENGL 3343 and MAS 3343; credit will be granted in only one department. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**MAS 3346. MEXICAN AMERICAN AND CHICANO/A LITERATURE. 3 Hours.**

Surveys Mexican American literature from 1848 to the present, including literature of the Chicano movement, focusing on important genres, themes, and historical developments. Offered as ENGL 3346 and MAS 3346; credit will be granted in only one department.

**MAS 3347. TOPICS IN MULTICULTURAL AMERICAN LITERATURES. 3 Hours.**

Focuses on literature produced within one or more ethnic communities in the U.S. in order to trace a theme or to explore issues such as intersectionality, hybridity/mestizaje, diaspora, or immigrant experiences. Topics may include Afro-Latino poetry, third-world feminist writing, multicultural literature of the Southwest, cultural memory and the Jewish literary tradition, or Asian-American fiction. Offered as ENGL 3347, AAST 3347, and MAS 3347; credit will be granted in only one department, and credit for MAS 3347 will be granted only once. Prerequisite: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**MAS 3348. LATINO IMMIGRATION TO THE U.S.. 3 Hours.**

Examines Latino immigration from the perspective of sociocultural anthropology. Focuses on how anthropologists have studied Mexican and other Latino immigrants, and discusses contemporary issues such as transnational communities, gender and immigration, citizenship, and immigrants' politics. The course seeks to familiarize students with the largest immigrant community in the U.S. through ethnographic case studies.

**MAS 3363. TEXAS TO 1850. 3 Hours.**

Multicultural heritage of Texas from pre-Colombian period to early statehood. Cultural contact; social, economic, and political change. Completion of either HIST 3345 or HIST 3346 is recommended for those planning to teach in Texas schools. Offered as HIST 3345 and MAS 3363; credit will be granted in only one department.

**MAS 3364. TEXAS SINCE 1845. 3 Hours.**

Texas in the Mexican-American and Civil Wars. Political events and ethnic relations since annexation. Rise of cotton, cattle, and oil industries. Literature and music in the 20th century. Completion of either HIST 3345 or HIST 3346 is recommended for those planning to teach history in Texas secondary schools. Offered as HIST 3346 and MAS 3364; credit will be granted in only one department.

**MAS 3375. LATIN AMERICAN HISTORY: ORIGINS THROUGH INDEPENDENCE. 3 Hours.**

Latin America during the colonial period of Spanish and Portuguese rule. Pre-European civilizations; Iberian backgrounds; conquest of indigenous peoples; development of colonial institutions, economic patterns, social structures, and race relations; independence from Europe. Offered as MAS 3375 and HIST 3375; credit will be granted in only one department.

**MAS 3376. LATIN AMERICAN HISTORY: POST-INDEPENDENCE TO THE PRESENT. 3 Hours.**

The evolution of six Latin American nations during the 19th and 20th centuries. The social, economic, and political development of three social groups in three regions: the Europeanized southern cone area of Argentina, Chile, and Uruguay; the indigenous culture of the Andean mountains in Peru; the African background of Brazil and Cuba. Offered as MAS 3376 and HIST 3376; credit will be granted in only one department.

**MAS 3377. HISTORY OF MEXICO. 3 Hours.**

Mexican history from its pre-Colonial indigenous foundation to the current situation. A social and economic analysis of the major events in Mexican history with emphasis on the 19th and 20th centuries. The major theme in this class is the growth of Mexican nationalism and its relation to region, religion, and ethnicity. Offered as HIST 3377 and MAS 3377; credit will only be granted in one department.

**MAS 3378. LATINO POLITICS. 3 Hours.**

An overview of Latino/Hispanic political behavior, identity, and power that analyzes the social, economic, and political issues impacting the Latino/Hispanic community in the United States. To be offered as POLS 3378 and MAS 3378. Credit will be granted only once.

**MAS 3379. LATINO POLITICAL THOUGHT. 3 Hours.**

An overview of the development of Latino/Hispanic political thought from Iberian and Latin American political culture and philosophy to contemporary North American Latino/Hispanic political ideology and political thought. To be offered as POLS 3379 and MAS 3379. Credit will be granted only once.

**MAS 3380. RACE, CRIME, AND JUSTICE. 3 Hours.**

An examination of race in the context of the criminal justice system. Emphasis is on social construction of crime; and the treatment of racial minorities as victims and offenders by law enforcement, courts, and corrections. Offered as CRCJ 3380 and MAS 3380; credit will be granted only once. Offered as AAST 3380 and CRCJ 3380; credit will be granted in only one department. Prerequisite: CRCJ 2334.

**MAS 4313. TOPICS IN HISPANIC CULTURE. 3 Hours.**

Among the topics are Spanish or Latin American music, television, radio, film, and literature as culture. May be repeated for credit as topic changes. Prerequisite: SPAN 3315 with a grade of C or better. Offered as MAS 4313 and SPAN 4313; credit will be given for MAS 4313 or SPAN 4313 but not both in a given semester.

**MAS 4315. TOPICS IN CONTEMPORARY LATIN-AMERICAN LITERATURE AND CULTURE, MODERNISM TO THE PRESENT. 3 Hours.**

Topics may include: Latin-American literature and culture of Modernism, modern Latin-American literature and culture, or any particular movement, genre, work or author from Modernism to the present. May be repeated for credit when content changes. Offered as MAS 4315 and SPAN 4315; credit will be given for MAS 4315 or SPAN 4315 but not both in a given semester. Prerequisite: SPAN 3315 with a grade of C or better.

**MAS 4317. U.S.-MEXICO LITERATURE & CULTURE. 3 Hours.**

U.S.-Mexico cultural manifestations with particular attention to music, television, radio, film, performance art, and literature as culture. Cross-listed with MAS 4317. Prerequisite: SPAN 3315 with a grade of C or better.

**MAS 4318. MEXICAN LITERATURE. 3 Hours.**

Studies in Mexican fiction, poetry, drama, and literary essay. Offered as MAS 4318 and SPAN 4318; credit will be given for MAS 4318 or SPAN 4318 but not both in a given semester. Prerequisite: SPAN 3315 with a grade of C or better.

**MAS 4319. POLITICS OF MEXICAN AMERICANS. 3 Hours.**

The influence of Mexican-American politics on United States government and policies with special attention given to organizational development, participation in political parties, leadership, ideology, the Chicano Movement, current issues, and relations with other ethnic groups. Offered as MAS 4319 and POLS 4319; credit will be given in only one department. Prerequisite: POLS 2311 and POLS 2312.

**MAS 4327. WOMEN IN HISPANIC LITERATURE. 3 Hours.**

Considers women as characters in and writers of Hispanic literature. Includes the analysis of themes, language, and how the writings of women often give voice to lesser-known aspects of culture. Also listed as SPAN 4327. Credit cannot be given for both.

**MAS 4350. TOPICS IN MEXICAN AMERICAN STUDIES. 3 Hours.**

Subjects of interest in Mexican American and Latino studies. May be repeated for credit when topic changes.

**MAS 4360. CONFERENCE COURSE. 3 Hours.**

Permission of the director of the Center for Mexican American Studies required. Topics for research or study in designated areas assigned in consultation with course instructor.

**MAS 4370. CAPSTONE MEXICAN AMERICAN STUDIES. 3 Hours.**

In consultation with the course instructor, students will design a research project or an internship that will integrate their previous course work into a capstone experience in either the applied or the cultural studies stream of the Mexican American Studies minor.

**MAS 4391. CONFERENCE COURSE. 3 Hours.**

Permission of the director of the Center for Mexican American Studies required. Topics for research or study in designated areas assigned in consultation with course instructor.

**MAS 4393. MEXICAN AMERICAN STUDIES INTERNSHIP. 3 Hours.**

A combination of field-related experience in the service, community, and/or business sectors with an academic component. Prerequisite: At least two MAS courses and permission of the instructor.

## COURSES

**MATH 0100. DEVELOPMENTAL MATHEMATICS SUPPORT. 1 Hour.**

The course supports students in developing skills, strategies, and reasoning needed to succeed in mathematics, including communication and appropriate use of technology. Topics include the study of numeracy and the real number system; algebraic concepts, notation, and reasoning; quantitative relationships; mathematical models; problem-solving; relations and functions, inequalities, and algebraic expressions and equations. Credit in this course does not fulfill any degree requirements. This is a corequisite course and requires continuous concurrent enrollment with the appropriately paired college-level math course. Prerequisite: An appropriate assessment test score. TSI MATH score of at least 940.

**MATH 0101. DEVELOPMENTAL MATHEMATICS SUPPORT. 1 Hour.**

The course supports students in developing skills, strategies, and reasoning needed to succeed in mathematics, including communication and appropriate use of technology. Topics include the study of numeracy and the real number system; algebraic concepts, notation, and reasoning; quantitative relationships; mathematical models; problem-solving; relations and functions, inequalities, and algebraic expressions and equations. Credit in this course does not fulfill any degree requirements. This is a corequisite course and requires continuous concurrent enrollment with MATH 1301. Prerequisite: An appropriate assessment test score. TSI MATH score of at least 940. Corequisite: MATH 1301.

**MATH 0102. INTERMEDIATE ALGEBRA SUPPORT. 1 Hour.**

The course supports students in developing skills, strategies, and reasoning needed to succeed in mathematics, including communication and appropriate use of technology. Topics include the study of relations and functions, inequalities, and algebraic expressions and equations (including absolute value, polynomial, radical, and rational), with a special emphasis on linear and quadratic expressions and equations. Credit in this course does not fulfill any degree requirements. This is a corequisite course and requires continuous concurrent enrollment with MATH 1302. Prerequisite: An appropriate assessment test score. TSI MATH score of at least 940. Corequisite: MATH 1302.

**MATH 0115. INTERMEDIATE ALGEBRA SUPPORT FOR BUSINESS. 1 Hour.**

The course supports students in developing skills, strategies, and reasoning needed to succeed in mathematics for business, including communication and appropriate use of technology. Topics include the study of relations and functions, inequalities, and algebraic expressions and equations (including absolute value, polynomial, radical, and rational), with a special emphasis on linear and quadratic expressions and equations. Credit in this course does not fulfill any degree requirements. This is a corequisite course and requires continuous concurrent enrollment with MATH 1315. Prerequisite: An appropriate assessment test score. TSI MATH score of at least 940. Corequisite: MATH 1315.

**MATH 0302. FUNDAMENTALS OF ALGEBRA. 3 Hours.**

This course is designed for students whose placement scores or life experience indicate that they may need additional preparation in order to take a college credit bearing mathematics course. Topics may include basic algebraic operations and expressions, linear equations and inequalities, polynomials, rational expressions, factoring, exponents and radicals, graphing, quadratic equations, and mathematical reasoning. Students will use mathematical software to master targeted areas and progress through a self-paced environment in order to achieve college readiness. Immediately following the successful completion of this foundational course, students should register for a credit bearing mathematics course accordingly to their degree plan. Credit in this course does not fulfill any degree requirement.

**MATH 0311. FOUNDATIONS FOR CONTEMPORARY MATHEMATICS. 3 Hours.**

This course is designed for students whose placement scores or life experience indicate that they may need additional preparation in order to take a college credit-bearing mathematics course. This course provides foundational preparation for MATH 1301. Topics include basic numeric and algebraic operations, expressions, linear and quadratic equations, solving techniques, graphing, mathematical logic and reasoning, as well as a brief introduction to probability and statistics. Students will use mathematical software to master targeted areas and progress through a modified self-paced environment in order to achieve college readiness. Immediately following the successful completion of this foundational course, students should register for a credit-bearing mathematics course according to their degree plan, specifically MATH 1301. Credit in this course does not fulfill any degree requirements.

**MATH 0312. FOUNDATIONS FOR ALGEBRA. 3 Hours.**

This course is designed for students whose placement scores or life experience indicate that they may need additional preparation in order to take a college credit-bearing mathematics course. This course provides foundational support for MATH 1302. Topics include basic numeric and algebraic operations and expressions, linear equations and inequalities, polynomials, rational expressions, factoring, exponents and radicals, graphing, and quadratic equations. Students will use mathematical software to master targeted areas and progress through a modified self-paced environment to achieve college readiness. This corequisite course requires continuous concurrent enrollment with MATH 1302. Credit in this course does not fulfill any degree requirements.

**MATH 0315. FOUNDATIONS FOR BUSINESS ALGEBRA. 3 Hours.**

This course is designed for students whose placement scores or life experience indicate that they may need additional preparation in order to take a college credit-bearing mathematics course. This course provides foundational support for MATH 1315. Topics include basic numeric and algebraic operations and expressions, linear equations and inequalities, polynomials, rational expressions, factoring, exponents and radicals, graphing, and quadratic equations. Students will use mathematical software to master targeted areas and progress through a modified self-paced environment to achieve college readiness. This corequisite course requires continuous concurrent enrollment with MATH 1315. Credit in this course does not fulfill any degree requirements.

**MATH 1301. CONTEMPORARY MATHEMATICS. 3 Hours. (TCCN = MATH 1332)**

This course covers real-world applications of mathematics intended for Non STEM (Science, Technology, Engineering and Mathematics) majors. It develops problem-solving and critical thinking skills. Topics include the mathematics of dimensional analysis, mathematical sets and logic, voting methods, number sense, intermediate algebra skills, probability, statistics, and finance. The use of online platforms and calculators are required. See course syllabus for details. Credit may be received for only one of MATH 1301, MATH 1302/1402, or MATH 1315.

**MATH 1302. COLLEGE ALGEBRA. 3 Hours. (TCCN = MATH 1314)**

This course is designed as preparation for higher level mathematics courses. Topics include the study of linear, quadratic, polynomial, rational, radical absolute value, logarithmic, and exponential functions, relations and inequalities; graphs, basic characteristics, and operations on functions; real and complex zeros of functions; graphing techniques; systems of equations and matrices. The use of mathematical software and calculators is required. See course syllabus for more details. Non-STEM (Science-Technology-Engineering-Mathematics) majors should enroll in MATH 1301, and Business majors should enroll in MATH 1315. Credit may be received for only one of MATH 1301, MATH 1302, MATH 1402 or MATH 1315. Students may not co-enroll in MATH 1302 and MATH 1402.

**MATH 1303. TRIGONOMETRY. 3 Hours. (TCCN = MATH 1316)**

Trigonometric functions, radian measure, solution of triangles, graphs of trigonometric functions, trigonometric identities and equations, and complex numbers. This course is not intended for Science majors. Prerequisite: C or better in MATH 1301, MATH 1302, MATH 1402, MATH 1308, MATH 1315, or a qualifying score on either Math Placement Test (MPT) or ALEKS PPL.

**MATH 1308. ELEMENTARY STATISTICAL ANALYSIS. 3 Hours. (TCCN = MATH 1342)**

Topics may include collection, analysis, presentation, and interpretation of data. Analysis includes descriptive statistics, probability, relationships between variables and graphs, elementary statistical models, hypothesis testing, inference, estimation, correlation, regression and confidence intervals. The use of mathematical software and calculators is required. See course syllabus for details.

**MATH 1309. STATISTICAL LITERACY. 3 Hours. (TCCN = MATH 1342)**

Topics may include collection, analysis, presentation, and interpretation of data. Analysis includes descriptive statistics, probability, relationships between variables and graphs, hypothesis testing, inference, estimation, correlation, regression, and confidence intervals. Special emphasis placed on statistical reasoning for everyday life, understanding statistical language and methods, and interpreting results. The use of mathematical software and calculators is required.

**MATH 1313. LIBERAL ARTS HONORS MATHEMATICS. 3 Hours.**

Topics include the development of the real number system, different orders of infinity, the idea of convergence and how this led to the development of calculus, the concept of a mathematical proof, the conceptual foundations of topology, networks, and knot theory, and modern applications of mathematics to the sciences.



**MATH 1315. COLLEGE ALGEBRA FOR ECONOMICS & BUSINESS ANALYSIS. 3 Hours. (TCCN = MATH 1324)**

This course covers material in a traditional algebra course with emphasis on business and financial application. The application of common algebraic functions including polynomial, exponential, logarithmic, and rational, to problems in business, economics, and the social sciences are addressed. Additional topics include systems of linear equations and inequalities, linear programming, mathematics of finance, elements of matrix algebra, logic and probability including expected value. Credit may be received for only one of MATH 1301, MATH 1302, MATH 1402, or MATH 1315.

**MATH 1316. MATHEMATICS FOR ECONOMICS AND BUSINESS ANALYSIS. 3 Hours. (TCCN = MATH 1325)**

This course is the basic study of limits and continuity, differentiation, optimization and graphing, and integration of elementary functions, with emphasis on mathematical tools and applications in business, economics, and social sciences. This course is not a substitute for MATH 1426 Calculus I. Prerequisite: C or better in MATH 1315 or MATH 1302 or MATH 1402, or a qualifying score on Math Placement Test (MPT) or ALEKS PPL, or student group.

**MATH 1324. ALGEBRA AND TRIGONOMETRY. 3 Hours. (TCCN = MATH 2412)**

A fast-paced summary study of the topics of MATH 1302 and MATH 1303. This course is not intended for calculus track students; those students should take MATH 1421. Credit cannot be received for MATH 1324 and MATH 1302/1402 or MATH 1303.

**MATH 1325. ANALYTIC GEOMETRY. 3 Hours.**

Vectors, lines in two dimensions, circles, conics, transformation of coordinates, polar coordinates, parametric equations, and the solid analytic geometry of vectors, lines, planes, cylinders, spherical and cylindrical coordinates. Prerequisite: C or better in MATH 1301 or MATH 1302 or MATH 1402 or MATH 1315 or MATH 1324, or a qualifying score on Math Placement Test.

**MATH 1327. ARCHITECTURAL CALCULUS WITH ANALYTIC GEOMETRY. 3 Hours.**

Topics from Analytic Geometry and Calculus including conics, polar coordinates, parametric equations; concepts of limit, continuity, differentiation and integration; applications of these concepts. This course will not substitute for MATH 1426. Prerequisite: Major or intended major in Architecture or Interior Design and C or better in MATH 1303 or MATH 1421, or a qualifying score on either the Math Placement Test (MPT) or ALEKS PPL, or student group.

**MATH 1330. ARITHMETICAL PROBLEM SOLVING. 3 Hours.**

This is a course in small and large group problem solving, with emphasis on reasoning and writing. Topics include problem solving, sets, operations and relations, arithmetic, place value and bases, propositional logic, fractions, number theory, number systems and estimation. Prerequisite: C or better in MATH 1301 or MATH 1302 or MATH 1402, and enrollment as an education major.

**MATH 1331. GEOMETRICAL INFERENCE AND REASONING. 3 Hours.**

A discovery-oriented exploration of two-and three-dimensional geometry, with emphasis on reasoning and writing. Topics include constructions, polygons, tessellations, polyhedra, symmetry, rigid motions in the plane, measurement, and discovering theorems. Prerequisite: C or better in MATH 1330 and enrollment as an education major.

**MATH 1332. FUNCTIONS, DATA, AND APPLICATIONS. 3 Hours.**

An exploration of interpreting data, using cooperative groups, spreadsheets and mathematical models. Topics include graphs, applications to economics and natural sciences, function concepts, counting principles, and basic probability and statistics. Prerequisite: C or better in MATH 1330 and enrollment as an education major.

**MATH 1402. COLLEGE ALGEBRA. 4 Hours. (TCCN = MATH 1414)**

This course is designed as preparation for higher level mathematics courses. Integrated review materials will be used to master targeted areas as students proceed through the course. Topics include foundational numeric and algebraic operations in addition to the study of linear, quadratic, polynomial, rational, radical absolute value, logarithmic, and exponential functions, relations and inequalities; graphs, basic characteristics, and operations on functions; real and complex zeros of functions; graphing techniques; systems of equations and matrices. The use of mathematical software and calculators is required. See course syllabus for more details. Non-STEM (Science-Technology-Engineering-Mathematics) majors should enroll in MATH 1301, and Business majors should enroll in MATH 1315. Credit may be received for only one of MATH 1301, MATH 1302, MATH 1402, or MATH 1315. Students may not co-enroll in MATH 1302 and MATH 1402.

**MATH 1421. PREPARATION FOR CALCULUS. 4 Hours.**

This course integrates and builds upon concepts and skills from college algebra and trigonometry that are essential to success in calculus. Problem solving activities form the basis for the establishment of these mathematical connections. Prerequisite: C or better in MATH 1302 or MATH 1402 or MATH 1315, or a qualifying score on either the Math Placement Test (MPT) or ALEKS PPL, or student group.

**MATH 1426. CALCULUS I. 4 Hours. (TCCN = MATH 2413)**

Concepts of limit, continuity, differentiation and integration; applications of these concepts. Prerequisite: A qualifying score on the Math Placement Test (MPT) or ALEKS PPL is required to register for this course, or student group.

**MATH 2326. CALCULUS III. 3 Hours. (TCCN = MATH 2315)**

Vectors, dot product, cross product, planes, quadric surfaces, partial differentiation, multiple integrals (with applications), line integrals, Green's Theorem, surface integrals, Stokes' Theorem, divergence theorem. Prerequisite: C or better in MATH 2425 or HONR-SC 2425, or student group.

**MATH 2330. FUNCTIONS AND MODELING. 3 Hours.**

Students engage in explorations and lab activities designed to strengthen and expand their knowledge of the topics found in secondary mathematics. Students collect data and explore a variety of situations that can be modeled using linear, exponential, polynomial, and trigonometric functions. Activities are designed to have them take a second, deeper look at topics they should have been exposed to previously; illuminate the connections between secondary and college mathematics; illustrate good, as opposed to typically poor, sometimes counterproductive, uses of technology in teaching; illuminate the connections between various areas of mathematics; and engage them in serious (i.e., non-routine) problem solving, problem-based learning, and applications of mathematics. While there is some discussion of how the content relates to secondary mathematics instruction, the course primarily emphasizes mathematics content knowledge and content connections, as well as applications of the mathematics topics covered. This course is part of the UTeach program. Prerequisite: C or better in MATH 2425; C or better in SCIE 1201 or SCIE 1334 or concurrent enrollment.

**MATH 2333. INTRODUCTION TO LINEAR ALGEBRA. 3 Hours.**

Solving systems of linear equations by (reduced) row-echelon form and matrix inversion, matrix algebra, determinants, real n-dimensional space and its geometric structure, linear transformations, eigenvalues and eigenvectors, basis, dot product, quadratic forms, and applications in science and engineering. Prerequisite: C or better in MATH 2425.

**MATH 2425. CALCULUS II. 4 Hours. (TCCN = MATH 2414)**

Applications of integration, techniques of integration, parametric equations, polar coordinates, sequences, and series. Prerequisite: C or better in MATH 1426 or HONR-SC 1426, or student group.

**MATH 3300. INTRODUCTION TO PROOFS. 3 Hours.**

Techniques for constructing proofs for various propositions. The propositions chosen exhibit properties of functions, relations, sets, cardinality, and other ideas in mathematics. An axiomatic approach to some areas in mathematics. Oral presentations of proofs are required. Prerequisite: Math major or math intended major. C or better in MATH 2425 or HONR-SC 2425, or student group.

**MATH 3301. FOUNDATIONS OF GEOMETRY. 3 Hours.**

A development of the foundations of geometry. Prerequisite: C or better in MATH 2425 or HONR-SC 2425, or student group.

**MATH 3302. MULTIVARIATE STATISTICAL METHODS. 3 Hours.**

Topics in multivariate data analysis with applications in various areas of interest, including multiple regression, analysis of experimental designs, covariate adjustment, non-linear regression and the use of standard multivariate statistical packages. Offered as MATH 3302 and STATS 3302; credit will be granted in only one department. Prerequisite: C or better in MATH 3313 or STATS 3313 or MATH 3316 or STATS 3316 or MATH 3351 or BIOL 3351 or consent of the instructor.

**MATH 3303. MATHEMATICAL GAME THEORY. 3 Hours.**

Two-person zero-sum games, solving matrix games by linear programming, two-person non-zero sum games, noncooperative n-person games, Nash equilibrium points and refinements, cooperative n-person games, core, Shapley value, and other concepts of solution. Applications to cost allocation, fair division, and voting power. Prerequisite: C or better in MATH 3330 or MATH 3319, or consent of the instructor.

**MATH 3304. LINEAR OPTIMIZATION APPLICATIONS. 3 Hours.**

An introduction to basic methods of optimization with applications to optimal resource application, minimal cost allocation and interpersonal decision making in noncooperative and cooperative environments. Includes simplex method, duality, zero sum games, transportation and assignment. Prerequisite: C or better in MATH 3330 or MATH 3319.

**MATH 3307. ELEMENTARY NUMBER THEORY. 3 Hours.**

Various topics in elementary number theory. Divisibility, congruences, quadratic reciprocity, and multiplicative functions. Prerequisite: 2.0 or better in nine hours of college mathematics, or student group.

**MATH 3313. INTRODUCTION TO PROBABILITY. 3 Hours.**

Basic concepts in probability, random variables, probability distributions, functions of random variables, moment generating functions, central limit theorem and its role in statistics, joint probability functions and joint probability density functions, joint cumulative distribution functions, conditional and marginal probability distributions, covariance and correlation coefficients, transformation and order statistics. Offered as MATH 3313 and STATS 3313; credit will be granted in only one department. Prerequisite: C or better in MATH 2326, or student group.

**MATH 3314. DISCRETE MATHEMATICS. 3 Hours.**

An introduction into discrete structures. Topics may include propositional calculus, sets and operations, functions and relations, induction, principles of counting, sequences and summations, the binomial theorem, divisibility and modular arithmetic, equivalences and partial orders, graphs and shortest path algorithms, trees and minimal spanning trees, tree traversal, and elements of boolean algebra. Prerequisite: C or better in MATH 1426 or HONR-SC 1426.

**MATH 3315. MATHEMATICAL MODELS. 3 Hours.**

Methods for solving, by means of mathematics, problems which occur in other disciplines such as physics, engineering, biology, and economics. Basic mathematical tools are chosen from areas such as optimization, probability, differential equations, and computer-oriented mathematics. Problems arising in other disciplines or industrial applications are emphasized. Subject matter will depend on the instructor. Prerequisite: C or better in MATH 2326, or permission of instructor, or student group.

**MATH 3316. STATISTICAL INFERENCE. 3 Hours.**

A comprehensive study of basic data analysis, focused on reasoning process of statistical investigations from asking question and collecting data to analyzing data and drawing inferences. Topics include exploratory data analysis, sampling, sampling distribution, estimation, hypothesis tests, regression, and ANOVA, with an emphasis on applications of these techniques using statistical software. Offered as MATH 3316 and STATS 3316; credit will be granted in only one department. Prerequisite: C or better in 6 hours from the following: MATH 1302, MATH 1308, MATH 1322, MATH 1323, MATH 1330, MATH 1331, MATH 1332, MATH 1402, MATH 1421, MATH 1426, MATH 2425, MATH 2326, MATH 3300, MATH 3307, MATH 3314, MATH 3319, or MATH 3330; HONR-SC 1426, HONR-SC 2425, or student group.

**MATH 3318. DIFFERENTIAL EQUATIONS. 3 Hours.**

Ordinary differential equations with emphasis on the solutions and analysis of first and higher order differential equations drawn from fields of physics, chemistry, geometry, and engineering. Prerequisite: C or better in MATH 2326 or concurrent registration, or student group.

**MATH 3319. DIFFERENTIAL EQUATIONS & LINEAR ALGEBRA. 3 Hours.**

Introductory course with emphasis on solution techniques. Ordinary differential equations, vector spaces, linear transformations, matrix/vector algebra, eigenvectors, and systems of equations. Math majors will not receive credit for this course. Prerequisite: C or better in MATH 2425 or student group.

**MATH 3321. ABSTRACT ALGEBRA I. 3 Hours.**

Groups including Lagrange's Theorem, Cauchy's Theorem, the homomorphism theorems, and symmetric groups. Prerequisite: C or better in MATH 3300 and MATH 3330, or student group.

**MATH 3330. INTRODUCTION TO LINEAR ALGEBRA AND VECTOR SPACES. 3 Hours.**

Solving systems of linear equations by (reduced) row-echelon form and matrix inversion, matrix operations, linear transformations, projections, characterizing invertibility, determinants, bases, change of basis, real  $n$ -dimensional space and its geometric structure, subspaces, kernel and image of a linear transformation, application to abstract vector spaces of arbitrary dimension, dot product, orthogonality, Gram-Schmidt process, eigenvalues and eigenvectors, characteristic polynomial, diagonalization, symmetric matrices, and principal-axis theorem. Prerequisite: C or better in MATH 2425, or student group.

**MATH 3335. ANALYSIS I. 3 Hours.**

Real numbers, sequences, series, limits of functions, continuity. Prerequisite: Grade of C or better in both MATH 2326 and MATH 3300, or student group.

**MATH 3345. NUMERICAL ANALYSIS AND COMPUTER APPLICATIONS. 3 Hours.**

Numerical solutions of nonlinear equations, numerical integration and differentiation, polynomial interpolation, solutions of linear systems, and an introduction to spline functions. Prerequisite: C or better in MATH 2326, and C or better in one of MATH 3330 or MATH 3319, or student group.

**MATH 4093. UNDERGRADUATE RESEARCH. 0 Hours.**

Undergraduate research experiences under supervision of faculty. Students are expected to disseminate research findings by poster or oral presentations in meetings or conferences. Students are also expected to participate in other activities as directed by the grant-funded Research Program Director.

**MATH 4150. SEMINAR IN MATHEMATICAL BIOLOGY. 1 Hour.**

Formulation and definition of interdisciplinary research problems in Mathematical Biology, the formulation and execution of strategies of solution, and the presentation of results. Research under faculty supervision and mentorship involving collaboration within a small group. Prerequisite: Consent of the instructor.

**MATH 4180. ORAL COMMUNICATION OF MATHEMATICS. 1 Hour.**

This course trains students in giving effective oral presentations of mathematics and topics involving mathematics. Students will give presentations to the class and evaluate the presentations of their classmates. Topics may be chosen from mathematics and science journals at a level suitable for undergraduates, from books and articles on the history and development of mathematics, or from previous course material.

**MATH 4191. SPECIAL TOPICS IN MATHEMATICS. 1 Hour.**

Special topics in mathematics are assigned to individuals or small groups. Faculty members closely supervise the projects and assign library reference material. Small groups will hold seminars at suitable intervals. May be repeated for credit. Prerequisite: senior standing and written permission of the instructor and department chair.

**MATH 4291. SPECIAL TOPICS IN MATHEMATICS. 2 Hours.**

Special topics in mathematics are assigned to individuals or small groups. Faculty members closely supervise the projects and assign library reference material. Small groups will hold seminars at suitable intervals. May be repeated for credit. Prerequisite: senior standing and written permission of the instructor & department chair.

**MATH 4303. INTRODUCTION TO TOPOLOGY. 3 Hours.**

A first course in topology from the axiomatic point of view. Prerequisite: C or better in MATH 3335.

**MATH 4311. STOCHASTIC MODELS AND SIMULATION. 3 Hours.**

A study of processes, whose outcomes are governed by chance, through a combination of lectures and computer lab sessions. Experiments include random number generation, coin tossing and other games of chance, random walks, Markov Chains, Poisson processes, birth-death processes, branching processes, and Brownian Motion. A foundation for modeling random phenomena in sciences, engineering and business. Prerequisite: C or better in MATH 2326 and knowledge of basic probability (MATH 3313/STATS 3313 or MATH 3351/BIOL 3351 or equivalent), or consent of instructor, or student group.

**MATH 4312. ACTUARIAL RISK ANALYSIS. 3 Hours.**

Fundamentals of actuarial science concerning risk theory based on probability. Topics include: utility theory, principles of premium calculations, collective and individual risk models, ruin theory, classical Lundberg's Model. Prerequisite: C or better in MATH 3313/STATS 3313.

**MATH 4313. MATHEMATICAL STATISTICS. 3 Hours.**

A continuation of MATH 3313. Random sampling and sampling distributions, estimation of unknown parameters and main properties of estimators, confidence intervals for unknown parameters, testing of hypotheses. Prerequisite: C or better in MATH 3313 or STATS 3313.

**MATH 4314. ADVANCED DISCRETE MATHEMATICS. 3 Hours.**

Finite automata, Turing machines, formal languages, graph theory, combinatorial optimization, complexity of algorithms, P versus NP, and decidable versus undecidable problems. Prerequisite: C or better in MATH 3314.

**MATH 4315. MATHEMATICAL FINANCE. 3 Hours.**

Option pricing based on geometric Brownian motion. Pricing contracts via arbitrage. The Black-Scholes formula and the delta hedging strategy. Call Option on dividend paying securities. European and American Put Options. Valuations by expected Utility and Portfolio Selection Problem. Value at Risk and conditional Value at Risk. The Capital Assets Pricing Model. Prerequisite: MATH 3313 or STATS 3313 or equivalent.

**MATH 4320. ADVANCED DIFFERENTIAL EQUATIONS. 3 Hours.**

The existence and properties of solution of differential equations. Prerequisite: C or better in MATH 3318 or MATH 3319.

**MATH 4321. ABSTRACT ALGEBRA II. 3 Hours.**

Rings and field theory, including polynomial rings and field extensions. Prerequisite: C or better in MATH 3321.

**MATH 4322. INTRODUCTION TO COMPLEX VARIABLES. 3 Hours.**

An introduction to the theory of functions of a complex variable and also an introduction to applications including uses of the residue theory, contour integration and conformal mapping. Prerequisite: C or better in MATH 2326, or student group.

**MATH 4324. INTRODUCTION TO PARTIAL DIFFERENTIAL EQUATIONS. 3 Hours.**

Methods of solutions of selected elliptic, parabolic, and hyperbolic partial differential equations with reference to physical applications. Prerequisite: C or better in MATH 3318 or MATH 3319.

**MATH 4330. ADVANCED LINEAR ALGEBRA. 3 Hours.**

Eigenvalues, eigenvectors, generalized eigenvectors, minimal/characteristic polynomial, Jordan normal/canonical form, companion matrix and rational canonical form, inner products, adjoint of a linear map, positive-definite operators and isometries, polar decomposition and singular-value decomposition, exponential of a matrix and applications to differential equations, least squares and curve fitting, bilinear and quadratic forms, dual spaces and transpose of a matrix, quotient spaces, multilinear maps, tensor products. Prerequisite: MATH 3330 or consent of instructor.

**MATH 4334. ADVANCED MULTIVARIABLE CALCULUS. 3 Hours.**

Topics include properties of limits of mappings, continuity of mappings, derivatives of mappings, and integrals of mappings from n-dimensional Euclidean space to m-dimensional Euclidean space. Prerequisite: C or better in MATH 3335, and MATH 3330.

**MATH 4335. ANALYSIS II. 3 Hours.**

Differentiation, integration, and selected topics in sequences and series of functions and metric spaces. Prerequisite: C or better in MATH 3335.

**MATH 4345. NUMERICAL ANALYSIS & COMPUTER APPLICATIONS II. 3 Hours.**

Numerical solutions for ordinary differential equations, boundary value problems, minimizations of multivariate functions, and methods of least squares. Prerequisite: C or better in MATH 3345.

**MATH 4350. PRECALCULUS FOR MID-LEVEL MATHEMATICS TEACHERS. 3 Hours.**

This course serves to bridge the gap between algebra and calculus for middle level teachers. It will develop a firm understanding of the concept of function, how to graphically represent various functions, analyze their behavior and create new functions from old. Functions will be used to model real-life situations. The course will focus on the essential elements of precalculus, as given by the TEKS. It will develop the foundations for functions and explore functions as a unifying theme. This includes transformations, inverses, and solving equations. These foundational ideas will be explored and applied to specific functions, including exponential, logarithmic, power, polynomial, rational, and trigonometric functions. There will be an emphasis on multiple representations of mathematical ideas: verbal, concrete, pictorial, tabular, symbolic and graphical. Throughout, the mathematical connections between precalculus and school mathematics will be highlighted. Prerequisite: C or better in MATH 1302/1402, MATH 1308, MATH 1330, MATH 1331 and MATH 1332. This course does not count toward a degree in mathematics.

**MATH 4351. CALCULUS FOR MID-LEVEL MATHEMATICS TEACHERS. 3 Hours.**

This course serves to introduce the basic concepts of calculus to middle level teachers. The primary goal is to help teachers develop a fundamental understanding of the key mathematical ideas in calculus in order to broaden their mathematical perspective and gain insight into the topics in the middle level curriculum which are related and foundational to its development. Participants will develop conceptual knowledge of the processes of differentiation and integration, and understanding of their applications and an understanding of the relationship between the two processes. Prerequisite: C or better in MATH 4350. This course does not count toward a degree in mathematics.

**MATH 4381. MATHEMATICS RESEARCH. 3 Hours.**

Formulation and definition of research problems, the formulation and execution of strategies of solution, and the presentation of results. Prerequisite: consent of instructor. Recommendation by other faculty encouraged.

**MATH 4391. SPECIAL TOPICS IN MATHEMATICS. 3 Hours.**

Special topics in mathematics are assigned to individuals or small groups. Faculty members closely supervise the projects and assign library reference material. Small groups will hold seminars at suitable intervals. May be repeated for credit. Prerequisite: senior standing and written permission of the instructor & department chair.

**MATH 4392. ADVANCED TOPICS IN MATHEMATICS. 3 Hours.**

Varies from semester to semester. New developments in mathematics, in-depth study of a topic not covered in other courses, or a special faculty expertise made available to undergraduates. May be repeated for credit as topic varies. Prerequisite: permission of instructor.

**MATH 4393. HONORS THESIS/SENIOR PROJECT. 3 Hours.**

Required of all students in the University Honors College. During the senior year the student must complete a thesis or a project under the direction of a faculty member in the math department. Prerequisite: enrollment in the University Honors College and written permission of the instructor and chair.

**MATH 4394. UNDERGRADUATE RESEARCH EXPERIENCES. 3 Hours.**

Research under faculty supervision and mentorship involving collaboration within a small group. The topic varies from semester to semester, is determined by the faculty teaching the course, and is announced in advance. The course promotes active learning based on inquiry, development of higher-order thinking skills, and meaningful scientific research. Prerequisite: consent of instructor.

**MATH 5190. INTERNSHIP FOR MATHEMATICAL SCIENCES. 1 Hour.**

Practical experiences in the mathematical sciences. May be repeated for credit when the content changes. Prerequisite: Successful completion of 18 graduate credit hours in the program of study and in good academic standing (i.e. graduate GPA 3.0/4.0 or higher).

**MATH 5191. SEMINAR FOR TEACHING ASSISTANTS. 1 Hour.**

This course is mandatory for all mathematics graduate teaching assistants. Students will be instructed on classroom procedures and effective teaching strategies and will be required to deliver teaching demonstrations under the supervision of mathematics faculty. The purpose is to enhance students' capacity to facilitate mathematics learning in a variety of settings. Admittance to this course is restricted to Math TAs.

**MATH 5300. INTRODUCTION TO SCIENTIFIC COMPUTING. 3 Hours.**

Introduction to scientific computing utilizing algorithmic languages and operating environment such as Fortran, MATLAB, C, and C++ and UNIX (LINUX) operating system. Prerequisite: consent of the instructor.

**MATH 5302. FUNDAMENTALS OF MATHEMATICAL SCIENCES I. 3 Hours.**

Matrices and operators, linear spaces, multivariable calculus, dynamical systems, applications. Prerequisites: MATH 3318 and MATH 3330 or consent of the instructor.

**MATH 5303. FUNDAMENTALS OF MATHEMATICAL SCIENCES II. 3 Hours.**

Wave propagation, potential theory, complex variables, transform techniques, perturbation techniques, diffusion, applications. Prerequisite: MATH 5302 or consent of the instructor.

**MATH 5304. GENERAL TOPOLOGY. 3 Hours.**

Introduction to fundamentals of general topology. Topics include product spaces, the Tychonoff theorem, Tietze's Extension theorem, and metrization theorems. Prerequisite: MATH 4304 or MATH 4335.

**MATH 5305. STATISTICAL METHODS. 3 Hours.**

Topics include descriptive statistics, numeracy, and report writing; basic principles of experimental design and analysis; regression analysis; data analysis using the SAS package. Prerequisite: consent of the instructor.

**MATH 5307. MATHEMATICAL ANALYSIS I. 3 Hours.**

Elements of topology and the real number system, sequences in metric spaces, limits and continuity of functions, differentiation, the Riemann integral, infinite series, and sequences and series of functions. Prerequisite: MATH 4335 or consent of Graduate Advisor.

**MATH 5308. MATHEMATICAL ANALYSIS II. 3 Hours.**

Analysis in  $\mathbb{R}^n$ , limits, continuity, Jacobian, extremum problems, multiple integrals, sequences and series of functions, Lebesgue integral. Prerequisite: MATH 5307 or consent of Graduate Advisor.

**MATH 5310. MATHEMATICAL GAME THEORY. 3 Hours.**

Two person null sum games. Bimatrix games and Nash equilibrium points. Noncooperative games, existence theorem. Cooperative games, core, Shapley value, the nucleolus. Cost allocation. Market games. Simple games and voting. Prerequisite: MATH 3330.

**MATH 5311. APPLIED PROBABILITY AND STOCHASTIC PROCESSES. 3 Hours.**

Topics include conditional expectations, law of large numbers and central limit theorem, stochastic processes, including Poisson, renewal, birth-death, and Brownian motion. Prerequisite: MATH 3313 or equivalent.

**MATH 5312. MATHEMATICAL STATISTICS I. 3 Hours.**

Random variables and their expectations, some special distributions, moment generating functions, transformations of bivariate random variables, sampling distribution of statistics, Central Limit Theorem, confidence intervals, maximum likelihood estimation, introduction to hypothesis testing, maximum likelihood tests. Prerequisite: MATH 3335 or consent of instructor.

**MATH 5313. MATHEMATICAL STATISTICS II. 3 Hours.**

Multivariate distributions, consistency and limiting distributions, Rao-Cramer lower bound and efficiency, sufficiency and completeness, most powerful tests, uniformly most powerful tests, likelihood ratio test, the sequential probability ratio test, minimax and classification procedures. Prerequisite: MATH 5312/STATS 5312.



**MATH 5314. EXPERIMENTAL DESIGN. 3 Hours.**

This course covers the classical theory and methods of experimental design, including randomization, blocking, one-way and factorial treatment structures, confounding, statistical models, analysis of variance tables and multiple comparisons procedures. Prerequisite: MATH 5305/STATS 5305 or MATH 5355/STATS 5355 or permission of instructor.

**MATH 5315. GRAPH THEORY. 3 Hours.**

Algorithms for problems on graphs. Trees, spanning trees, connectedness, fundamental circuits. Eulerian graphs and Hamiltonian graphs. Graphs and vector spaces, matrices of a graph. Covering and coloring. Flows. Prerequisite: MATH 3314.

**MATH 5316. COMBINATORIAL OPTIMIZATION. 3 Hours.**

Shortest paths. Minimum weight spanning trees and matroids. Matchings and optimal assignment. Connectivity. Flows in networks, applications. Prerequisite: MATH 3314.

**MATH 5317. REAL ANALYSIS. 3 Hours.**

Sigma-fields, measures, measurable functions, convergence in measure and almost everywhere, integration, Fatou's Lemma, Lebesgue-dominated convergence, signed measures, Radon-Nikodym Theorem, product measures, Fubini's Theorem. Prerequisite: Math 5307 or consent of the Graduate Advisor.

**MATH 5318. FUNDAMENTALS OF STOCHASTIC ANALYSIS. 3 Hours.**

General properties of stochastic processes, processes with independent increments, martingales, limit theorems including invariance principle, Markov processes, stochastic integral, stochastic differential. Prerequisite: Math 5317 or consent of the instructor.

**MATH 5319. PROBABILITY THEORY. 3 Hours.**

Probability spaces, random variables, filtrations, conditional expectations, martingales, strong law of large numbers, ergodic theorem, central limit theorem, Brownian motion and its properties. Prerequisite: MATH 5317.

**MATH 5320. ORDINARY DIFFERENTIAL EQUATIONS. 3 Hours.**

Fundamentals of the theory of systems of ordinary differential equations: existence, uniqueness, and continuous dependence of solutions on data; linear equations, stability theory and its applications, periodic and oscillatory solutions. Prerequisite: MATH 5307 and MATH 5333.

**MATH 5321. APPLIED PARTIAL DIFFERENTIAL EQUATIONS. 3 Hours.**

General first order equations. Basic linear theory for elliptic, hyperbolic, and parabolic second order equations, including existence and uniqueness for initial and boundary value problems. Prerequisites: MATH 5307 and MATH 5333.

**MATH 5322. COMPLEX VARIABLES I. 3 Hours.**

Fundamental theory of analytic functions, residues, conformal mapping and applications. Prerequisite: MATH 5307.

**MATH 5325. ALGEBRAIC NUMBER THEORY. 3 Hours.**

Field extensions, number fields and number rings, ramification theory, class groups, elliptic curves and their group structure, applications to Fermat's last theorem. Prerequisite: MATH 3321.

**MATH 5326. ALGEBRAIC TOPOLOGY. 3 Hours.**

Basics of topology, Fundamental groups, covering spaces, Van Kampen's Theorem, categories and functors, singular homology, relative homology, Mayer-Vietoris sequence, cohomology, cup products, the cohomology ring of a space, CW complexes. Prerequisites: MATH 3321, MATH 3335.

**MATH 5327. FUNCTIONAL ANALYSIS I. 3 Hours.**

Introduction to Hilbert and Banach spaces: Hahn-Banach, Banach-Steinhaus, and closed graph theorems. Riesz representation theorem and bounded linear operators in Hilbert space. Prerequisite: MATH 5317 or consent of the instructor.

**MATH 5328. FUNCTIONAL ANALYSIS II. 3 Hours.**

The theory of distributions and Sobolev spaces, with applications to differential equations. Compact operators and Fredholm theory. Spectral theory for unbounded operators. Prerequisite: MATH 5327.

**MATH 5329. HOMOLOGICAL ALGEBRA. 3 Hours.**

Projective and injective modules, projective and injective resolutions, Hom and tensor, the language of category theory, derived functors, Ext and Tor, complexes.

**MATH 5330. ALGEBRAIC GEOMETRY. 3 Hours.**

Theory of ideals in polynomial rings, Nullstellensatz, Hilbert's basis theorem, computation in polynomial rings, affine and projective varieties, singular and smooth points on varieties. Prerequisite: MATH 4321.

**MATH 5331. ABSTRACT ALGEBRA I. 3 Hours.**

Fundamental topics on groups, rings and modules that may include: abelian groups; dihedral groups; groups of permutations; normal subgroups; quotient groups; group actions; Lagrange's Theorem; Cayley's Theorem; Sylow's Theorems; factorization in commutative rings; localization in commutative rings; quotient rings; quotient modules; isomorphism theorems. Prerequisite: permission from instructor.

**MATH 5332. ABSTRACT ALGEBRA II. 3 Hours.**

Fundamental topics that may include: modules; chain conditions, noetherian rings and modules, artinian rings; Wedderburn's Theorem; localization with Ore conditions; Maschke's Theorem; special classes of rings such as regular algebras, Cohen-Macaulay rings, Gorenstein rings, universal enveloping algebras. Prerequisite: MATH 5331 or permission from instructor.

**MATH 5333. LINEAR ALGEBRA AND MATRICES. 3 Hours.**

Vector spaces, their sums, linear (in)dependence, bases, linear maps and their matrices, change of basis, inner-products, adjoints, diagonalization, eigenvectors and generalized eigenvectors, eigenvalues, Jordan form, characteristic and minimal polynomials, dual vector spaces, bilinear and quadratic forms. Prerequisite: MATH 3330 or consent of instructor.

**MATH 5334. DIFFERENTIAL GEOMETRY. 3 Hours.**

Introduction to the theory of curves and surfaces in three dimensional Euclidean space. Prerequisite: MATH 4334 or MATH 4335.

**MATH 5336. CONCEPTS AND TECHNIQUES IN NUMBER THEORY. 3 Hours.**

Topics include mathematical induction, fundamental theorem of arithmetic, inequalities, special sequences and sums, divisibility properties, greatest common divisor, division and Euclidean algorithm, properties of congruence and Diophantine equations.

**MATH 5337. CONCEPTS AND TECHNIQUES IN CALCULUS. 3 Hours.**

Topics studied include limits, continuity, differentiation, integration, numerical approximations, applications and Taylor series.

**MATH 5338. NUMERICAL ANALYSIS I. 3 Hours.**

Solution of equations including linear and nonlinear systems, interpolation and approximation, spline, numerical differentiation and quadrature. Prerequisite: MATH 2425 or consent of the instructor.

**MATH 5339. NUMERICAL ANALYSIS II. 3 Hours.**

Rigorous treatment of numerical aspects of linear algebra and numerical solution of ordinary differential equations, boundary value problems, introduction to numerical solution of partial differential equations. Prerequisite: MATH 5338 or consent of the instructor.

**MATH 5340. DISCRETE MATHEMATICS FOR PROBLEM SOLVING. 3 Hours.**

Topics may include functions, mathematical induction, principles of counting, combinatorics, sequences and recurrence relations, finite graph theory, and elementary game theory.

**MATH 5341. MODERN GEOMETRY. 3 Hours.**

Topics include Euclidean and non-Euclidean geometries with an emphasis on comparing intrinsic and extrinsic characteristics of geodesics and the resulting geometrical implications.

**MATH 5342. CONCEPTS AND TECHNIQUES IN ALGEBRA. 3 Hours.**

A study of algebra as described in the K-12 research literature and connections to algebraic structures. Topics include algebra as the study of functions and function relationships, algebra as the study of multiple representations with an emphasis on graphs, tables, and formulae, algebra as generalized arithmetic and quantitative reasoning, and algebra as a language.

**MATH 5343. CONCEPTS AND TECHNIQUES IN PROBABILITY AND STATISTICS. 3 Hours.**

Consideration of (1) exploring data: descriptive statistics of situations involving one and two variables; (2) anticipating patterns: probability and simulation; (3) design of experiments and planning a study; (4) statistical inference: confirming models. Use of a graphing calculator and other appropriate technology.

**MATH 5344. MATHEMATICS-SPECIFIC TECHNOLOGIES. 3 Hours.**

Focus on use of current mathematics-specific technologies for enhancing mathematical understanding and mathematics teaching. May include use of Geometer's Sketchpad, Fathom, graphing calculators and computer algebra systems.

**MATH 5345. HISTORICAL APPROACH TO REAL ANALYSIS. 3 Hours.**

A historical treatment of real analysis that explores motivations for the early definitions and theorems in analysis. Topics may include Fourier's introduction of trigonometric series and the issues it created for mathematicians of the early 19th century, Cauchy's efforts toward establishing a firm foundation for calculus, and Dirichlet's proof of the validity of the Fourier series expansion. Prerequisite: MATH 5337 or consent of the instructor.

**MATH 5346. CONCEPTS AND TECHNIQUES IN PROBLEM SOLVING. 3 Hours.**

A study of the application of various heuristics and general problem strategies in mathematics, with application to the teaching and learning of secondary school and college-level mathematics. Topics include analyzing, classifying, and modifying tasks, assessment of problem solving, and implementing problem solving in the classroom. Assignments require interaction in secondary school or college field settings.

**MATH 5347. CONCEPTS AND TECHNIQUES IN MATHEMATICAL MODELING WITH APPLICATIONS. 3 Hours.**

Topics studied include algebraic, graphical, geometrical and numerical techniques to model and solve applied problems.

**MATH 5348. ADVANCED ALGEBRA IN SECONDARY SCHOOL MATHEMATICS. 3 Hours.**

Major concepts of second-year algebra applied to the teaching and learning of secondary school mathematics. Topics include relations, algebraic, tabular, verbal and geometric representations of functions, transformations, including applications involving systems of equations and inequalities.

**MATH 5350. APPLIED MATHEMATICS I. 3 Hours.**

Development of models arising in the natural sciences and in engineering. Emphasis will be on the mathematical techniques and theory needed to analyze such models; these include aspects of the theory of differential and integral equations, boundary value problems, theory of distributions and transforms. Prerequisites: MATH 5307 and MATH 5333.

**MATH 5351. APPLIED MATHEMATICS II. 3 Hours.**

Continuation of MATH 5350; models arising in the physical sciences whose analysis includes such topics as the theory of operators in a Hilbert space, variational principles, branching theory, perturbation and stability analysis. Prerequisite: MATH 5350.

**MATH 5352. CONCEPTS AND TECHNIQUES IN PRECALCULUS. 3 Hours.**

Topics include functions (transcendental, inverse, parametric, polar, transformations), asymptotic behavior, conics, sequences, complex numbers.

**MATH 5353. APPLIED LINEAR MODELS. 3 Hours.**

The course covers, at an operational level, three topics: 1) the univariate linear model, including a self-contained review of the relevant distribution theory, basic inference methods, several parameterizations for experimental design and covariate-adjustment models and applications, and power calculation; 2) the multivariate linear model, including basic inference (e.g. the four forms of test criteria and simultaneous methods), applications to repeated measures experiments and power calculation; and 3) the univariate mixed model, including a discussion of the likelihood function and its maximization, approximate likelihood inference, and applications to complex experimental designs, missing data, unbalanced data, time series observations, variance component estimation, random effects estimation, power calculation and a comparison of the mixed model's capabilities relative to those of the classical multivariate model. Knowledge of the SAS package is required. Prerequisite: MATH 5358/STATS 5358 (Regression Analysis) or equivalent.

**MATH 5354. CATEGORICAL DATA ANALYSIS. 3 Hours.**

This course covers classical methods for analyzing categorical data from a variety of response/factor structures (univariate or multivariate responses, with or without multivariate factors), based on several different statistical rationales (weighted least squares, maximum likelihood and randomization-based). Included are logistic regression, multiple logit analysis, mean scores analysis, observer agreement analysis, association measures, methods for complex experimental designs with categorical responses and Poisson regression. The classical log-linear model for the association structure of multivariate responses is briefly reviewed. Randomization-based inference (e.g. Mantel-Haenszel) is discussed as well. The necessary distribution theory (multinomial, asymptotics of weighted least squares and maximum likelihood) are discussed at an operational level. Knowledge of the SAS package is required. Prerequisite: MATH 5358, or MATH 5305, or IE 5318 or by consent of instructor.

**MATH 5355. STATISTICAL THEORY FOR RESEARCH WORKERS. 3 Hours.**

Designed for graduate students not majoring in mathematics. Topics include basic probability theory, distributions of random variables, point estimation, interval estimation, testing hypotheses, regression, and an introduction to analysis of variance. Graduate credit not given to math majors. Prerequisite: calculus MATH 1426/MATH 2425/MATH 2326 or permission of instructor.

**MATH 5356. APPLIED MULTIVARIATE STATISTICAL ANALYSIS. 3 Hours.**

Statistical analysis for data collected in several variables, topics including sampling from multivariate normal distribution, Hotelling's  $T^2$ , multivariate analysis of variance, discriminant analysis, principal components, and factor analysis. Prerequisite: MATH 5312/STATS 5312 or consent of instructor.

**MATH 5357. SAMPLE SURVEYS. 3 Hours.**

A comprehensive account of sampling theory and methods, illustrations to show methodology and practice, simple random sampling, stratified random sample, ratio estimates, regression estimates, systematic sampling, cluster sampling, and nonsampling errors. Prerequisite: MATH 5312/STATS 5312 or consent of instructor.

**MATH 5358. REGRESSION ANALYSIS. 3 Hours.**

A comprehensive course including multiple linear regression, non-linear regression and logistic regression. Emphasis is on modeling, inference, diagnostics and application to real data sets. The course begins by developing a toolbox of methods via a sequence of guided homework assignments. It culminates with projects based on consulting-level data analysis problems involving stratification, covariate adjustment and messy data sets. Some knowledge of the SAS package is required. Prerequisites: MATH 5312/STATS 5312 or MATH 5305/STATS 5305 with a B or better or permission of the instructor.

**MATH 5359. SURVIVAL ANALYSIS. 3 Hours.**

This course covers analysis of lifetime data with applications in engineering and biomedical research. Topics may include survival function, hazard function, cumulative hazard function, parametric distributions to model lifetime data, censoring, Kaplan-Meier estimator, testing for survival times for two or more groups, Cox proportional hazards model (both fixed and time dependent covariate), parametric regression models, regression diagnostics, accelerated failure time models, sample size determination, extensive use of R statistical software. Prerequisites: MATH 5305/STATS 5305 or MATH 5312/STATS 5312 or permission of instructor.

**MATH 5361. APPLIED CALCULUS OF VARIATION. 3 Hours.**

Functionals, variation, extremization, Euler's equation, direct and indirect approximation methods; applications to mechanics and control theory. Prerequisite: MATH 5302.

**MATH 5362. MATHEMATICS OF LINEAR PROGRAMMING. 3 Hours.**

The simplex method and the revised simplex method. Linear algebra for polyhedra and polytopes. Duality theory. Sensitivity analysis. Applications to transportation problems, network flow problems, matrix-games and scheduling problems. Integer programming. Quadratic programming. Prerequisite: MATH 3330.

**MATH 5363. OSCILLATIONS AND WAVES. 3 Hours.**

Development of methods and results related to phenomena in nature that exhibit oscillatory motion; mathematical techniques include Fourier series, ordinary and partial differential equations, and the theory of almost periodic functions. Prerequisite: MATH 3318.

**MATH 5364. INTRODUCTION TO MATHEMATICAL CONTROL THEORY. 3 Hours.**

Systems in science, engineering, and economics and their mathematical description by means of functional equations (ordinary, partial, integral, delay-type). Basic properties of various classes of systems: observability, controllability, stability, and oscillating systems; optimal control problems and applications. Prerequisite: MATH 3318 or MATH 4320.

**MATH 5365. BIOMATHEMATICS. 3 Hours.**

Mathematical techniques used in modeling such as perturbation theory, dimensional analysis, Fourier analysis, and differential equations. Applications to morphogenetics, population dynamics, compartmental systems, and chemical kinetics.

**MATH 5366. INTRODUCTION TO NEURAL AND COGNITIVE MODELING. 3 Hours.**

Principles of neural network modeling; application of these principles to the simulation of cognitive processes in both brains and machines; models of associative learning, pattern recognition, and classification. Prerequisite: consent of instructor.

**MATH 5370. PROBLEM SOLVING IN K-8 MATHEMATICS. 3 Hours.**

A study of the nature and aspects of problem solving in mathematics, with application to the teaching and learning of K-8 mathematics. Topics include deconstructing and modifying tasks, assessment of problem solving, and the roles of representation, conjecture & proof, and technology in problem solving. Assignments require interaction in K-8 field settings. Prerequisite: graduate standing.

**MATH 5371. APPLIED NUMERICAL LINEAR ALGEBRA. 3 Hours.**

Numerical solutions of linear algebraic systems, least squares problems, and eigenvalue problems; LU and QR decompositions, Schur and Singular Value decompositions, Gaussian elimination, QR algorithm, and Krylov subspace iterations for large and sparse linear algebra problems. Prerequisites: MATH 3330 or consent of the instructor.

**MATH 5372. OPTIMIZATION METHODS & NUMERICAL SOLUTIONS OF NONLINEAR EQUATIONS. 3 Hours.**

Unconstrained and constrained optimization, solutions of nonlinear system of equations; Newton and quasi-Newton methods, secant methods and variations, nonlinear least squares problems. Prerequisite: consent of the instructor.

**MATH 5373. NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS. 3 Hours.**

Numerical methods for approximating solutions of initial value problems, boundary value problems, including linear multistep methods, Runge-Kutta methods, shooting methods. Prerequisite: MATH 5300, MATH 3319 or consent of instructor.

**MATH 5374. NUMERICAL SOLUTION OF PARTIAL DIFFERENTIAL EQUATIONS. 3 Hours.**

Numerical methods for elliptic, parabolic, hyperbolic, mixed, and systems of partial differential equations; finite difference methods, finite element methods, spectral methods. Prerequisite: MATH 5373 or consent of instructor.

**MATH 5375. CONSTRUCTING WHOLE NUMBER AND OPERATIONS IN K-8 MATHEMATICS. 3 Hours.**

A study of the interaction between the structure of place-value numeration systems and the nature of the four arithmetic operations. The development of traditional and alternative computational arithmetic algorithms from conceptual and concrete models for operations, viewed through the lens of alternative numeration systems and research on children's mathematical thinking. Assignments require interaction in K-8 field settings. Prerequisite: graduate standing.

**MATH 5376. CONSTRUCTING RATIONAL NUMBER AND OPERATIONS IN K-8 MATH. 3 Hours.**

The meanings and representations of rational numbers, and the development of computations on rational numbers from algorithms for whole numbers, including concrete models for operations on fractions and decimals. Discussion of research on the learning and teaching of operations on rational numbers. Also, divisibility tests and factoring. Assignments require interaction in K-8 field settings. Prerequisite: MATH 5375.

**MATH 5377. ALGEBRAIC THINKING IN K-8 MATHEMATICS. 3 Hours.**

A study of the practice of making and justifying generalizations in K-8 mathematics, including field properties of operations, modular arithmetic (with applications to odd/even), relations and equivalence relations, the introduction and use of variables and unknowns, and the influence of representations on the form of mathematical arguments. Assignments require interaction in K-8 field settings. Prerequisite: MATH 5375.

**MATH 5378. GEOMETRY CONCEPTS IN K-8 MATHEMATICS. 3 Hours.**

Major concepts of geometry applied to the teaching and learning of K-8 mathematics. Topics include dimension, development of definitions, meanings of angle, geometric comparison relations, notions of center, and non-Euclidean geometries. Assignments require interaction in K-8 field settings. Prerequisite: graduate standing.

**MATH 5379. MEASUREMENT CONCEPTS IN K-8 MATHEMATICS. 3 Hours.**

The development of measurement concepts as applied to the teaching and learning of K-8 mathematics. Topics include the development and properties of standard and nonstandard units, notions of size, decomposing space, relationships between boundaries and interiors, the algebra of units, measuring time, and notions of heaviness. Assignments require interaction in K-8 field settings. Prerequisite: graduate standing.

**MATH 5380. SEMINAR. 3 Hours.**

Current topics in mathematics, may be repeated for credit twice. Prerequisite: consent of instructor.

**MATH 5391. SPECIAL TOPICS IN MATHEMATICS. 3 Hours.**

Topics in mathematics assigned individual students or small groups. Faculty members closely supervise the students in their research and study. In areas where there are only three hours offered, the special topics may be used by students to continue their study in the same area. Graded P/F/R. Prerequisite: permission of instructor.

**MATH 5392. SELECTED TOPICS IN MATHEMATICS. 3 Hours.**

May vary from semester depending upon need and interest of the students. May be repeated for credit. Prerequisite: permission of Graduate Advisor.

**MATH 5395. SPECIAL PROJECT. 3 Hours.**

Graded P/F/R. Prerequisite: permission of Graduate Advisor.

**MATH 5398. THESIS. 3 Hours.**

MATH 5398 Graded R/F only; MATH 5698 graded P/F/R. Prerequisite: permission of Graduate Advisor.

**MATH 5399. RESEARCH IN MATHEMATICS. 3 Hours.**

Faculty directed individual study and research. May be repeated for credit. Graded P/F/R/W only. Prerequisite: permission of instructor.

**MATH 5698. THESIS. 6 Hours.**

Graded P/F/R. Prerequisite: permission of Graduate Advisor.

**MATH 5699. RESEARCH IN MATHEMATICS. 6 Hours.**

Faculty directed individual study and research. May be repeated for credit. Graded P/F/R/W only. Prerequisite: permission of instructor.

**MATH 5999. RESEARCH IN MATHEMATICS. 9 Hours.**

Faculty directed individual study and research. May be repeated for credit. Graded P/F/R/W only. Prerequisite: permission of instructor.

**MATH 6180. SEMINAR FOR PROFESSIONAL DEVELOPMENT OF PhD STUDENTS IN SPECIAL PROJECTS. 1 Hour.**

This seminar class is for Ph.D. students enrolled in special University projects. Topics include a survey of new Math, Science, Technology and Engineering advancements, Ph.D. students professional development and mentoring. Prerequisite: Prior approval of Project Director.

**MATH 6310. FOUNDATION OF DATA SCIENCES. 3 Hours.**

Basic knowledge and computational methods in data sciences, select topics in norms, semidefinite matrix, nonnegative matrix, Cholesky decomposition, QR decompositions, linear system, least squares problem, eigenvalue and singular value decompositions, low rank approximation, nonnegative matrix factorization, introduction to simplex method, KKT conditions for optimizations, Krylov subspace methods, and applications. Prerequisite: MATH 3330 or consent of the instructor.

**MATH 6311. OPTIMIZATION ON BIG DATA. 3 Hours.**

Introduction to big data analysis; real world applications of data science; linear system solutions; linear programming; duality theory; convex sets; convex functions; optimality conditions; unconstrained optimization; constraint optimization; conjugate direction methods; alternating direction method of multipliers; classification/regression models and algorithms; dimensionality reduction for visualization; projects on real data. Prerequisite: MATH 3330 or consent of the instructor.

**MATH 6312. DATA MINING. 3 Hours.**

The course focuses on topics including but not limited to: linear methods in regression, linear methods in classification, model assessment and selection, regularized models, splines, generalized additive models, model averaging, ensemble learning, support vector machines, neural networks, probabilistic graphical models, cluster analysis, dimension reduction techniques, and multidimensional scaling. Prerequisite: MATH 5305/STATS 5305 or MATH 5312/STATS 5312 or permission of instructor. Basic programming skills are preferred.

**MATH 6313. TOPICS IN PROBABILITY AND STATISTICS. 3 Hours.**

May be repeated for credit when the content changes.

**MATH 6353. GENERALIZED LINEAR MODELS. 3 Hours.**

This course covers modern methods for analyzing Bernoulli, multinomial and count data. It begins with a development of generalized linear model theory, including the exponential family, link function and maximum likelihood. Second is a discussion of the case of models for independent observations. Next is a discussion of models for repeated measures, based on quasi-likelihood methods. These include models (such as Markov chains) for categorical time series. Next is a treatment of models with random effects. Finally is a discussion of methods for handling missing data. Knowledge of the SAS package is required. Prerequisites: MATH 5358/STATS 5358 (Regression Analysis) and preferably MATH 5313/STATS 5313. (Students without 5313 can still succeed but must deal with the slightly higher mathematical level of this course.).

**MATH 6356. TIME SERIES ANALYSIS. 3 Hours.**

This course covers classical methods of time series analysis, for both the time and frequency domains. For covariance stationary series, these include ARIMA modeling and spectral analysis. For nonstationary series, they include methods for detrending and filtering. Also included is a treatment of multivariate series, as well as a discussion of the Kalman filter state-space model. Knowledge of the SAS package is required. Prerequisites: MATH 5358/STATS 5358 (Regression Analysis) and MATH 5313/STATS 5313.

**MATH 6357. NONPARAMETRIC STATISTICS. 3 Hours.**

This is a survey of classical nonparametric methods for inference in standard observational settings (one-sample, two-sample, k-samples and the univariate linear model), and includes a development of U-statistics, rank statistics and their asymptotic distribution theory. The mathematical level is fairly high. Prerequisite: MATH 5313/STATS 5313.

**MATH 6390. BAYESIAN DATA ANALYSIS. 3 Hours.**

Introduces the Bayesian framework to statistical inference and describes effective approaches for Bayesian modeling and computation. Prerequisite: Mathematical Statistic; statistical computing.

**MATH 6391. SPECIAL TOPICS IN MATHEMATICS. 3 Hours.**

Faculty directed individual study and research. May be repeated for credit when the content changes.

**MATH 6399. DISSERTATION. 3 Hours.**

Prerequisite: admission to candidacy for the Doctor of Philosophy degree in mathematics.

**MATH 6699. DISSERTATION. 6 Hours.**

Prerequisite: admission to candidacy for the Doctor of Philosophy degree in mathematics.



**MATH 6999. DISSERTATION. 9 Hours.**

Prerequisite: admission to candidacy for the Doctor of Philosophy degree in mathematics.

**MATH 7399. DOCTORAL DEGREE COMPLETION. 3 Hours.**

This course may be taken during the semester in which a student expects to complete all requirements for the doctoral degree and graduate. Enrolling in this course meets minimum enrollment requirements for graduation, for holding fellowships awarded by The Office of Graduate Studies and for full-time GTA or GRA positions. Students should verify that enrollment in this course meets other applicable enrollment requirements. To remain eligible in their final semester of study for grants, loans or other forms of financial aid administered by the Financial Aid Office must enroll in a minimum of 5 hours as required by the Office of Financial Aid. Other funding sources may also require more than 3-hours of enrollment. Additional hours may also be required to meet to requirements set by immigration law or by the policies of the student's degree program. Students should contact the Financial Aid Office, other sources of funding, Office of International Education and/or their graduate advisor to verify enrollment requirements before registering for this course. This course may only be taken twice. Students who do not complete all graduation requirements while enrolled in this course must enroll in a minimum of 6 dissertation hours (6699 or 6999) in their graduation term. Graded P/F/R.

## COURSES

**ME 5000. PREPARATORY COURSE FOR MECHANICAL ENGINEERING. 0 Hours.**

The course may be offered with multiple sections, wherein each section is paired with a corresponding undergraduate course being offered that semester. The purpose of the course is to allow students to take undergraduate courses in areas that may enhance their research knowledge and preparation for their graduate degree. Students can concurrently enroll in multiple sections. For each section of ME 5000, students must be concurrently enrolled in a section of either ME 5397 or ME 6397. Prerequisite: Consent of the Graduate Advisor.

**ME 5010. AUTOMOTIVE ENGINEERING PRACTICUM. 0 Hours.**

Practical design experience as full member of automotive design competition team. Prerequisite: Permission of Director for the Arnold E. Petsche Center for Automotive Engineering.

**ME 5101. GRADUATE SEMINAR. 1 Hour.**

The purpose is to acquaint graduate students with ongoing research at UTA, and outside in academia and industry. Seminars are given by graduate students of the department based on their ongoing research. Seminars are also given by external speakers from academia, industry and government.

**ME 5191. PROJECT STUDIES IN MECHANICAL ENGINEERING. 1 Hour.**

May be repeated for credit as topics change. Project work performed under a non-thesis degree will normally be accomplished under this course number, with prior approval of the Committee on Graduate Studies. May be graded pass/fail.

**ME 5197. RESEARCH IN MECHANICAL ENGINEERING. 1 Hour.**

Research in master's programs.

**ME 5291. PROJECT STUDIES IN MECHANICAL ENGINEERING. 2 Hours.**

May be repeated for credit as topics change. Work performed as a thesis substitute will normally be accomplished under this course number, with prior approval of the Committee on Graduate Studies. Maybe graded P/F.

**ME 5297. RESEARCH IN MECHANICAL ENGINEERING. 2 Hours.**

Research in master's programs.

**ME 5302. INTRODUCTION TO BEARING DESIGN AND LUBRICATION. 3 Hours.**

The course introduces 1) selection principles and design guidelines for various rolling element bearings, 2) theory of liquid and gas lubrication, 3) various novel fluid film bearings used in modern high speed turbomachinery and energy systems, and 4) fundamental principles of rotordynamics.

**ME 5303. CLASSICAL METHODS OF CONTROL SYSTEMS ANALYSIS AND SYNTHESIS. 3 Hours.**

Equip the student with familiarity of significant tools of the control engineer. Topics covered include controllers and their effect on system performance and stability, block diagram algebra, stability and analysis, system performance definition, root locus, frequency techniques, and state variable methods. Digital simulation tools for design and simulation of control systems. Demonstration of controller design and performance in the laboratory. Also offered as AE 5303. Credit will be granted only once.

**ME 5305. DYNAMIC SYSTEMS MODELING. 3 Hours.**

To equip the student with the capability of determining the necessary equations for distributed and lumped parameter modeling of mixed physical system types including mechanical, fluid, electrical, and thermal components. Models are formulated for computer simulation and analysis for systems with deterministic and stochastic inputs. Topics of random vibration and system identification are included. Offered as AE 5305 and ME 5305. Credit will be granted only once.

**ME 5306. FLUID POWER CONTROL. 3 Hours.**

Mathematical models for hydraulic and pneumatic control components and systems including hydraulic pumps, motors, and spool valves. The application of electrohydraulic and hydromechanical servomechanisms for position and velocity control are treated. Theory supported by laboratory demonstrations and experiments.

**ME 5310. FINITE ELEMENT METHODS. 3 Hours.**

Finite element method in the study of the static response of complex structures and of continua; applications to field problems; analytical methods emphasized, and digital computer application undertaken. Offered as AE 5310 and ME 5310. Credit will be granted only once.

**ME 5311. STRUCTURAL DYNAMICS. 3 Hours.**

Natural frequencies; forced response of complex structural systems studied through the use of the finite element method; computational aspects of these problems discussed, and digital computer applications undertaken. Offered as AE 5311 and ME 5311. Credit will be granted only once.

**ME 5312. CONTINUUM MECHANICS. 3 Hours.**

Study of the underlying physical and mathematical principles relating to the behavior of continuous media; interrelationships between fluid and solid mechanics. Offered as AE 5312 and ME 5312. Credit will be granted only once.

**ME 5313. FLUID DYNAMICS. 3 Hours.**

Basic conservation laws, flow kinematics, special forms of the governing equations, two-dimensional potential flows, surface waves and some exact solutions of viscous incompressible flows. Offered as AE 5313 and ME 5313. Credit will be granted only once.

**ME 5315. FUNDAMENTALS OF COMPOSITES. 3 Hours.**

This fundamental course will introduce students to mechanics of composites at various scales, including analysis, characterization, and manufacturing methods. Emphasis is on constitutive relations; mechanical and hygrothermal behavior; stress analysis; and simple applications. Offered as AE 5315 and ME 5315. Credit will be granted only once.

**ME 5316. THERMAL CONDUCTION. 3 Hours.**

Fundamental laws, initial and boundary conditions, basic equations for isotropic and anisotropic media, related physical problems and steady and transient temperature distributions in solid structures.

**ME 5317. CONVECTION HEAT TRANSFER. 3 Hours.**

Equations of motion of viscous fluids are reviewed and the energy equations are introduced. Exact and approximate solutions are made for forced convective problems with non-isothermal and unsteady boundaries. Free convection and combined free- and forced-convection problems are solved.

**ME 5318. RADIATIVE HEAT TRANSFER. 3 Hours.**

General equations of radiative transfer derived and solved for special problems, and the elements of atomic, molecular, and continuum radiation are introduced.

**ME 5319. ADVANCED FINITE ELEMENT METHODS. 3 Hours.**

Continuation of ME 5310. Modeling of large systems, composite and incompressible materials, substructuring, mesh generation, solids applications, nonlinear problems. Prerequisite: ME 5310 or equivalent.

**ME 5320. DESIGN OPTIMIZATION. 3 Hours.**

The purpose of this course is to present modern concepts of optimal design of structures. Basic ideas from optimization theory are developed with simple design examples. Analytical and numerical methods are developed and their applications discussed. Use of numerical simulation methods in the design process is described. Concepts of structural design sensitivity analysis and approximation methods will be discussed. The emphasis is made on the application of modern optimization techniques linked to the numerical methods of structural analysis, particularly, the finite element method. Prerequisite: AE 5310 or ME 5310.

**ME 5321. ADVANCED CLASSICAL THERMODYNAMICS. 3 Hours.**

Fundamentals of thermodynamics reviewed. Different treatments of principles studied, compared and formal relationships developed and applied to chemical, magnetic, electric and elastic systems.

**ME 5322. ADVANCED STRUCTURAL DYNAMICS. 3 Hours.**

Normal mode method for undamped and proportionally damped systems, component mode synthesis, generally damped systems, complex modes, effect of design modification on system response. Prerequisite: ME 5311 or equivalent.

**ME 5323. ENGINEERING RESEARCH METHODS. 3 Hours.**

This hands-on course will teach the tools that are essential for conducting graduate research, with an aim to prepare the students for project-based graduate research. The course will be focused on the integration of engineering concepts to complete course projects that imitate mini research projects. Prerequisite: Undergraduate education in engineering or science.

**ME 5324. POWER PLANT ENGINEERING. 3 Hours.**

Fundamental thermodynamics and heat transfer principles behind design and optimization of power generation systems with significant emphasis on component and system design. This class will cover a number of power plant types, including coal/gas fired, hydroelectric, nuclear, and solar. Concepts learnt in this class prepare students for an engineering career in power plants, oil, gas and related industries.

**ME 5325. COMBUSTION. 3 Hours.**

Fundamental treatment of problems involving simultaneous occurrence of chemical reaction and transfer of heat, mass and momentum. Topics include kinetically controlled combustion phenomena; diffusion flames in liquid fuel combustion; combustion of solids; combustion of gaseous fuel jets; flames in premixed gasses. Offered as AE 5325 and ME 5325. Credit will be granted only once.

**ME 5326. MANUFACTURING PROCESSES AND SYSTEMS. 3 Hours.**

Survey and modeling of manufacturing, assembly, surface treatment, automation, and integration processes. Prerequisite: Graduate standing.

**ME 5327. DESIGN FOR MANUFACTURING. 3 Hours.**

The interaction between design and manufacturing stressed in terms of the design process, customer-focused quality, design specifications versus process capability and tolerances, and redesign for producibility. Topics include material and manufacturing process selection, tolerancing, quality function deployment (QFD), design for assembly (DFA), quality control techniques, reliability, and robust design. Prerequisite: ME 5326.

**ME 5328. METAL ADDITIVE MANUFACTURING. 3 Hours.**

This course will provide students with essential knowledge and technical skills for metal additive manufacturing (AM), providing a solid foundation for a future career in the field. Primary areas of focus include: metal AM processes and their capabilities, process fundamentals, part design and analysis, build preparation and machine set-up, fabrication and post-processing, inspection and monitoring, microstructure analysis and mechanical testing, and process optimization.

**ME 5329. ADDITIVE MANUFACTURING. 3 Hours.**

The range of technologies and processes, both physical and digital, used to translate virtual solid model data into physical models using additive layering methods. Emphasis is given to application of these technologies to manufacture end use components and assemblies but rapid prototyping is also discussed. Metal, polymer, ceramic, and composite material applications of additive manufacturing are included. Discussion includes advantages and limitations of additive methods with respect to subtractive methods and to each other. Principles of design for additive manufacturing are covered along with discussion of applications. Students complete a project to design and build an engineering component or assembly for additive manufacturing. Offered as AE 5329 and ME 5329. Credit will be granted only once. Prerequisite: Graduate standing.

**ME 5331. ANALYTIC METHODS IN ENGINEERING. 3 Hours.**

Introduction to advanced analytic methods in engineering. Methods include multivariable calculus and field theory, Fourier series, Fourier and Laplace Transforms. Offered as AE 5331 and ME 5331. Credit will be granted only once. Prerequisite: Undergraduate degree in engineering, physics, or mathematics.

**ME 5332. ENGINEERING ANALYSIS. 3 Hours.**

Introduction to partial differential equations and complex variable theory with application to modeling of physical systems. Offered as AE 5332 and ME 5332. Credit will be granted only once.

**ME 5333. THERMAL PHENOMENA IN MICROSYSTEMS. 3 Hours.**

Introduction to experimental methods for microscale thermal transport, including experimental measurement techniques, design of experiments, data acquisition and analysis tools. Significant emphasis on carrying out mini-projects on related topics. Course learning outcomes are directly relevant for engineering jobs in semiconductors, energy conversion and other related industries. Offered as AE 5333 and ME 5333. Credit will be granted only once.

**ME 5335. OPTIMAL CONTROL OF DYNAMIC SYSTEMS. 3 Hours.**

Linear and nonlinear optimization methods; optimal control; continuous time Ricatti equation; bang-bang control; singular arcs; differential inclusions; collocation techniques; design of optimal dynamic system trajectories. Offered as AE 5335 and ME 5335. Credit will be granted only once.

**ME 5336. OPTIMAL ESTIMATION OF DYNAMIC SYSTEMS. 3 Hours.**

Kalman filter design and implementation. Optimal filtering for discrete-time and continuous-time dynamical systems with noise. Wiener filtering. State-space determination. Offered as EE 6327, AE 5336 and ME 5336. Credit will be granted only once. Prerequisite: introductory systems or identification course is desirable. Also offered as AE 5336 and EE 6327. Credit will be granted only once.

**ME 5337. INTRODUCTION TO ROBOTICS. 3 Hours.**

An overview of industrial robots and applications to traditional and emerging applications. Coordinate systems and homogeneous transformations, kinematics of manipulators; motion characteristics and trajectories; dynamics and control of manipulators; actuation and design issues. Programming of industrial robotic manipulators in the laboratory. Offered as AE 5337 and ME 5337. Credit will be granted only once.

**ME 5338. ANALYTICAL & COMPUTATIONAL DYNAMICS. 3 Hours.**

The course focuses on developing the equations of motion for dynamic systems composed of multiple, connected and unconnected, rigid bodies using Kane's method and the Lagrangian approach. The resulting model is used to simulate and visualize the predicted motion. Topics include: kinematics, Euler parameters, kinematic constraints, virtual work, the calculus of variations, energy, momentum, contact, impact, and checking functions. Offered as AE 5338 and ME 5338. Credit will be granted only once.

**ME 5339. INTERMEDIATE MECHANICS OF MATERIALS. 3 Hours.**

This fundamental mechanics course covers the concepts of deriving stress formulas from deformation and the stress-strain relationship, stress and failure analysis, 2D elasticity, energy methods, and elastic stability. Offered as AE 5339 and ME 5339. Credit will be granted only once.

**ME 5340. AUTOMOTIVE ENGINEERING. 3 Hours.**

Introduction to automotive engine types and performance, drive train modeling and vehicle loading characteristics, fueling requirements, fuel injection systems, tire characteristics and modeling, suspension characteristics and handling, braking systems and requirements. Course taught through lecture, student presentations and student design projects.

**ME 5341. CONTROL SYSTEM COMPONENTS. 3 Hours.**

The components and hardware used in electronic, hydraulic, and pneumatic control systems; techniques of amplification, computation, compensation, actuation, and sensing; modeling of multiport systems as well as servo systems analysis. Pulse modulated systems. Offered as AE 5341 and ME 5341. Credit will be granted only once. Prerequisite: Undergraduate introductory control course in Mechanical Engineering or equivalent or ME 5303 or equivalent.

**ME 5342. GAS DYNAMICS. 3 Hours.**

Review of fundamental compressible flow theory, method of characteristics for perfect gases, the Rankine-Hugoniot conditions, linearized flow theory. Offered as AE 5342 and ME 5342. Credit will be granted only once. Prerequisite: MAE 3303 or equivalent.

**ME 5344. VISCOUS FLOWS. 3 Hours.**

Navier-Stokes equations and Prandtl's boundary layer approximations; laminar and turbulent boundary layers including internal and external flows.

**ME 5345. NUMERICAL HEAT TRANSFER AND FLUID FLOW. 3 Hours.**

Introduction to numerical solutions for problems in heat transfer and fluid flow by the finite-volume method. The focus will be on numerical aspects pertaining to incompressible fluids. It provides the background training towards the use of commercial software. Offered as AE 5345 and ME 5345. Credit will be granted only once.

**ME 5347. HEAT EXCHANGER DESIGN. 3 Hours.**

Design procedures, system evaluations and design parameters in heat exchangers. Heat exchanger configurations; student design projects.

**ME 5349. POLYMER SCIENCE AND ENGINEERING. 3 Hours.**

This course provides a broad introduction to polymer science, technology, and use in engineering design. Topics covered are: polymer chemistry (major synthetic polymerization routes); Polymer physics (solution and melt behavior, solid-state morphology and properties); polymer engineering (melt processing, recycling methods); and polymer applications (automotive, aerospace, composites, 3D printing). Offered as AE 5349 and ME 5349. Credit will be granted only once.

**ME 5350. COMPUTER AIDED DESIGN AND MANUFACTURING. 3 Hours.**

Study of detailed computer aided tools within the framework of designing and manufacturing processes of real-world products. Topics covered are mathematics of geometric modeling, process of defining geometric elements with constraints and relations, concurrent engineering in design including modularization of products, reverse engineering with surface reconstruction, kinematic chain analysis for machine design, and simulation of manufacturing processes along with some aspects of digital manufacturing and its role in direct and additive manufacturing.

**ME 5352. FUNDAMENTALS IN ELECTRONIC PACKAGING. 3 Hours.**

An introductory treatment of electronic packaging, from single chip to multichip, including materials, electrical design, thermal design, mechanical design, package modeling and simulation, processing considerations, reliability, and testing.

**ME 5353. COMPUTATIONAL TECHNIQUES FOR ELECTRONIC PACKAGING. 3 Hours.**

Characterization of the thermo/mechanical reliability of microelectronics devices using commercial computational heat transfer codes (Icepak, Flotherm, and ANSYS). Industry related problems ranging from first level packages through system level packages analyzed. Formulate and model contemporary problems using commercial CFD codes.

**ME 5358. RACECAR ENGINEERING. 3 Hours.**

This course intended for Formula SAE team members and other interested students to develop new systems or analyze concepts for the Formula SAE or Formula Electric racecar and related equipment. The students will form teams and perform research and development on projects related to automotive or racecar engineering.

**ME 5359. APPLIED AUTOMOTIVE ENGINEERING. 3 Hours.**

The purpose of this course is to gain practical experience in the design and fabrication of parts or systems for automotive applications. The student must write a proposal, give a public oral presentation, and prepare a formal final report. The student must have attained full team member status in a student design competition team. Prerequisites: permission of Director of the Arnold E. Petsche Center for Automotive Engineering.

**ME 5362. INTRODUCTION TO MICRO AND NANOFLUIDICS. 3 Hours.**

As going down to micro scales, the basic hypothesis in the macro scale fluid mechanics may not be applicable in such scales. The objectives of this course are: to identify dominant forces and their effects in micro scale fluid systems that are different from those in the macro scales; to understand the fundamentals of micro fluidic phenomena; to discuss various microfluidic applications in research and commercial levels; and to explore new possible microfluidic applications in the emerging fields. Topics include overview of microfluidics, scaling laws, violation limit of the Navier-Stokes equations, surface force, surface tension, electrowetting, electrokinetics, dielectrophoresis, and soft lithography. Prerequisite: MAE 2314 and MAE 3310 or equivalents.

**ME 5363. INTRODUCTION TO ROTORCRAFT ANALYSIS. 3 Hours.**

History of rotorcraft. Behavior of the rotor blade in hover and forward flight. Rotor configurations, dynamic coupling with the fuselage, elastic and aeroelastic effects. Offered as AE 5363 and ME 5363. Credit will be granted only once.

**ME 5364. INTRODUCTION TO AERODYNAMICS OF ROTORCRAFT. 3 Hours.**

Practical aerodynamics of rotors and other components of rotorcraft. Introduction to performance, handling qualities, and general flight mechanics related to rotorcraft design, test, and certification requirements. Emphasis is on rotorcraft mission capabilities as defined by the customer. Offered as AE 5364 and ME 5364. Credit will be granted only once.

**ME 5365. INTRODUCTION TO HELICOPTER AND TILTROTOR SIMULATION. 3 Hours.**

Dynamic and aerodynamic modeling of rotorcraft elements using vector mechanics, linear algebra, calculus and numerical methods. Special emphasis on rotors, aerodynamic interference, proper axis system representation, model assembly methods and trimming. Offered as AE 5365 and ME 5365. Credit will be granted only once.

**ME 5366. FUEL CELLS AND APPLICATIONS. 3 Hours.**

The course introduces: Principles and thermodynamics applied to fuel cell-based power generation systems; materials and manufacturing methods of two common fuel cells and their stacks; modeling, analysis, and design of fuel cells and various reformers; and design issue of balance of plants such as steam management systems.

**ME 5374. NONLINEAR SYSTEMS ANALYSIS AND CONTROLS. 3 Hours.**

Nonlinear systems; phase plane analysis; Poincare-Bendixon theorems; nonlinear system stability; limit cycles and oscillations; center manifold theorem, Lyapunov methods in control; variable structure control; feedback linearization; backstepping techniques. Offered as AE 5374 and ME 5374. Credit will be granted only once.

**ME 5378. INTRODUCTION TO UNMANNED VEHICLE SYSTEMS. 3 Hours.**

Introduction to UVS (Unmanned Vehicle Systems) such as UAS (Unmanned Aircraft Systems), UGS (Unmanned Ground System) and UMS (Unmanned Maritime System), their history, missions, capabilities, types, configurations, subsystems, and the disciplines needed for UVS development and operation. UVS missions could include student competitions sponsored by various technical organizations. This course is team-taught by engineering faculty. Offered as AE 5378 and ME 5378. Credit will be granted only once.

**ME 5379. UNMANNED VEHICLE SYSTEM DEVELOPMENT. 3 Hours.**

Introduction to the technologies needed to create an UVS (Unmanned Vehicle System). Integration of these technologies (embodied as a set of sensors, actuators, computing and mobility platform sub-systems) into a functioning UVS through team work. UVS could be designed to compete in a student competition sponsored by various technical organizations or to support a specific mission or function defined by the instructors. This course is team-taught by engineering faculty. Offered as AE 5379 and ME 5379. Credit will be granted only once. Prerequisite: B or better in MAE 4378 or AE 5378 or ME 5378 and admission to the UVS certificate program.

**ME 5380. DESIGN OF DIGITAL CONTROL SYSTEMS. 3 Hours.**

Difference equations, z- and w- transforms, discrete TF (Transfer Function). Discrete equivalence (DE) to continuous TF. Aliasing & Nyquist sampling theorem. Design by DE, root locus in z- plane & Youla parameterization. Discrete state- space model, minimality after sampling, pole placement, Moore-Kimura method, linear quadratic regulator, asymptotic observer. Computer simulation and/or laboratory implementation. Offered as EE 5324, AE 5380 and ME 5380. Credit will be granted only once. Prerequisite: undergraduate level controls course or equivalent. Also offered as AE 5380, EE 5324. Credit will be granted only once.

**ME 5381. BOUNDARY LAYERS. 3 Hours.**

An introductory course on boundary layers. The coverage emphasizes the physical understanding and the mathematical foundations of boundary layers, including applications. Topics covered include laminar and turbulent incompressible and compressible boundary layers, and an introduction to boundary layer transition. Offered as AE 5381 and ME 5381. Credit will be granted only once.

**ME 5382. RESEARCH TRENDS IN RENEWABLE ENERGY TECHNOLOGIES. 3 Hours.**

This course is offered to graduate and senior level undergraduate students with engineering and science background to introduce them to micro/nano research and development for energy conversion and storage. The course will cover topics such as Scaling laws, MEMS fabrication, Nanomaterial synthesis, Electrochemical energy storage/conversion (Batteries, Fuel Cells & Supercapacitors), Solar energy (photovoltaics and solar thermal energy), Energy harvesting and Solar water splitting and electrocatalysis.

**ME 5386. WIND & OCEAN CURRENT ENERGY HARVESTING FUNDAMENTALS. 3 Hours.**

A broad senior/graduate first course in wind/wave/ocean current energy harvesting systems, focused on fundamentals, and serving as the basis for subsequent MAE specialized follow-on graduate course offerings focused on structures (conventional and composite), aero/hydro-mechanical response and control, and tailoring and smart material actuation, respectively, as well as for non-MAE, specialized graduate courses. (also taught as AE 5386).

**ME 5390. SPECIAL TOPICS IN MECHANICAL ENGINEERING. 3 Hours.**

To provide formal instruction in special topics pertinent to Mechanical Engineering from semester to semester depending on the availability of faculty. May be repeated provided topics differ.

**ME 5391. ADVANCED STUDIES IN MECHANICAL ENGINEERING. 3 Hours.**

May be repeated for credit as topics change. Project work performed under a non-thesis degree will normally be accomplished under this course number, with prior approval of the Committee on Graduate Studies.

**ME 5397. RESEARCH IN MECHANICAL ENGINEERING. 3 Hours.**

Research in master's programs.

**ME 5398. THESIS. 3 Hours.**

Thesis.

**ME 5698. THESIS. 6 Hours.**

Thesis Prerequisite: GRAD ME thesis major.

**ME 5998. THESIS. 9 Hours.**

Thesis Prerequisite: GRAD ME thesis major.

**ME 6196. MECHANICAL ENGINEERING INTERNSHIP. 1 Hour.**

For students participating in internship programs. May be repeated for credit. Requires prior approval of ME Graduate Advisor.

**ME 6197. RESEARCH IN MECHANICAL ENGINEERING. 1 Hour.**

May be repeated for credit.

**ME 6297. RESEARCH IN MECHANICAL ENGINEERING. 2 Hours.**

May be repeated for credit.

**ME 6299. DISSERTATION. 2 Hours.**

Prerequisite: Admission to candidacy for the Doctoral of Philosophy degree.

**ME 6304. ADVANCED MECHANICS OF MATERIALS. 3 Hours.**

This graduate level course will cover the calculation of stresses and strains in a body that experiences hyperelastic, viscoelastic and plastic deformation. Offered as AE 6304 and ME 6304. Credit will be granted only once. Prerequisite: AE 5339, ME 5339, or instructor consent.



**ME 6310. ADVANCED FINITE ELEMENT METHODS. 3 Hours.**

Modeling of large systems, composite and incompressible materials, substructuring, mesh generation, solids applications, nonlinear problems. Offered as AE 6310 and ME 6310. Credit will be granted only once. Prerequisite: AE 5310, ME 5310, or instructor consent.

**ME 6311. ADVANCED STRUCTURAL DYNAMICS. 3 Hours.**

Normal mode method for undamped and proportionally damped systems, component mode synthesis, generally damped systems, complex modes, effect of design modification on system response. Offered as AE 6311 and ME 6311. Credit will be granted only once. Prerequisite: AE 5311, ME 5311, or instructor consent.

**ME 6314. FRACTURE MECHANICS. 3 Hours.**

Linear elastic fracture mechanics, energy of fracture, mixed mode crack propagation, fatigue crack growth, numerical methods for stress intensity factor determination, damage tolerance and durability design. Offered as AE 6314 and ME 6314. Credit will be granted only once. Prerequisite: AE 5339, ME 5339, or instructor consent.

**ME 6315. ADVANCED COMPOSITES. 3 Hours.**

This course introduces students to advanced mechanics of composites at various scales, including analysis and characterization methods. Emphasis is on advanced methods for material characterization; nonlinear constitutive relations; structural and microstructural analysis; and advanced materials and structures applications. Offered as AE 6315 and ME 6315. Credit will be granted only once. Prerequisite: AE 5315, ME 5315, or instructor consent.

**ME 6337. ADVANCED ROBOTICS. 3 Hours.**

Advanced robotic design concepts considering structural statics, dynamics and control strategies for both rigid and flexible manipulators will be studied using optimization techniques and analytical approaches and introduction to micro- and mobile robotic devices. Study of emerging applications of robotics will be explored. Digital simulation of robotic devices and programming and demonstration of robotic devices in the laboratory. Prerequisites: AE 5337 or ME 5337 or equivalent.

**ME 6344. HEAT TRANSFER IN TURBULENT FLOW. 3 Hours.**

Introduction to heat transfer in turbulent boundary layers including internal and external flows, turbulence structure, the Reynolds analogy, van Driest hypothesis, high and low Prandtl number two equation model, effects of surface roughness on heat transfer. Also offered as AE 6344. Credit will be granted only once.

**ME 6397. RESEARCH IN MECHANICAL ENGINEERING. 3 Hours.**

May be repeated for credit.

**ME 6399. DISSERTATION. 3 Hours.**

May be repeated for credit.

**ME 6697. RESEARCH IN MECHANICAL ENGINEERING. 6 Hours.**

May be repeated for credit.

**ME 6699. DISSERTATION. 6 Hours.**

Prerequisite: Admission to candidacy for the Doctor of Philosophy degree.

**ME 6997. RESEARCH IN MECHANICAL ENGINEERING. 9 Hours.**

May be repeated for credit.

**ME 6999. DISSERTATION. 9 Hours.**

Admission to candidacy for the Doctor of Philosophy degree.

**ME 7399. DOCTORAL DEGREE COMPLETION. 3 Hours.**

This course may be taken during the semester in which a student expects to complete all requirements for the doctoral degree and graduate. Enrolling in this course meets minimum enrollment requirements for graduation, for holding fellowships awarded by The Office of Graduate Studies and for full-time GTA or GRA positions. Students should verify that enrollment in this course meets other applicable enrollment requirements. To remain eligible in their final semester of study for grants, loans or other forms of financial aid administered by the Financial Aid Office must enroll in a minimum of 5 hours as required by the Office of Financial Aid. Other funding sources may also require more than 3-hours of enrollment. Additional hours may also be required to meet to requirements set by immigration law or by the policies of the student's degree program. Students should contact the Financial Aid Office, other sources of funding, Office of International Education and/or their graduate advisor to verify enrollment requirements before registering for this course. This course may only be taken twice. Students who do not complete all graduation requirements while enrolled in this course must enroll in a minimum of 6 dissertation hours (6699 or 6999) in their graduation term. Graded P/F/R.

## COURSES

**MILS 0180. LEADERSHIP LAB. 1 Hour.**

A practical laboratory of applied leadership and skills. Student-planned, -organized and -conducted training, oriented toward leadership development. Laboratory topics include marksmanship, small unit tactics, multi-tiered programs focused on individual skill levels. Uniform and equipment provided. Concurrent enrollment in appropriate Military Science course (MILS 1141, MILS 1142, MILS 2251, MILS 2252, MILS 3341, MILS 3342, MILS 4341, MILS 4342, MILS 2291 and/or MILS 4391) required. Prerequisite: permission from the Professor of Military Science (PMS). May be repeated for credit.

**MILS 1111. MILITARY PHYSICAL CONDITIONING I-A. 1 Hour.**

This course is designed for beginners, emphasizing the Army components of physical fitness; cardiorespiratory endurance, muscular strength, muscular endurance, flexibility and body composition. Students are oriented to Army programs, planning, and training methodologies focused around functional fitness. An essential objective for each student is to achieve a minimum score in the Army Fitness test for record.

**MILS 1112. MILITARY PHYSICAL CONDITIONING I-B. 1 Hour.**

This course serves as a continuation of MILS 1111, emphasizing the Army components of physical fitness: cardiorespiratory endurance, muscular strength, muscular endurance, flexibility and body composition. Students continue to develop their understanding of Army programs, planning, and training methodologies focused around functional fitness to include leading small group practical exercises and developing small group fitness plans. An essential objective for each student is to achieve a minimum score in the Army Fitness test for record. Prerequisite: MILS 1111.

**MILS 1141. FOUNDATIONS OF LEADERSHIP. 1 Hour.**

Fundamental concepts of leadership in a profession in both classroom and outdoor laboratory environments. The study of time management skills, basic drill and ceremony, physical fitness, repelling, leadership reaction course, first aid, making presentations and marksmanship. Concurrent enrollment in MILS 0180 leadership lab and mandatory participation in independent physical fitness training, plus optional participation in a weekend field training exercise.

**MILS 1142. INTRODUCTION TO LEADERSHIP. 1 Hour.**

Application of principles of leadership through participation in physically and mentally challenging exercises with upper division ROTC students. Course focuses on communication skills, organizational ethics, and study and time management techniques. Concurrent enrollment in MILS 0180 leadership lab and mandatory participation in individual physical fitness training, plus optional participation in a weekend field training exercise. Prerequisite: MILS 1141.

**MILS 2121. MILITARY PHYSICAL CONDITIONING II-A. 1 Hour.**

This course implements the Army's holistic and fitness models by improving student's physical and mental well-being by utilizing Army Physical Readiness Training (PRT). Building on concepts of the 100 level class, emphasizing on the Army components of physical fitness; cardiorespiratory endurance, muscular strength, muscular endurance, flexibility and body composition. An essential objective for each student is to achieve a minimum score in the Army fitness test for record. Prerequisite: MILS 1111, MILS 1112.

**MILS 2122. MILITARY PHYSICAL CONDITIONING II-B. 1 Hour.**

This course implements the Army's holistic and fitness models by improving student's physical and mental well-being by utilizing Army Physical Readiness Training (PRT). Continuation of MILS 2121 with emphasis on leadership of a small group or squad during physical training, supervising each individual's correct performance of stretching and calisthenics, as well as following assigned student's progression and taking responsibility for mentoring subordinates. An essential objective for each student is to achieve a minimum score in the Army fitness test for record. Prerequisite: MILS 1111, MILS 1112, MILS 2121.

**MILS 2251. INDIVIDUAL/TEAM DEVELOPMENT. 2 Hours.**

Application of ethics-based leadership skills and fundamentals of ROTC's Leadership Development Program. Develop skills in oral presentations, concise writing, event planning, coordination of group efforts, advanced first aid, land navigation, and military tactics. Concurrent enrollment in MILS 0180 leadership lab and mandatory participation in individual physical fitness training, plus optional participation in a weekend field training exercise.

**MILS 2252. INDIVIDUAL/TEAM MILITARY TACTICS. 2 Hours.**

Introduction to individual and team aspects of military tactics in small unit operations. Includes use of radio communications, making safety assessments, movement techniques, planning for team safety/security, and pre-execution checks. Concurrent enrollment in MILS 0180 leadership lab and mandatory participation in individual physical fitness training, plus optional participation in a weekend field training exercise.

**MILS 2343. LEADERSHIP TRAINING CAMP (LTC). 3 Hours.**

A rigorous five-week summer camp conducted at an Army post, stresses leadership, initiative and self-discipline. No military obligation incurred. Completion of MILS 2343 qualifies a student for entry into the Advanced Course. Three different cycles offered during the summer, but spaces are limited by the Army. Candidates can apply for a space any time during the school year prior to the summer. Open only to students who have not taken all four of MILS 1141, MILS 1142, MILS 2251, and MILS 2252, and who pass an ROTC physical examination. P/F grade only.

**MILS 3131. MILITARY PHYSICAL CONDITIONING III-A. 1 Hour.**

This course is designed to improve on existing previous levels of physical fitness and to develop the ability to design/implement physical fitness regiments structured for large groups or company sized elements. Focus is on achieving Army combat fitness standard and maintaining tactical readiness in dynamic environments in preparation for Army field training exercises. An essential objective for each student is to achieve a minimum score in the Army Fitness test for record and meet contracting standards. Prerequisite: MILS 1111, MILS 1112, MILS 2121, MILS 2122.

**MILS 3132. MILITARY PHYSICAL CONDITIONING III-B. 1 Hour.**

This course is a continuation of MILS 3131 to improve on existing previous levels of physical fitness and to develop the ability to design/implement physical fitness regiments structured for large groups or company sized elements. Focus is on achieving Army combat fitness standard and maintaining tactical readiness in dynamic environments in preparation for Army field training exercises. An essential objective for each student is to achieve a minimum score in the Army Fitness test for record and meet contracting standards. Prerequisite: MILS 1111, MILS 1112, MILS 2121, MILS 2122, MILS 3131.

**MILS 3333. SMALL UNIT TACTICS AND LEADERSHIP. 3 Hours.**

A study of military tactics and leadership at squad, platoon, and company level in both classroom and outdoor laboratory environments. Includes mission planning; movement and maneuver formations and techniques; offensive operations, defensive operations, patrolling, and convoy movement; indirect fires planning; terrain analysis, route selection, danger areas, and security measures; risk management; and motivating subordinates.

**MILS 3341. LEADERSHIP I. 3 Hours.**

Development of ability to evaluate situations, plan and organize training, learn military tactics, review case studies in leadership management and develop teaching and briefing skills. Concurrent enrollment in MILS 0180 mandatory. Prerequisite: permission of the Professor of Military Science (PMS).

**MILS 3342. LEADERSHIP II. 3 Hours.**

Practical application of squad and platoon leadership in tactical situations; operation of small unit communications systems. Development of the leaders' ability to express themselves, analyze military problems, and prepare and deliver logical solutions. Demanding physical fitness training and performance-oriented instruction, in preparation for Summer Field Training. Concurrent enrollment in MILS 0180 mandatory. Prerequisite: permission of the Professor of Military Science (PMS).

**MILS 3370. MILITARY HISTORY. 3 Hours.**

Surveys and analyzes the American military experience from its colonial origins through the present and from a comparative and multinational perspective. Involves reading and writing about American military history, as well as staging simulations and visiting museums and/or battlefields. Prerequisite: Permission of the Professor of Military Science (PMS).

**MILS 3443. LEADER DEVELOPMENT AND ASSESSMENT COURSE. 4 Hours.**

A five-week off-campus field training course stressing the practical application of leadership management, with emphasis on tactical and technical military field skills. Open only to students who have successfully completed MILS 3341 and MILS 3342, P/F grade only.

**MILS 3495. NURSING ADVANCED SUMMER TRAINING. 4 Hours.**

Seven-week off-campus internship at a major U.S. Army hospital for ROTC nursing students. A nursing practicum with the focus on providing the student with hands-on experience which integrates clinical, interpersonal, and leadership knowledge and skills. Practical experience and familiarization with Army nursing in a variety of clinical tasks in the areas of medical-surgical nursing, pediatrics, obstetrics, and, in some cases, intensive care in ICUs. May be used for partial credit for NURS 3647 or NURS 3347 with prior arrangement and approval of the Dean of Nursing.

**MILS 4141. MILITARY PHYSICAL CONDITIONING IV-A. 1 Hour.**

Putting together all of the personal fitness concepts learned in the previous classes with emphasis on leadership of large groups or a battalion sized organization, including planning and coordination of all physical fitness for the ROTC Battalion and evaluation of the personal fitness training and trainers. Coordination of individual training specific to fitness ends. An essential objective for each student is to achieve a minimum score in the Army Fitness test for record. Prerequisite: MILS 1111, MILS 1112, MILS 2121, MILS 2122, MILS 3131, MILS 3132.

**MILS 4142. MILITARY PHYSICAL CONDITIONING IV-B. 1 Hour.**

Continuation of 4141 with emphasis on grasping the Army's policy on physical fitness, fitness maintenance, and safety. Students hone their mastery with Army regulations and forms pertaining to physical fitness. Responsible for planning, documentation, testing and briefing of the ROTC Battalion's Physical Fitness Program. An essential objective for each student is to achieve a minimum score in the Army. Prerequisite: MILS 1111, MILS 1112, MILS 2121, MILS 2122, MILS 3131, MILS 3132, MILS 4141 and permission from the Professor of Military Science (PMS).

**MILS 4341. ADVANCED LEADERSHIP I. 3 Hours.**

Stresses leadership qualities necessary for Command and Staff functions and operations. Plan and conduct meetings, briefings and conferences. Introduction to the Army Logistical System and the Personnel Management System. Preparation of after-action reports. Plan and conduct physical training programs. Concurrent enrollment in MILS 0180 mandatory. Prerequisite: permission of the Professor of Military Science (PMS).

**MILS 4342. ADVANCED LEADERSHIP II. 3 Hours.**

Provides students with a basic working knowledge of the Military Justice System with emphasis on company-level actions and requirements, including Law of Land Warfare. Examines the ethical standards, professional roles, responsibilities, and uniqueness of the profession of officership. Concurrent enrollment in MILS 0180 mandatory. Prerequisite: permission of the Professor of Military Science (PMS).

**MILS 4391. CONFERENCE COURSE. 3 Hours.**

Independent study on an individual basis on current topics in military science. Performance will be assessed by oral examination, written test, or research paper as arranged. May be repeated for credit. Prerequisite: permission of the Professor of Military Science (PMS).

## COURSES

**MODL 1441. TOPICS IN MODERN LANGUAGE LEVEL I. 4 Hours.**

(Chinese, etc.). This course parallels the 1441 courses in FREN 1441, GERM 1441, RUSS 1441, and SPAN 1441.

**MODL 1442. TOPICS IN MODERN LANGUAGE LEVEL II. 4 Hours.**

(Chinese, etc.). This course parallels the 1442 courses in FREN 1442, GERM 1442, RUSS 1442, and SPAN 1442.

**MODL 1491. CONFERENCE COURSE. 4 Hours.**

Independent study; consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: Permission of the instructor.

**MODL 2301. INTRODUCTION TO WORLD LANGUAGES. 3 Hours.**

An overview of the linguistic features of some of the world's most widely spoken languages, as well as issues affecting languages in a globalized world. Topics include language families; global distribution; writing systems and vocabulary; language and society; languages and globalization. This course satisfies the University of Texas at Arlington core curriculum requirement in social and behavioral sciences. Taught in English.

**MODL 2313. TOPICS IN MODERN LANGUAGE LEVEL III. 3 Hours.**

(Chinese, etc.). This course parallels the 2313 courses in FREN 2313, GERM 2313, RUSS 2313, and SPAN 2313.

**MODL 2314. TOPICS IN MODERN LANGUAGE LEVEL IV. 3 Hours.**

(Chinese, etc.). This course parallels the 2314 courses in FREN 2314, GERM 2314, RUSS 2314, and SPAN 2314 .

**MODL 2391. CONFERENCE COURSE. 3 Hours.**

Independent study; consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: Permission of the instructor.

**MODL 3301. TOPICS IN COMPARATIVE LANGUAGES, CULTURE, AND LITERATURES. 3 Hours.**

Comparisons of language and language/culture issues across languages and/or time. Topics may include folklore across cultures, comparison of language and cultural production (e.g., international film and international feminism). May be counted toward fulfilling core curriculum requirement in literature or culture. May be repeated for credit when content changes. No prerequisites.

**MODL 3310. LOCALIZATION & TRANSLATION I. 3 Hours.**

Introduction to cultural and linguistic issues in the translation of language texts. Students will explore current technologies used in various real-world translation contexts and how to adapt texts, products, and services to the locale for which they are intended. Prerequisite: ARAB 2314, CHIN 2314, PORT 2314, or MODL 2314 with a grade of C or better.

**MODL 3311. LOCALIZATION & TRANSLATION II. 3 Hours.**

Continued study of cultural and linguistic issues in the translation of foreign language and English language texts. Systematic development of advanced skills in localization and computer-aided translation and in using TMX/TBX (international standards for translation memory and terminology exchange) tools. Translation practice, individually and in translation teams, with increasingly longer and more specialized texts. Prepares localization and translation specialists for real-world careers in the language-services industry. May be repeated once. Prerequisites: MODL 3310 with a grade of B or better.

**MODL 3318. TOPICS OF IDENTITY IN FRANCE AND THE FRENCH-SPEAKING WORLD. 3 Hours.**

This course is a study of places, periods, persons, or questions that helped define French and French-speaking cultural identity, from its origins to the present. Issues studied include linguistic choice, immigration, citizenship, religion, schools, and the representation of women and other groups. No prior knowledge of French language or culture is necessary. Taught in English. May be repeated as the topic changes. Offered as MODL 3318 and FREN 3318; credit will be granted for either MODL or FREN. Students who are working toward a major or minor in French will be required to take FREN 3318.

**MODL 3346. BUSINESS OF LOCALIZATION AND TRANSLATION. 3 Hours.**

This course examines the business of localization with an emphasis on translation relevance, speed, and quality. This course will address the art of machine translation as well as the areas of cost and metrics. Students will undertake two real-world case studies and will end the course with a final project and/or exam addressing the management of translations in a major industry. Exclusively for students pursuing a minor or major in Localization and Translation. Prerequisite: ENGL 1302.

**MODL 3347. LANGUAGE SERVICES INDUSTRY. 3 Hours.**

This course will focus on the language services industry and language services for the modern enterprise, including website globalization, transcreation, video localization, multilingual Search Engine Optimization (SEO), International testing and machine translation. It will also provide an overview of industry best practices for tools that automate and streamline localization, translation, and global content creation and use. Exclusively for students pursuing a minor or major in Localization and Translation. Prerequisite: ENGL 1302.

**MODL 3391. INDEPENDENT STUDY. 3 Hours.**

Independent study; consultation with instructor on a regular basis. May be repeated for credit.

**MODL 3393. MODERN LANGUAGE INTERNSHIP. 3 Hours.**

A combination of field-related experience in the business or service sector with an academic component. Coursework may include journal writing, outside readings, reflection papers, and formal presentations. Prerequisite: Permission of Instructor.

**MODL 4305. METHODS OF MODERN LANGUAGE TEACHING. 3 Hours.**

An applied linguistics course for modern language professionals, focusing on the application of research and theory in linguistics and second language acquisition to the classroom setting. May include specific methods, language learning strategies, cooperative language learning, component and performance skills, lesson planning, and intercultural communication. Prerequisite: Two language courses at the 3000 level with a grade of C or better, or consent of the instructor.

**MODL 4310. GRAPHIC NOVELS AND THE MEDICAL WORLD. 3 Hours.**

This course examines the ways in which the comic book medium can bring new insights to patient, healthcare, and clinical experiences. Students will become familiar with both major works of graphic medicine and key theoretical texts related to sequential art and to pathographies (autobiographies that revolve particularly around health issues). Includes a cultural comparison component through patient and practitioner stories from an American and from a French perspective. Taught in English. Students in French can read the material in French and write assignments in French with permission of the instructor.

**MODL 4316. TOPICS IN GLOBAL FRENCH CUISINES. 3 Hours.**

The course examines the history and culture of French cuisines across the globe from France to its former colonies and spheres of influence in the Middle East, North Africa, West Africa, Canada, Louisiana, and the Caribbean across history. Topics include North African and Middle Eastern Cuisines, the Culinary Traditions of Provence, Caribbean Cuisines, West African Cuisines, and the Rise of Café and Bistro Cultures. No prior knowledge of French language or culture is necessary. Taught in English. May be repeated as the topic changes. Offered as MODL 4316 and FREN 4316; credit will be granted for either MODL or FREN. Students who are working toward a major or minor in French will be required to take FREN 4316.

**MODL 4338. TOPICS IN GLOBAL FRENCH LITERATURES AND CULTURES. 3 Hours.**

This course focuses on French-speaking cultures in Europe, the Middle East, North Africa, West Africa, the Americas, and Asia from the 17th century to the present through literature, music, film, and other forms of expression. Topics include the French Caribbean Novel, French Canada, the Mediterranean in the Maghreb and the Middle East. No prior knowledge of French language or culture is necessary. Taught in English. May be repeated as the topic changes. Offered as MODL 4338 and FREN 4338; credit will be granted for either MODL or FREN. Students who are working toward a major or minor in French will be required to take FREN 4338.

**MODL 4339. LANGUAGE ACQUISITION. 3 Hours.**

Theory and practice of language acquisition. Techniques needed to understand and analyze the sounds, vocabulary, and grammar of the target language and how this knowledge informs classroom practice. Prerequisite: Completion of two 3000 level courses in the same language (Arabic, Chinese, French, German, Korean, Russian, or Spanish) with a grade of C or better, or consent of the instructor.

**MODL 4340. TOPICS IN MODERN LANGUAGE PEDAGOGY. 3 Hours.**

Topics, methods, and techniques specific to the teaching of modern languages and the creation of an effective and communicative language classroom. Recommended for students seeking teacher certification. May be repeated for credit as topic changes. Prerequisite: Completion of one 4000-level class or two 3000-level classes in the same language (Arabic, Chinese, French, German, Korean, Russian, or Spanish) with a grade of B or better.

**MODL 4347. RESEARCH IN LOCALIZATION AND TRANSLATION. 3 Hours.**

Overview of research and practice in localization and translation. Topics to include: emerging research frameworks and tools; ethics and risk in applied research for localization and translation settings. Prerequisite: FREN 3320, GERM 3310, GERM 4334, RUSS 3310, RUSS 4334, SPAN 3310, ARAB 3310, CHIN 3310, KORE 3310, or KORE 4334.

**MODL 4348. NATURAL LANGUAGE PROCESSING AND UNDERSTANDING. 3 Hours.**

Overview of research and practice in natural language processing and natural language understanding. Topics to include: emerging research; identification, planning, and implementation of natural language technologies for the language setting; machine learning; human and machine roles in machine learning; ethics and risks in the natural language processing context. Prerequisite: FREN 3320, GERM 3310, GERM 4334, RUSS 3310, RUSS 4334, SPAN 3310, ARAB 3310, CHIN 3310, KORE 3310, or KORE 4334.

**MODL 4349. MACHINE TRANSLATION AND EMERGING LANGUAGE TECHNOLOGIES. 3 Hours.**

Overview of machine translation and emerging technologies in language services and their application in real-world settings. Topics to include: history of machine translation; identification, planning, and implementation of automated translation use cases; human and machine roles in translation automation; ethics and risk in emerging language technologies. Prerequisite: FREN 3320, GERM 3310, GERM 4334, RUSS 3310, RUSS 4334, SPAN 3310, ARAB 3310, CHIN 3310, KORE 3310, or KORE 4334.

**MODL 4391. INDEPENDENT STUDY. 3 Hours.**

Independent study; consultation with instructor on a regular basis. May be repeated for credit.

**MODL 4393. MODERN LANGUAGE INTERNSHIP. 3 Hours.**

A combination of field-related experience in the business or service sector with an academic component. Coursework may include journal writing in Spanish, outside readings, and formal presentations. Prerequisite: Two 3000-level courses and permission of the instructor.

**MODL 5300. HISTORY OF THE FRENCH LANGUAGE. 3 Hours.**

Development of the French language from its earliest forms to the present. Required for the MA in MODL with French concentration.

**MODL 5301. MODERN LANGUAGES FOR GRADUATE READING. 3 Hours.**

An intensive one-semester course designed for Ph.D. candidates and other graduate students to fulfill departmental foreign language requirements. Sections may be offered in French, German, Russian, or other applicable or appropriate languages. Does not fulfill any graduate degree requirements.

**MODL 5302. TOPICS ACROSS THE LANGUAGES. 3 Hours.**

This topic course varies in focus and will be taught by in-house faculty or visiting scholars. Taught in English, it will consider issues to cultural and literary concerns across the languages. Possible course offerings include: From Novel to Film, History and/as Literature, Propaganda as Literature, The History and Aesthetics of Film, The Other in Literature and Culture, Freud and the Literary Imagination, and Modernism.

**MODL 5304. CURRENTS IN EUROPEAN AND LATIN AMERICAN LITERATURES AND THOUGHT. 3 Hours.**

An examination of the mainstream genres and movements in European and Latin American literatures from 1600 to the present. Taught in English. Required for MA students in Modern Languages. May not be repeated for credit.

**MODL 5305. METHODS OF MODERN LANGUAGE TEACHING. 3 Hours.**

Methods of Modern Language Teaching is an applied linguistics course for modern language professionals, focusing on the application of research and theory in linguistics and second language acquisition to the classroom setting. May include specific methods, language learning strategies, cooperative language learning, component and performance skills, and intercultural communication.



**MODL 5306. L2 ACQUISITION. 3 Hours.****MODL 5307. TOPICS IN SECOND LANGUAGE ACQUISITION. 3 Hours.**

May include topics in the areas of second language acquisition, methodologies, culture, and disciplines related to second language acquisition. May be repeated for credit as topics change.

**MODL 5308. TECHNOLOGY AND LANGUAGE INSTRUCTION. 3 Hours.**

Presentation and critique of research regarding the use of electronic media in language instruction; emphasis on computer and video, with attention to the application of research findings to the language classroom.

**MODL 5309. TRANSLATION THEORY. 3 Hours.**

Provides an introduction to basic concepts and offers a general conceptual framework for the study of translation theory. Students acquire the tools to identify, analyze and resolve translation problems while developing a rational approach to translation. (Following the completion of this course, students are encouraged to enroll in FREN 5309, GERM 5309 or SPAN 5309, Practicum in Translation.).

**MODL 5310. THEORIES OF LITERATURE AND CULTURE. 3 Hours.**

Readings, analyses, and applications of recent literary and cultural theories. Particular attention to how such theories may serve to focus or refocus literature as cultural production. Required for the M.A. in French, German, and Spanish.

**MODL 5391. CONFERENCE. 3 Hours.****MODL 5393. MODL GRADUATE INTERNSHIP. 3 Hours.**

Graduate internship in the Department of Modern Languages with the student performing duties related to the field of modern languages. A combination of field-related experience at the graduate level with an academic component. Students are required to submit an approved academic project related to the work performed. May be repeated with approval of Graduate Advisor.

## COURSES

**MSE 3300. INTRODUCTION TO MATERIALS SCIENCE AND ENGINEERING. 3 Hours.**

Introduction to the atomic bonding, crystal structure, defects in materials, diffusion processes, phase diagram and phase transformation, and their relation to the mechanical, electrical, optical and thermal properties of metals, semiconductors, ceramics, polymers and composites. Prerequisites: CHEM 1442 or CHEM 1465; PHYS 1444.

**MSE 4191. ADVANCED PROBLEMS IN MATERIALS SCIENCE & ENGINEERING. 1 Hour.**

The investigation of special individual problems in materials science and engineering under the direction of a faculty member. Prerequisite: consent of the head of the department.

**MSE 4291. ADVANCED PROBLEMS IN MATERIALS SCIENCE & ENGINEERING. 2 Hours.**

The investigation of special individual problems in materials science and engineering under the direction of a faculty member. Prerequisite: consent of the head of the department.

**MSE 4304. ANALYSIS OF MATERIALS. 3 Hours.**

Theoretical understandings and practical applications of various characterization techniques to materials analysis, ranging from x-rays and electron diffraction, x-ray spectroscopy, and surface topography, are discussed. Practice of these techniques in lab class typically includes SEM spectroscopy, powder diffraction, Laue diffraction, and the double crystal x-ray diffraction. Prerequisite: Department consent and must be in a college of engineering professional program or college of science professional program.

**MSE 4310. POLYMER MATERIALS SCIENCE. 3 Hours.**

Intermolecular forces of attraction in high polymers, polymer synthesis, morphology and order in crystalline polymers, mechanics of amorphous polymers, time-dependent mechanical behavior, transitional phenomena, mechanical behavior of semicrystalline polymers. Prerequisite: Department consent and must be in a college of engineering professional program or college of science professional program.

**MSE 4312. MECHANICAL BEHAVIOR OF MATERIALS. 3 Hours.**

Concept of stress and strain, theory of plasticity; elementary dislocation theory. Deformation of single crystals; strengthening mechanisms like solid solution strengthening, and precipitation hardening. Fracture mechanics; microscopic aspects of fracture, fatigue, and creep of materials; design and processing of materials for improved mechanical properties. Prerequisite: Department consent and must be in a college of engineering professional program or college of science professional program.

**MSE 4315. INTRODUCTION TO COMPOSITES. 3 Hours.**

Composite classification, laminate coding, fabrication, processing and properties of composite laminates, point stress analysis and failure prediction of composite laminates, material allowable, issues in composite structural design. Prerequisite: Department consent and must be in a college of engineering professional program or college of science professional program.

**MSE 4316. TRIBOLOGY AND LUBRICATION. 3 Hours.**

The course provides a comprehensive understanding of the Tribology and Lubrication process in materials. This course will employ theoretical and practical examples. Mechanism of coating deposition for tribological, oxidation and corrosion protection are also examined. Prerequisite: Department consent and must be in a college of engineering professional program or college of science professional program.

**MSE 4320. NANOSCALE MATERIALS. 3 Hours.**

Introduction to the synthesis and characterization of nano-materials. Fundamental concepts of surface physics and chemistry. Survey of electronic, biological and biomedical applications. The materials presented include semiconductor and metal thin films, nanoparticles and nanowires, carbon fullerenes and nanotubes, and organic nanoparticles. Prerequisite: Department consent and must be in a college of engineering professional program or college of science professional program.

**MSE 4321. PHASE TRANSFORMATIONS OF MATERIALS. 3 Hours.**

The theory of homogeneous and heterogeneous transformations, nucleation and growth, martensitic transformations, heat treatment and control of microstructure. Prerequisite: Department consent and must be in a college of engineering professional program or college of science professional program.

**MSE 4330. CORROSION SCIENCE AND ENGINEERING. 3 Hours.**

Corrosion principles and quantitative application of electrochemical principles to corrosion reactions. Effects of material factors and environmental conditions on aqueous corrosion and high temperature oxidation along with principal methods used in corrosion prevention. Prerequisite: Department consent and must be in a college of engineering professional program or college of science professional program.

**MSE 4333. INTRODUCTION TO MAGNETIC MATERIALS. 3 Hours.**

Classical and quantum mechanical understandings of magnetic properties of materials. Specific applications of these properties to various devices are discussed. Prerequisite: Department consent and must be in a college of engineering professional program or college of science professional program.

**MSE 4334. OPTICAL PROCESSES IN SOLID MATERIALS. 3 Hours.**

Basic understanding of optical response of materials based on classical and quantum models. Particular focus on all phenomena involving light in semiconductors and their optoelectronic applications. Optical properties of solid materials with reduced dimensionality such as thin films and quantum wells and dots. Prerequisite: Department consent and must be in a college of engineering professional program or college of science professional program.

**MSE 4335. ELECTRICAL PROPERTIES OF MATERIALS. 3 Hours.**

Advanced discussion of electronic structure, transport mechanisms in metals, semiconductors and superconductors, with applications to materials used in various electronic devices. Prerequisite: Department consent and must be in a college of engineering professional program or college of science professional program.

**MSE 4337. FATIGUE OF ENGINEERING MATERIALS. 3 Hours.**

Cyclic deformation, fatigue crack initiation and growth in ductile solids. Application of fracture mechanics to fatigue. Mechanisms of crack closure. Variable and multiaxial fatigue and corrosion fatigue. Fatigue of brittle solids. Prerequisite: Department consent and must be in a college of engineering professional program or college of science professional program.

**MSE 4339. FRACTURE MECHANICS. 3 Hours.**

Theory and applications of fracture mechanics. Stress analysis of cracks, crack-tip plasticity, fatigue crack growth, and stress corrosion cracking. Applicability to materials selection, structural design, failure analysis, and structural reliability. Prerequisite: Department consent and must be in a college of engineering professional program or college of science professional program.

**MSE 4343. NANOBIOTECHNOLOGY. 3 Hours.**

The objective of this course is to provide students with the fundamental principles of physical and biological sciences at the nanoscale and the basic concepts of applying such interdisciplinary principles to develop new technologies for improving human life and health. The first part of this course introduces the fundamental principles of physics, chemistry, and biology at the nanoscale and the basic techniques to generate, manipulate, and characterize man-made and nature's nanomaterials and systems. The second part of this course covers the state-of-the-art applications of nanobiotechnology, with emphasis on biomedical applications. Prerequisite: Department consent and must be in a college of engineering professional program or college of science professional program.

**MSE 4345. CERAMIC MATERIALS. 3 Hours.**

Crystal structure of ceramic materials. Phase equilibria in ceramic materials. The processing of ceramics and ceramic matrix composites. Strengthening mechanisms and mechanical properties of ceramics and ceramic matrix composites including flexure, tensile, fracture toughness, fatigue, and creep. Prerequisite: Department consent and must be in a college of engineering professional program or college of science professional program.

**MSE 4350. INTRODUCTION TO COMPUTATIONAL MATERIALS. 3 Hours.**

This course provides fundamentals of computational materials sciences, such as molecular dynamics, first-principles calculation, density functional theory and phase-field simulation. This course will also provide students with hands-on experience using different materials simulation method including XMD, Quantum Espresso, VASP and phase-field modeling to study different problems such as energy calculation, melting and sintering, vacancy diffusion and phase transition. Prerequisite: Department consent and must be in a college of engineering professional program or college of science professional program.

**MSE 4351. CURRENT TOPICS IN NANOTECHNOLOGY. 3 Hours.**

Review and discussion of the latest advancements in the field of nanoscale science and technology. Topics include nanoscale electronic materials/devices, energy materials and devices, biological and chemical sensors, cancer diagnosis and cure, self assembly of materials, nanoscale composite materials, techniques for observing and manipulating atoms and molecules, and synthesis of nanoscale materials such as nanoparticles, nanowires, and graphenes. The course will comprise of several sections (several subareas of nanoscale science and technology) and will be taught by several professors who have expertise in each field. Prerequisite: Department consent and must be in a college of engineering professional program or college of science professional program.

**MSE 4353. FUNDAMENTALS OF SUSTAINABLE ENERGY. 3 Hours.**

Basic concepts and applications of energy generation and storage. Topics cover a broad spectrum of sustainable energy technologies, including thermal, tide, solar, biomass, wind and electrochemical devices, with emphasis on fundamentals in materials and engineering. Prerequisite: Department consent and must be in a college of engineering professional program or college of science professional program.

**MSE 4354. ELECTRONIC MATERIALS AND DEVICES. 3 Hours.**

Fundamentals and applications of modern electronic devices and materials. Topics include electrical properties of semiconductors, electrons and holes, energy bands, effective electron masses and effective hole masses, p-n junctions, drift current and diffusion current, metal-oxide-semiconductor (MOS) structure, capacitance-voltage (C-V) plots, field-effect transistors, bipolar junction transistors, and integrated circuits. Prerequisites: Department consent and must be in a college of engineering professional program or college of science professional program.

**MSE 4355. MATERIALS FOR ENERGY. 3 Hours.**

The course aims to introduce concepts and design of advanced materials for sustainable energy generation and storage systems. It will cover polymer electrolyte materials, metallic nanoparticles, semiconductors, and nano-fabrication in clean energy conversion, energy storage, fuel cells, photovoltaic cells, and other emerging energy harvesting and storage. Prerequisite: Department consent and must be in a college of engineering professional program or college of science professional program.

**MSE 4357. SYNTHESIS AND PROPERTIES OF MODERN ENGINEERING MATERIALS. 3 Hours.**

In this course, materials science, chemistry, physics, and engineering concepts will be applied to describe, explain, and analyze the structure, properties, processing, and performance of engineering materials. A fundamental understanding of the atomic bonding, thermodynamics and kinetics of dissolution and precipitation processes, phase diagrams, crystalline structures and defects, and chemical and physical surficial and interfacial phenomena will be applied to understand the influences of chemical composition and reactions, and mass transport processes on the evolution of microstructure and properties of modern engineering materials, include cements and concrete, zeolites, glasses, and nanomaterials. Prerequisite: Department consent and must be in a college of engineering professional program or college of science professional program.

**MSE 4358. ORTHOPEDIC IMPLANTS - MATERIAL SELECTION AND CHARACTERIZATION. 3 Hours.**

Materials science basics, material selection and material characterization for orthopedic implants. Survey of metallic materials, ceramic materials, polymers and composite materials applied in orthopedic implants. Introduction to surface modification, biostability, and tribology of orthopedic implants. Several laboratory practices are included. Prerequisite: Must be in a college of engineering professional program or college of science professional program or department consent.

**MSE 4359. FAILURE ANALYSIS AND RELIABILITY ENGINEERING. 3 Hours.**

The basic scope of this course is to understand 1) various types of failure modes in engineering materials, 2) contributing factors to those failures and 3) analysis and detection methods employed in the relevant industries. The failure of engineering materials under discussion includes those by mechanical, electrical and chemical load. Specific cases of discussion include materials for structural as well as microelectronics applications. Also discussed will be the method of statistical analysis and its modeling. Prerequisite: Department consent and must be in a college of engineering professional program or college of science professional program.

**MSE 4390. SPECIAL TOPICS IN MATERIALS SCIENCE & ENGINEERING. 3 Hours.**

Special topics pertinent to the field of materials science and engineering, such as electrical, optical, and magnetic properties of materials, will vary from semester to semester depending on the availability of faculty. May be repeated, provided that topics are different. Prerequisite: prior approval by the MSE undergraduate advisor.

**MSE 4391. ADVANCED PROBLEMS IN MATERIALS SCIENCE & ENGINEERING. 3 Hours.**

The investigation of special individual problems in materials science and engineering under the direction of a faculty member. Prerequisite: consent of the head of the department.

**MSE 5141. TRANSMISSION ELECTRON MICROSCOPY LAB. 1 Hour.**

Specimen preparation. Operation of the transmission electron microscope. Beam alignment and rotation calibration. Bright field and dark field imaging. Weak beam imaging. Examination of defects.

**MSE 5190. SPECIAL TOPICS IN MATERIALS SCIENCE AND ENGINEERING. 1 Hour.**

May be repeated for credit when topic changes.

**MSE 5192. MASTER'S COMPREHENSIVE EXAMINATION. 1 Hour.**

Directed study, consultation, and comprehensive examination over coursework leading to the Master of Engineering degree in Materials Science and Engineering. Required of all Master of Engineering students in the semester they plan to graduate.

**MSE 5193. SEMINAR IN MATERIALS SCIENCE AND ENGINEERING. 1 Hour.**

Selected topics in materials science and engineering presented by faculty, students, and invited lecturers.

**MSE 5290. SPECIAL TOPICS IN MATERIALS SCIENCE AND ENGINEERING. 2 Hours.**

May be repeated for credit when topic changes.

**MSE 5300. INTRODUCTION TO MATERIALS SCIENCE AND ENGINEERING. 3 Hours.**

Introduction to the atomic bonding, crystal structure, defects in materials, diffusion processes, phase diagram and phase transformation, and their relation to the mechanical, electrical, optical and thermal properties of metals, semiconductors, ceramics, polymers and composites.

**MSE 5304. ANALYSIS OF MATERIALS. 3 Hours.**

Theoretical understandings and practical applications of various characterization techniques to materials analysis, ranging from x-rays and electron diffraction, x-ray spectroscopy, and surface topography, are discussed. Practice of these techniques in lab class typically includes SEM spectroscopy, powder diffraction, Laue diffraction, and the double crystal x-ray diffraction.

**MSE 5305. SOLID STATE PHYSICS AND THERMODYNAMICS OF MATERIALS. 3 Hours.**

This course comprises of three sections, a) solid state physics, b) classical thermodynamics, and c) statistical thermodynamics. The solid state physics covers the physics of crystalline solids. This includes 1) classical theory of electrons in metals, 2) Sommerfeld theory of electrons in solids, 3) reciprocal lattice, 4) Bloch's theorem, 5) energy bands of solids, and 6) electrons in weak periodic potentials. The classical thermodynamics covers macroscopic aspects of thermodynamics. It covers 1) entropy, 2) temperature, 3) first, second, and third laws of thermodynamics, 4) internal energy and free energy, 5) Helmholtz free energy, Gibbs free energy, and 6) Maxwell relations. The statistical thermodynamics covers microscopic aspects of thermodynamic laws. It includes 1) entropy and temperature, 2) second law of thermodynamics, 3) partition function and Boltzmann factor, 4) free energies, and 5) canonical and grand canonical formalisms.

**MSE 5312. MECHANICAL BEHAVIOR OF MATERIALS. 3 Hours.**

Concepts of stress and strain, theory of plasticity. Elementary dislocation theory. Deformation of single crystals. Strengthening mechanisms like solid solution strengthening, precipitation hardening, etc. Elementary concepts in fracture mechanics. Microscopic aspects of fracture, fatigue, and creep of materials.

**MSE 5314. FRACTURE MECHANICS. 3 Hours.**

Theory and applications of linear elastic fracture mechanics. Topics include stress analysis of cracks, crack-tip plasticity, fatigue and stress corrosion. Applicability to materials selection, failure analysis and structural reliability reviewed.

**MSE 5315. FATIGUE OF ENGINEERING MATERIALS. 3 Hours.**

Cyclic deformation, fatigue crack initiation and growth in ductile solids. Application of fracture mechanics to fatigue. Mechanisms of crack closure. Variable and multiaxial fatigue and corrosion fatigue. Fatigue of brittle solids.

**MSE 5316. TRIBOLOGY AND LUBRICATION. 3 Hours.**

The course provides a comprehensive understanding of the Tribology and Lubrication process in materials. This course will employ theoretical and practical examples. Mechanism of coating deposition for tribological, oxidation and corrosion protection are also examined.

**MSE 5320. NANOSCALE MATERIALS. 3 Hours.**

Use Experiment-Oriented Just-in-Time Teaching to introduce the synthesis, properties and applications of inorganic thin films and nanoparticles. Before each lab session several lectures will be given that are specifically arranged for this particular experiment, including reviews of all necessary basic knowledge and introductions to new concepts, especially nanoscale size effects. Through such know-how/know-why approach students are expected to learn how all basic knowledge bonds together to apply to nanotechnology.

**MSE 5321. PHASE TRANSFORMATIONS OF MATERIALS. 3 Hours.**

The theory of homogeneous and heterogeneous transformations, nucleation and growth, martensitic transformations, heat treatment and control of microstructure.

**MSE 5330. CORROSION SCIENCE AND ENGINEERING. 3 Hours.**

Corrosion principles and quantitative application of electrochemical principles to corrosion reactions. Effects of material factors and environmental conditions on aqueous corrosion and high temperature oxidation along with principal methods used in corrosion prevention.

**MSE 5333. MAGNETIC PROPERTIES OF MATERIALS. 3 Hours.**

Classical and quantum mechanical understandings of magnetic properties of materials. Specific applications of these properties to various devices are discussed.

**MSE 5334. OPTICAL PROCESSES IN SOLID MATERIALS. 3 Hours.**

Basic understanding of optical response of materials based on classical and quantum models. Particular focus on all phenomena involving light in semiconductors and their optoelectronic applications. Optical properties of solid materials with reduced dimensionality such as thin films and quantum wells and dots.

**MSE 5335. ELECTRICAL PROPERTIES OF MATERIALS. 3 Hours.**

Advanced discussion of electronic structure, transport mechanisms in metals, semiconductors and superconductors, with applications to materials used in various electronic devices.

**MSE 5339. FAILURE ANALYSIS AND RELIABILITY ENGINEERING. 3 Hours.**

The basic scope of this course is to understand 1) various types of failure modes in engineering materials, 2) contributing factors to those failures and 3) analysis and detection methods employed in the relevant industries. The failure of engineering materials under discussion includes those by mechanical, electrical and chemical load. Specific cases of discussion include materials for structural as well as microelectronics applications. Also discussed will be the method of statistical analysis and its modeling.

**MSE 5341. TRANSMISSION ELECTRON MICROSCOPY IN MATERIALS SCIENCE. 3 Hours.**

This course provides theoretical and experimental knowledge on a basic TEM optics, sample requirements, electron diffraction, the imaging modes, high-resolution TEM, and related theories of image formation. This course is intended for graduate students who are potential new users of TEM for study of materials.

**MSE 5343. NANOBIO TECHNOLOGY. 3 Hours.**

The objective of this course is to provide students with the fundamental principles of physical and biological sciences at the nanoscale and the basic concepts of applying such interdisciplinary principles to develop new technologies for improving human life and health. The first part of this course introduces the fundamental principles of physics, chemistry, and biology at the nanoscale and the basic techniques to generate, manipulate, and characterize man-made and nature's nanomaterials and systems. The second part of this course covers the state-of-the-art applications of nanobiotechnology, with emphasis on biomedical applications.

**MSE 5345. CERAMIC MATERIALS. 3 Hours.**

Crystal structure of ceramic materials. Phase equilibria in ceramic materials. The processing of ceramics and ceramic matrix composites. Strengthening mechanisms and mechanical properties of ceramics and ceramic matrix composites including flexure, tensile, fracture toughness, fatigue, and creep.

**MSE 5347. POLYMER MATERIALS SCIENCE. 3 Hours.**

Intermolecular forces of attraction in high polymers, polymer synthesis, morphology and order in crystalline polymers, mechanics of amorphous polymers, time-dependent mechanical behavior, transitional phenomena, mechanical behavior of semicrystalline polymers.

**MSE 5348. FUNDAMENTALS OF COMPOSITES. 3 Hours.**

Composite structural analysis; structural properties, damage characterization and failure mechanisms; stiffness loss due to damage, notched sensitivity; delamination; impact; fatigue characteristics; composite material testing; material allowables; characteristics of composite joints.

**MSE 5350. INTRODUCTION TO COMPUTATIONAL MATERIALS SCIENCE. 3 Hours.**

Atomic to mesoscale computational modeling in Materials Science and Engineering, including the random-walk model, molecular dynamics, first-principle methods, density functional theory and phase-field modeling, by using various computational software and codes, such as Matlab, XMD, LAMMPS, Quantum Espresso and Multiphysics COMSOL Modeling.

**MSE 5351. CURRENT TOPICS IN NANOTECHNOLOGY. 3 Hours.**

Review and discussion of the latest advancements in the field of nanoscale science and technology. Topics include nanoscale electronic materials/devices, energy materials and devices, biological and chemical sensors, cancer diagnosis and cure, self assembly of materials, nanoscale composite materials, techniques for observing and manipulating atoms and molecules, and synthesis of nanoscale materials such as nanoparticles, nanowires, and graphenes. The course will comprise of several sections (several subareas of nanoscale science and technology) and will be taught by several professors who have expertise in each field.

**MSE 5352. SOLAR ENERGY MATERIALS AND DEVICES. 3 Hours.**

Fundamental principles of photovoltaic devices and solar energy materials used for the devices. Topics include thermodynamics of solar energy conversion, carrier generation and recombination, the solid-state device physics of p-n junction under illumination, various state-of-the-art photovoltaic materials, simulation of photovoltaic devices, and solar module technologies.

**MSE 5353. FUNDAMENTALS OF SUSTAINABLE ENERGY. 3 Hours.**

Basic concepts and applications of energy generation and storage. Topics cover a broad spectrum of sustainable energy technologies, including thermal, tide, solar, biomass, wind and electrochemical devices, with emphasis on fundamentals in materials & engineering.

**MSE 5354. ELECTRONIC MATERIALS AND DEVICES. 3 Hours.**

Fundamentals and applications of modern electronic devices and materials. Topics include electrical properties of semiconductors, electrons and holes, energy bands, effective electron masses and effective hole masses, p-n junctions, drift current and diffusion current, metal-oxide-semiconductor (MOS) structure, capacitance-voltage (C-V) plots, field-effect transistors, bipolar junction transistors, and integrated circuits.

**MSE 5355. MATERIALS FOR ENERGY. 3 Hours.**

The course aims to introduce concepts and design of advanced materials for sustainable energy generation and storage systems. It will cover polymer electrolyte materials, metallic nanoparticles, semiconductors, and nano-fabrication in clean energy conversion, energy storage, fuel cells, photovoltaic cells, and other emerging energy harvesting and storage.

**MSE 5356. INSTRUMENTATION FOR MATERIALS CHARACTERIZATION. 3 Hours.**

This course is composed of two components: lecture and laboratory for several materials characterization techniques. The lecture part includes the instruction of basic principles and theories behind AFM, Raman, FT-IR, XRD, SEM, TEM and spectroscopic techniques. Students in the class are divided into small groups for the laboratory part (4-5 people per group) so that students can gain hand-on experiences on various characterization techniques by operating associated equipment.

**MSE 5357. SYNTHESIS AND PROPERTIES OF MODERN ENGINEERING MATERIALS. 3 Hours.**

In this course, materials science, chemistry, physics, and engineering concepts will be applied to describe, explain, and analyze the structure, properties, Processing, and performance of engineering materials. A fundamental understanding of the atomic bonding, thermodynamics and kinetics of dissolution and precipitation processes, phase diagrams, crystalline structures and defects, and chemical and physical surficial and interfacial phenomena will be applied to understand the influences of chemical composition and reactions, and mass transport processes on the evolution of microstructure and properties of modern engineering materials, include cements and concrete, zeolites, glasses, and nanomaterials.

**MSE 5358. ORTHOPEDIC IMPLANTS - MATERIAL SELECTION AND CHARACTERIZATION. 3 Hours.**

Materials science basics, material selection and material characterization for orthopedic implants. Survey of metallic materials, ceramic materials, polymers and composite materials applied in orthopedic implants. Introduction to surface modification, biostability, and tribology of orthopedic implants. Several laboratory practices are included. Prerequisite: Graduate standing in science or engineering, or department consent.



**MSE 5390. SPECIAL TOPICS IN MATERIALS SCIENCE AND ENGINEERING. 3 Hours.**

Special topics pertinent to the field of materials science and engineering, such as electrical, optical, and magnetic properties of materials, will vary from semester to semester depending on the availability of faculty. May be repeated, provided that topics are different.

**MSE 5391. ADVANCED STUDIES IN MATERIALS SCIENCE AND ENGINEERING. 3 Hours.**

Topics selected from various areas of materials science and engineering. Work performed as a thesis substitute normally will be accomplished under MSE 5391, with prior approval of the Committee on Graduate Studies.

**MSE 5392. RESEARCH PROJECT IN MATERIALS SCIENCE AND ENGINEERING I. 3 Hours.**

Research course with credit granted according to work performed. The student will have to put together a research plan for the semester with approval of his/her dissertation advisor. End of semester requirement is a written report of research performed with results and discussion. A presentation at the end of the semester on research progress may be required.

**MSE 5394. MASTER'S RESEARCH PROJECT IN MATERIALS SCIENCE AND ENGINEERING. 3 Hours.**

The student will carry out a hands-on project under a guidance of his/her supervising professor. The student will need to provide a written project report. At the end of semester, the student will present his/her project results to MSE faculty members and students. The MSE faculty members will decide the grade.

**MSE 5398. THESIS. 3 Hours.**

THESIS.

**MSE 5405. PHYS THERMO MAT. 4 Hours.****MSE 5698. THESIS. 6 Hours.****MSE 5998. THESIS. 9 Hours.**

THESIS.

**MSE 6196. MSE INTERNSHIP. 1 Hour.**

For students participating in internship programs. May be repeated for credit.

**MSE 6197. ADVANCED STUDIES IN MATERIALS SCIENCE AND ENGINEERING. 1 Hour.**

May be repeated for credit.

**MSE 6198. RESEARCH IN MATERIALS SCIENCE AND ENGINEERING. 1 Hour.**

Individually approved research projects in materials science and engineering. May be repeated for credit.

**MSE 6298. RESEARCH IN MATERIALS SCIENCE AND ENGINEERING. 2 Hours.**

Individually approved research projects in materials science and engineering. May be repeated for credit.

**MSE 6396. MSE INTERNSHIP. 3 Hours.**

For students participating in internship programs. May be repeated for credit.

**MSE 6397. ADVANCED STUDIES IN MATERIALS SCIENCE AND ENGINEERING. 3 Hours.**

May be repeated for credit.

**MSE 6398. RESEARCH IN MATERIALS SCIENCE AND ENGINEERING. 3 Hours.**

Individually approved research projects in materials science and engineering. May be repeated for credit.

**MSE 6399. DISSERTATION. 3 Hours.****MSE 6696. MSE INTERNSHIP. 6 Hours.**

For students participating in internship programs. May be repeated for credit.

**MSE 6698. RESEARCH IN MATERIALS SCIENCE AND ENGINEERING. 6 Hours.**

Individually approved research projects in materials science and engineering. May be repeated for credit.

**MSE 6699. DISSERTATION. 6 Hours.****MSE 6996. MSE INTERNSHIP. 9 Hours.**

For students participating in internship programs. May be repeated for credit.

**MSE 6998. RESEARCH IN MATERIALS SCIENCE AND ENGINEERING. 9 Hours.**

Individually approved research projects in materials science and engineering. May be repeated for credit.

**MSE 6999. DISSERTATION. 9 Hours.****MSE 7399. DOCTORAL DEGREE COMPLETION. 3 Hours.**

This course may be taken during the semester in which a student expects to complete all requirements for the doctoral degree and graduate. Enrolling in this course meets minimum enrollment requirements for graduation, for holding fellowships awarded by The Office of Graduate Studies and for full-time GTA or GRA positions. Students should verify that enrollment in this course meets other applicable enrollment requirements. To remain eligible in their final semester of study for grants, loans or other forms of financial aid administered by the Financial Aid Office must enroll in a minimum of 5 hours as required by the Office of Financial Aid. Other funding sources may also require more than 3-hours of enrollment. Additional hours may also be required to meet to requirements set by immigration law or by the policies of the student's degree program. Students should contact the Financial Aid Office, other sources of funding, Office of International Education and/or their graduate advisor to verify enrollment requirements before registering for this course. This course may only be taken twice. Students who do not complete all graduation requirements while enrolled in this course must enroll in a minimum of 6 dissertation hours (6699 or 6999) in their graduation term. Graded P/F/R.

**COURSES****MUSI 0010. STUDIO CLASS. 0 Hours.**

Departmental performance classes, master classes, guest artist performances and lectures related to performance specializations. Students enroll concurrently with private lesson in specialization.

**MUSI 0101. MARCHING BAND. 1 Hour.**

The music major must receive credit for the ensembles required in his/her option. The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 0102. WIND SYMPHONY. 1 Hour.**

The music major must receive credit for the ensembles required in his/her option. The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 0103. SYMPHONIC WINDS. 1 Hour.**

The music major must receive credit for the ensembles required in his/her option. The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 0104. A CAPPELLA CHOIR. 1 Hour.**

The music major must receive credit for the ensembles required in his/her option. The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 0105. WOMEN'S CHORUS. 1 Hour.**

The music major must receive credit for the ensembles required in his/her option. The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 0106. CHAMBER SINGERS. 1 Hour.**

The music major must receive credit for the ensembles required in his/her option. The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 0108. UNIVERSITY SINGERS. 1 Hour.**

The music major must receive credit for the ensembles required in his/her option. The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 0109. KEYBOARD ENSEMBLE. 1 Hour.**

The music major must receive credit for the ensembles required in his/her option. The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 0110. WOODWIND ENSEMBLE. 1 Hour.**

The music major must receive credit for the ensembles required in his/her option. The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 0111. BRASS CHOIR. 1 Hour.**

The music major must receive credit for the ensembles required in his/her option. The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 0112. JAZZ ORCHESTRA. 1 Hour.**

The music major must receive credit for the ensembles required in his/her option. The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 0113. ELECTRIC GUITAR ENSEMBLE. 1 Hour.**

The music major must receive credit for the ensembles required in his/her option. The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 0114. PERCUSSION ENSEMBLE. 1 Hour.**

The music major must receive credit for the ensembles required in his/her option. The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 0115. MUSICAL THEATRE / OPERA LAB. 1 Hour.**

The music major must receive credit for the ensembles required in his/her option. The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director. By audition only.

**MUSI 0116. JAZZ ENSEMBLE. 1 Hour.**

The music major must receive credit for the ensembles required in his/her option. The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 0117. TROMBONE CHOIR. 1 Hour.**

The music major must receive credit for the ensembles required in his/her option. The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 0118. MARCHING PERCUSSION. 1 Hour.**

The music major must receive credit for the ensembles required in his/her option. The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 0119. TRUMPET ENSEMBLE. 1 Hour.**

The music major must receive credit for the ensembles required in his/her option. The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 0120. FRENCH HORN ENSEMBLE. 1 Hour.**

The music major must receive credit for the ensembles required in his/her option. The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 0121. COLOR GUARD. 1 Hour.**

The music major must receive credit for the ensembles required in his/her option. The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 0122. JAZZ COMBO. 1 Hour.**

The music major must receive credit for the ensembles required in his/her option. The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 0123. VOCAL JAZZ. 1 Hour.**

The music major must receive credit for the ensembles required in his/her option. The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 0124. FLUTE CHOIR. 1 Hour.**

The music major must receive credit for the ensembles required in his/her option. The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 0125. SAX CHOIR. 1 Hour.**

The music major must receive credit for the ensembles required in his/her option. The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 0126. CHAMBER MUSIC. 1 Hour.**

The music major must receive credit for the ensembles required in his/her option. The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 0127. TUBA ENSEMBLE. 1 Hour.**

The music major must receive credit for the ensembles required in his/her option. The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 0128. ORCHESTRA. 1 Hour.**

The music major must receive credit for the ensembles required in his/her option. The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 0129. EARLY MUSIC PERFORMANCE PRACTICE. 1 Hour.**

Study of early music for individual instruments. Topics will vary by semester. May be repeated for credit. Prerequisite: Permission of instructor.

**MUSI 0130. SYMPHONIC BAND. 1 Hour.**

The music major must receive credit for the ensembles required in his/her option. The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 0131. COMMERCIAL MUSIC ENSEMBLE. 1 Hour.**

This course is open to Music Industry Studies students. This ensemble provides practical and artistic experience in ensembles rooted in commercial and popular music styles. Prerequisite: Approval of the ensemble director.

**MUSI 0132. MAVBRASS. 1 Hour.**

The UTA Basketball Band ("MavBrass") is open through an audition to students enrolled in marching band or a concert band. Does not fulfill the Department of Music large ensemble requirement. Prerequisite: Permission of instructor.

**MUSI 0171. ELECTIVE PERFORMANCE. 1 Hour.**

For students who desire elective private instruction in strings, woodwinds, brass, keyboard, voice, or percussion. May be repeated eight times for credit.

**MUSI 0174. SECONDARY KEYBOARD. 1 Hour.**

For music majors whose degree option requires secondary piano, organ, or harpsichord. A jury is required to receive credit. May be repeated for credit. Prerequisite: C or better in MUSI 2181 or faculty approval.

**MUSI 0175. SECONDARY VOICE. 1 Hour.**

For music majors whose degree option requires secondary voice. A jury is required to receive credit. May be repeated for credit.

**MUSI 0271. ELECTIVE PERFORMANCE. 2 Hours.**

For students who desire elective private instruction in strings, woodwinds, brass, keyboard, voice, or percussion. May be repeated for credit up to eight times.

**MUSI 1101. JAZZ LISTENING. 1 Hour.**

Jazz listening from a historical perspective. Students will develop intelligent listening habits with regard to genres and their innovators. Open to all students; required of jazz studies majors. May be repeated for credit as topic changes.

**MUSI 1103. HIGH BRASS CLASS. 1 Hour.**

Open to music majors only. Emphasis on pedagogical techniques for teaching the trumpet and French horn. Lectures and playing opportunities will provide information concerning the teaching of embouchure, tonguing, tonal and technical development to beginning students.

**MUSI 1104. WOODWIND CLASS I. 1 Hour.**

Open to music majors only. Emphasis on pedagogical techniques for teaching the clarinet and flute. Lectures and playing opportunities will provide information concerning the teaching of embouchure, tonguing, tonal and technical development to beginning students.

**MUSI 1105. VOICE CLASS. 1 Hour. (TCCN = MUSI 1183)**

Open to music majors only. A practical study of the physiology of the voice with emphasis on vocal technique, sound production, the changing voice, and limited repertoire.

**MUSI 1106. LOW BRASS CLASS. 1 Hour.**

Open to music majors only. Emphasis on pedagogical techniques for teaching the trombone and euphonium/tuba. Lectures and playing opportunities will provide information concerning the teaching of embouchure, tonguing, tonal and technical development to beginning students.

**MUSI 1107. WOODWIND CLASS II. 1 Hour.**

Open to music majors only. Emphasis on pedagogical techniques for teaching the saxophone, oboe and bassoon. Lectures and playing opportunities will provide information concerning the teaching of embouchure, tonguing, tonal and technical development to beginning students.

**MUSI 1140. PRIVATE LESSONS IN VOICE-MUSICAL THEATRE. 1 Hour.**

This sequence of courses is required of students who are pursuing the BFA in Musical Theatre. These courses may not be used as substitute voice lessons for those students pursuing a Bachelor of Music degree. Offered as MUSI 1140 and THEA 1140; credit will be granted only in one department. Prerequisite: Open to Musical Theatre majors only or by permission of the Department Chair.

**MUSI 1141. PRIVATE LESSONS IN VOICE-MUSICAL THEATRE. 1 Hour.**

This sequence of courses is required of students who are pursuing the BFA in Musical Theatre. These courses may not be used as substitute voice lessons for those students pursuing a Bachelor of Music degree. Offered as MUSI 1141 and THEA 1141; credit will be granted only in one department. Prerequisite: C or better in MUSI 1140 or THEA 1140. Open to Musical Theatre majors only or by permission of the Department Chair.

**MUSI 1142. PRIVATE LESSONS IN PIANO. 1 Hour.**

This sequence of courses is required of and limited to music majors with jazz option for whom the principal instrument is piano.

**MUSI 1143. PRIVATE LESSONS IN PIANO. 1 Hour.**

This sequence of courses is required of and limited to music majors with jazz option for whom the principal instrument is piano. Prerequisite: C or better in MUSI 1142.

**MUSI 1144. PRIVATE LESSONS IN DOUBLE BASS. 1 Hour.**

This sequence of courses is required of and limited to music majors with jazz option for whom the principal instrument is bass.

**MUSI 1145. PRIVATE LESSONS IN DOUBLE BASS. 1 Hour.**

This sequence of courses is required of and limited to music majors with jazz option for whom the principal instrument is bass. Prerequisite: C or better in MUSI 1144.

**MUSI 1146. PRIVATE LESSONS IN JAZZ BASS. 1 Hour.**

This sequence of courses is required of and limited to music majors with jazz option for whom the principal instrument is bass.

**MUSI 1147. PRIVATE LESSONS IN JAZZ BASS. 1 Hour.**

This sequence of courses is required of and limited to music majors with jazz option for whom the principal instrument is bass. Prerequisite: C or better in MUSI 1146.

**MUSI 1154. PRIVATE LESSONS IN JAZZ PIANO. 1 Hour.**

This sequence of courses is required of and limited to music majors with jazz option for whom the principal instrument is piano.

**MUSI 1155. PRIVATE LESSONS IN JAZZ PIANO. 1 Hour.**

This sequence of courses is required of and limited to music majors with jazz option for whom the principal instrument is piano. Prerequisite: C or better in MUSI 1154.

**MUSI 1180. FUNCTIONAL PIANO I. 1 Hour. (TCCN = MUSI 1181)**

Required of and limited to music majors who are not piano majors or concentrates. The aim is to develop keyboard skills necessary to use the piano as a tool in teaching, composing, improvising, and performing.

**MUSI 1181. FUNCTIONAL PIANO II. 1 Hour. (TCCN = MUSI 1182)**

Required of and limited to music majors who are not piano majors or concentrates. The aim is to develop keyboard skills necessary to use the piano as a tool in teaching, composing, improvising, and performing. Prerequisite: C or better in MUSI 1180.

**MUSI 1182. CLASS PIANO FOR NON-MUSIC MAJORS I. 1 Hour.**

Limited to non-music majors. The purpose of this class is to help UTA students learn piano in a group setting and facilitate their involvement with Music Department activities.

**MUSI 1183. CLASS PIANO FOR NON-MUSIC MAJORS II. 1 Hour.**

The purpose of this class is to help UTA students learn piano in a group setting and facilitate their involvement with Music Department activities.

Prerequisite: C or better in MUSI 1182 or passing grade on proficiency exam.

**MUSI 1185. SIGHTSINGING AND EAR TRAINING I. 1 Hour. (TCCN = MUSI 1116)**

This sequence of courses is required of music majors. Develops skills in aural skills and melodic sight-singing.

**MUSI 1186. SIGHTSINGING AND EAR TRAINING II. 1 Hour. (TCCN = MUSI 1117)**

This sequence of courses is required of music majors. Develops skills in aural skills and melodic sight-singing. Prerequisite: C or better in MUSI 1185 and MUSI 1325.

**MUSI 1236. PRIVATE LESSONS IN JAZZ GUITAR. 2 Hours.**

This sequence of courses meets the requirements of music majors whose concentration is jazz guitar.

**MUSI 1237. PRIVATE LESSONS IN JAZZ GUITAR. 2 Hours.**

This sequence of courses meets the requirements of music majors whose concentration is jazz guitar. Prerequisite: C or better in MUSI 1236.

**MUSI 1238. PRIVATE LESSONS IN JAZZ DRUMSET. 2 Hours.**

This sequence of courses meets the requirements of music majors whose concentration is jazz drumset.

**MUSI 1239. PRIVATE LESSONS IN JAZZ DRUMSET. 2 Hours.**

This sequence of courses meets the requirements of music majors whose concentration is jazz drumset. Prerequisite: C or better in MUSI 1238.

**MUSI 1240. PRIVATE LESSONS IN VOICE. 2 Hours.**

This sequence of courses is required of music majors whose concentration is voice.

**MUSI 1241. PRIVATE LESSONS IN VOICE. 2 Hours.**

This sequence of courses is required of music majors whose concentration is voice.

**MUSI 1242. PRIVATE LESSONS IN PIANO. 2 Hours.**

This sequence of courses is required of music majors whose concentration is piano.

**MUSI 1243. PRIVATE LESSONS IN PIANO. 2 Hours.**

This sequence of courses is required of music majors whose concentration is piano. Prerequisite: C or better in MUSI 1242.

**MUSI 1244. PRIVATE LESSONS IN STRINGS. 2 Hours.**

This sequence of courses meets the requirements of music majors whose concentration is strings.

**MUSI 1245. PRIVATE LESSONS IN STRINGS. 2 Hours.**

This sequence of courses meets the requirements of music majors whose concentration is strings. Prerequisite: C or better in MUSI 1244.

**MUSI 1246. PRIVATE LESSONS IN WOODWINDS. 2 Hours.**

This sequence of courses is required of music majors whose concentration is woodwinds.

**MUSI 1247. PRIVATE LESSONS IN WOODWINDS. 2 Hours.**

This sequence of courses is required of music majors whose concentration is woodwinds.

**MUSI 1248. PRIVATE LESSONS IN BRASS. 2 Hours.**

This sequence of courses is required of music majors whose concentration is brass.

**MUSI 1249. PRIVATE LESSONS IN BRASS. 2 Hours.**

This sequence of courses is required of music majors whose concentration is brass. Prerequisite: C or better in MUSI 1248.

**MUSI 1250. PRIVATE LESSONS IN PERCUSSION. 2 Hours.**

This sequence of courses is required of music majors whose concentration is percussion.

**MUSI 1251. PRIVATE LESSONS IN PERCUSSION. 2 Hours.**

This sequence of courses is required of music majors whose concentration is percussion. Prerequisite: C or better in MUSI 1250.

**MUSI 1252. PRIVATE LESSONS IN JAZZ BASS. 2 Hours.**

This sequence of courses meets the requirements of jazz studies majors whose concentration is jazz bass.

**MUSI 1253. PRIVATE LESSONS IN JAZZ BASS. 2 Hours.**

This sequence of courses meets the requirements of jazz studies majors whose concentration is jazz bass. Prerequisite: C or better in MUSI 1252.



**MUSI 1254. PRIVATE LESSONS FOR B.A. STUDENTS. 2 Hours.**

Students complete four semesters of these lessons within one of the following 3 tracks: Commercial, Jazz, or Classical. These courses are open to non-music majors only with written permission of the Music Department Chair. Prerequisite: C or better in MUSI 1301.

**MUSI 1255. PRIVATE LESSONS FOR B.A. STUDENTS. 2 Hours.**

Students complete four semesters of these lessons within one of the following 3 tracks: Commercial, Jazz, or Classical. These courses are open to non-music majors only with written permission of the Music Department Chair. Prerequisite: C or better in MUSI 1254.

**MUSI 1257. PRIVATE LESSONS IN ORGAN. 2 Hours.**

This sequence of courses is required of music majors whose concentration is organ.

**MUSI 1258. PRIVATE LESSONS IN ORGAN. 2 Hours.**

This sequence of courses is required of music majors whose concentration is organ. Prerequisite: C or better in MUSI 1257.

**MUSI 1267. PRIVATE LESSONS IN HARPSICHORD. 2 Hours.**

This sequence is required of music majors whose concentration is harpsichord.

**MUSI 1268. PRIVATE LESSONS IN HARPSICHORD. 2 Hours.**

This sequence is required of music majors whose concentration is harpsichord. Prerequisite: C or better in MUSI 1267.

**MUSI 1300. MUSIC APPRECIATION. 3 Hours. (TCCN = MUSI 1306)**

Course designed to develop intelligent listening and enjoyment of music. Provides an opportunity to increase the student's cultural experience and vocabulary. This course satisfies the University of Texas at Arlington's core curriculum requirement in Creative Arts.

**MUSI 1301. ELEMENTS OF MUSIC. 3 Hours. (TCCN = MUSI 1303)**

Basic musical notation, harmony, and theory for students who are pursuing the BA in Music Industry Studies and the non-music major.

**MUSI 1302. JAZZ APPRECIATION. 3 Hours.**

The development of American jazz from its African and European roots to the present. This course satisfies the University of Texas at Arlington Core Curriculum requirement in Creative Arts.

**MUSI 1303. HISTORY AND APPRECIATION OF HIP HOP AND R&B MUSIC. 3 Hours.**

Explores the history and evolution of Hip Hop and modern urban music, emphasizing musical style and social context, from rhythm and blues through the present. Offered as AAST 2303 and MUSI 1303; credit will be granted in only one department.

**MUSI 1304. HISTORY OF ROCK MUSIC. 3 Hours.**

Open to all students as fine arts elective. Explores the history and evolution of rock music emphasizing musical style and social context, from rhythm and blues through the present. This course satisfies the University of Texas at Arlington core curriculum requirement in creative arts.

**MUSI 1305. INTRODUCTION TO MUSICAL ACOUSTICS. 3 Hours.**

An introduction, for the music major, to the nature of periodic motion and its relation to music, characteristics of sound waves, sources of sound used in music, musical scales and temperament, mechanics of hearing, recording and reproduction of sound. This course does not fulfill the requirement for a Core Science credit.

**MUSI 1324. EXPLORATIONS IN MUSIC THEORY. 3 Hours.**

A study of music skills necessary for the Music Industry Studies and Music Theatre majors involving written and analytical perspectives. Prerequisite: C or better in MUSI 1301.

**MUSI 1325. THEORY AND HARMONY I. 3 Hours. (TCCN = MUSI 1311)**

Scales, intervals, triads, and part writing with primary triads. Prerequisite: For B.A. Music Industry students, C or better in MUSI 1301; For all other degrees, open to music majors or faculty approval.

**MUSI 1326. THEORY AND HARMONY II. 3 Hours. (TCCN = MUSI 1312)**

Part writing including all diatonic triads, seventh chords, and traditional non-chord tones. Prerequisite: C or better in MUSI 1325.

**MUSI 2101. BRASS SURVEY. 1 Hour.**

Open to music majors in the All-level Instrumental Option (orchestra emphasis) and All-level Choral Option only. Emphasis on pedagogical techniques for teaching brass instruments. Lectures and playing opportunities will provide information concerning the teaching of embouchure, tonguing, tonal and technical development to beginning students.

**MUSI 2102. WOODWIND SURVEY. 1 Hour.**

Open to music majors in the All-level Instrumental Option (orchestra emphasis) and All-level Choral Option only. Emphasis on pedagogical techniques for teaching woodwind instruments. Lectures and playing opportunities will provide information concerning the teaching of embouchure, tonguing, tonal and technical development to beginning students.

**MUSI 2103. STRING CLASS. 1 Hour.**

Open to music majors only. A practical study of the string instruments of the orchestra with emphasis on bowing techniques, articulation, performance of scales, and limited repertoire.

**MUSI 2104. PERCUSSION CLASS. 1 Hour. (TCCN = MUSI 1188)**

(MUSI 1188). Open to music majors only. A practical study of the percussion instruments of the band and orchestra with emphasis on rudimental techniques and performance of limited repertoire.

**MUSI 2112. INTRODUCTION TO MUSIC EDUCATION. 1 Hour.**

Comprehensive survey of instrumental, choral and elementary music through lecture and research pertaining to professional responsibilities and career opportunities.

**MUSI 2140. PRIVATE LESSONS IN VOICE-MUSICAL THEATRE. 1 Hour.**

This sequence of courses is required of students who are pursuing the BFA in Musical Theatre. These courses may not be used as substitute voice lessons for those students pursuing a Bachelor of Music degree. Offered as MUSI 2140 and THEA 2140; credit will be granted only in one department. Prerequisite: C or better in MUSI 1141 or THEA 1141. Open to Musical Theatre majors only or by permission of the Department Chair.

**MUSI 2141. PRIVATE LESSONS IN VOICE-MUSICAL THEATRE. 1 Hour.**

This sequence of courses is required of students who are pursuing the BFA in Musical Theatre. These courses may not be used as substitute voice lessons for those students pursuing a Bachelor of Music degree. Offered as MUSI 2141 and THEA 2141; credit will be granted only in one department. Prerequisite: C or better in MUSI 2140 or THEA 2140. Open to Musical Theatre majors only or by permission of the Department Chair.

**MUSI 2142. PRIVATE LESSONS IN PIANO. 1 Hour.**

This sequence of courses is required of and limited to music majors with jazz option for whom the principal instrument is piano. Prerequisite: C or better in MUSI 1143.

**MUSI 2143. PRIVATE LESSONS IN PIANO. 1 Hour.**

This sequence of courses is required of and limited to music majors with jazz option for whom the principal instrument is piano. Prerequisite: C or better in MUSI 2142.

**MUSI 2144. PRIVATE LESSONS IN DOUBLE BASS. 1 Hour.**

This sequence of courses is required of and limited to music majors with jazz option for whom the principal instrument is bass. Prerequisite: C or better in MUSI 1145.

**MUSI 2145. PRIVATE LESSONS IN DOUBLE BASS. 1 Hour.**

This sequence of courses is required of and limited to music majors with jazz option for whom the principal instrument is bass. Prerequisite: C or better in MUSI 2144.

**MUSI 2146. PRIVATE LESSONS IN JAZZ BASS. 1 Hour.**

This sequence of courses is required of and limited to music majors with jazz option for whom the principal instrument is bass. Prerequisite: C or better in MUSI 1147.

**MUSI 2147. PRIVATE LESSONS IN JAZZ BASS. 1 Hour.**

This sequence of courses is required of and limited to music majors with jazz option for whom the principal instrument is bass. Prerequisite: C or better in MUSI 2146.

**MUSI 2154. PRIVATE LESSONS IN JAZZ PIANO. 1 Hour.**

This sequence of courses is required of and limited to music majors with jazz option for whom the principal instrument is piano. Prerequisite: C or better in MUSI 1155.

**MUSI 2155. PRIVATE LESSONS IN JAZZ PIANO. 1 Hour.**

This sequence of courses is required of and limited to music majors with jazz option for whom the principal instrument is piano. Prerequisite: C or better in MUSI 2154.

**MUSI 2180. FUNCTIONAL PIANO III. 1 Hour. (TCCN = MUSI 2181)**

Required of and limited to music majors who are not piano majors or concentrates. The aim is to develop keyboard skills necessary to use the piano as a tool in teaching, composing, improvising, and performing. Prerequisite: C or better in MUSI 1181.

**MUSI 2181. FUNCTIONAL PIANO IV. 1 Hour. (TCCN = MUSI 2182)**

Required of and limited to music majors who are not piano majors or concentrates. The aim is to develop keyboard skills necessary to use the piano as a tool in teaching, composing, improvising, and performing. Prerequisite: C or better in MUSI 2180.

**MUSI 2185. SIGHTSINGING AND EAR TRAINING III. 1 Hour. (TCCN = MUSI 2116)**

This sequence of courses is required of music majors. Develops skills in aural skills and melodic sight-singing. Prerequisite: C or better in MUSI 1186 and MUSI 1326.

**MUSI 2186. SIGHTSINGING AND EAR TRAINING IV. 1 Hour. (TCCN = MUSI 2117)**

This sequence of courses is required of music majors. Develops skills in aural skills and melodic sight-singing. Prerequisite: C or better in MUSI 2185 and MUSI 2325.

**MUSI 2190. BODY AND BREATHING FOR FITNESS. 1 Hour.**

Course designed to improve a singers total body engagement in producing a healthy vocal tone. Prerequisite: Requires concurrent enrollment in voice lessons or permission of instructor.

**MUSI 2222. DEVELOPMENTAL PRIVATE LESSONS. 2 Hours.**

Continued work in technique and repertoire to meet the requirements of the sophomore barrier.

**MUSI 2223. PREPARATORY PRIVATE LESSONS. 2 Hours.**

Private instruction on technique and repertoire in preparation for the sophomore proficiency exam. May be repeated up to four times for credit.

**MUSI 2227. COMPOSITION TECHNIQUES. 2 Hours.**

An introduction to contemporary music designed to acquaint students with composition styles and techniques through written assignments. Required for music majors with emphasis in Composition, Theory, and Music/Media. Prerequisite: C or better in MUSI 2325.

**MUSI 2236. PRIVATE LESSONS IN JAZZ GUITAR. 2 Hours.**

This sequence of courses meets the requirements of music majors whose concentration is jazz guitar. Prerequisite: C or better in MUSI 1237.

**MUSI 2237. PRIVATE LESSONS IN JAZZ GUITAR. 2 Hours.**

This sequence of courses meets the requirements of music majors whose concentration is jazz guitar. Prerequisite: C or better in MUSI 2236.

**MUSI 2238. PRIVATE LESSONS IN JAZZ DRUMSET. 2 Hours.**

This sequence of courses meets the requirements of music majors whose concentration is jazz drumset. Prerequisite: C or better in MUSI 1239.

**MUSI 2239. PRIVATE LESSONS IN JAZZ DRUMSET. 2 Hours.**

This sequence of courses meets the requirements of music majors whose concentration is jazz drumset. Prerequisite: C or better in MUSI 2238.

**MUSI 2240. PRIVATE LESSONS IN VOICE. 2 Hours.**

This sequence of courses is required of music majors whose concentration is voice. Prerequisite: C or better in MUSI 1241.

**MUSI 2241. PRIVATE LESSONS IN VOICE. 2 Hours.**

This sequence of courses is required of music majors whose concentration is voice. Prerequisite: C or better in MUSI 2240.

**MUSI 2242. PRIVATE LESSONS IN PIANO. 2 Hours.**

This sequence of courses is required of music majors whose concentration is piano. Prerequisite: C or better in MUSI 1243.

**MUSI 2243. PRIVATE LESSONS IN PIANO. 2 Hours.**

This sequence of courses is required of music majors whose concentration is piano. Prerequisite: C or better in MUSI 2242.

**MUSI 2244. PRIVATE LESSONS IN STRINGS. 2 Hours.**

This sequence of courses meets the requirements of music majors whose concentration is strings. Prerequisite: C or better in MUSI 1245.

**MUSI 2245. PRIVATE LESSONS IN STRINGS. 2 Hours.**

This sequence of courses meets the requirements of music majors whose concentration is strings. Prerequisite: C or better in MUSI 2244.

**MUSI 2246. PRIVATE LESSONS IN WOODWINDS. 2 Hours.**

This sequence of courses is required of music majors whose concentration is woodwinds. Prerequisite: C or better in MUSI 1247.

**MUSI 2247. PRIVATE LESSONS IN WOODWINDS. 2 Hours.**

This sequence of courses is required of music majors whose concentration is woodwinds. Prerequisite: C or better in MUSI 2246.

**MUSI 2248. PRIVATE LESSONS IN BRASS. 2 Hours.**

This sequence of courses is required of music majors whose concentration is brass. Prerequisite: C or better in MUSI 1249.

**MUSI 2249. PRIVATE LESSONS IN BRASS. 2 Hours.**

This sequence of courses is required of music majors whose concentration is brass. Prerequisite: C or better in MUSI 2248.

**MUSI 2250. PRIVATE LESSONS IN PERCUSSION. 2 Hours.**

This sequence of courses is required of music majors whose concentration is percussion. Prerequisite: C or better in MUSI 1251.

**MUSI 2251. PRIVATE LESSONS IN PERCUSSION. 2 Hours.**

This sequence of courses is required of music majors whose concentration is percussion. Prerequisite: C or better in MUSI 2250.

**MUSI 2252. PRIVATE LESSONS IN JAZZ BASS. 2 Hours.**

This sequence of courses meets the requirements of jazz studies majors whose concentration is jazz bass. Prerequisite: C or better in MUSI 1253.

**MUSI 2253. PRIVATE LESSONS IN JAZZ BASS. 2 Hours.**

This sequence of courses meets the requirements of jazz studies majors whose concentration is jazz bass. Prerequisite: C or better in MUSI 2252.

**MUSI 2254. PRIVATE LESSONS FOR B.A. STUDENTS. 2 Hours.**

Students complete four semesters of these lessons within one of the following 3 tracks: Commercial, Jazz, or Classical. These courses are open to non-music majors only with written permission of the Music Department Chair. Prerequisite: C or better in MUSI 1255.

**MUSI 2255. PRIVATE LESSONS FOR B.A. STUDENTS. 2 Hours.**

Students complete four semesters of these lessons within one of the following 3 tracks: Commercial, Jazz, or Classical. These courses are open to non-music majors only with written permission of the Music Department Chair. Prerequisite: C or better in MUSI 2254.

**MUSI 2257. PRIVATE LESSONS IN ORGAN. 2 Hours.**

This sequence of courses is required of music majors whose concentration is organ. Prerequisite: C or better in MUSI 1258.

**MUSI 2258. PRIVATE LESSONS IN ORGAN. 2 Hours.**

This sequence of courses is required of music majors whose concentration is organ. Prerequisite: C or better in MUSI 2257.

**MUSI 2267. PRIVATE LESSONS IN HARPSICHORD. 2 Hours.**

This sequence is required of music majors whose concentration is harpsichord. Prerequisite: C or better in MUSI 1268.

**MUSI 2268. PRIVATE LESSONS IN HARPSICHORD. 2 Hours.**

This sequence is required of music majors whose concentration is harpsichord. Prerequisite: C or better in MUSI 2267.

**MUSI 2300. INTRODUCTION TO WORLD MUSIC. 3 Hours.**

The music of Asia, Africa, and Oceania and the native traditions of the Americas; the role of music in the world's societies and non-Western music systems. This course satisfies the University of Texas at Arlington Core Curriculum Requirement in Creative Arts.

**MUSI 2301. APPRECIATION OF MUSIC IN FILM. 3 Hours.**

A study of the history, compositional styles and impact of music in films during the 20th century. This course satisfies the University of Texas at Arlington Core Curriculum requirement in Creative Arts.

**MUSI 2302. MUSIC LITERATURE. 3 Hours. (TCCN = MUSI 1307)**

An introduction to music literature of various style periods with an emphasis on reading orchestral scores.

**MUSI 2325. THEORY AND HARMONY III. 3 Hours. (TCCN = MUSI 2311)**

Modulation, chromatic part writing, and harmonic analysis. Prerequisite: C or better in MUSI 1326.

**MUSI 2326. THEORY AND HARMONY IV. 3 Hours. (TCCN = MUSI 2312)**

Harmonic, linear, and formal analysis of 19th- and 20th-century compositional techniques. Prerequisite: C or better in MUSI 2325.

**MUSI 3101. ITALIAN AND FRENCH DICTION. 1 Hour.**

A guide to correct pronunciation of Italian and French in vocal music.

**MUSI 3103. VOCAL PEDAGOGY. 1 Hour.**

A basic survey of the science of voice culture and the skills and knowledge needed to teach healthy, effective vocal production in school and/or private studio. Prerequisite: C or better in MUSI 2241.

**MUSI 3104. VOCAL COACHING. 1 Hour.**

Advanced instruction in diction, interpretation, and style for singers and collaborative instrumentalists. This course is designed as a supplement to applied lessons for advanced students. Permission of instructor required.

**MUSI 3125. JAZZ THEORY & KEYBOARD FUNDAMENTALS I. 1 Hour.**

Basic-to-intermediate jazz concepts including modes, harmony, chord progressions, and their keyboard applications. Prerequisite: C or better in MUSI 1325 (B.M. Music majors), MUSI 1324 (B.A. Music majors), or faculty approval, and C or better in MUSI 1180 or passing grade on basic piano proficiency exam.

**MUSI 3126. JAZZ THEORY & KEYBOARD FUNDAMENTALS II. 1 Hour.**

Intermediate-to-advanced jazz concepts including modes, harmony, chord progressions, and their keyboard applications. Prerequisite: C or better in MUSI 3125 or faculty approval.

**MUSI 3127. COMPUTER COMPOSITION I. 1 Hour.**

Course designed to meet the needs of students desiring to become composers or teachers of composition. Prerequisite: C or better in MUSI 1326 and MUSI 3394.

**MUSI 3128. COMPUTER COMPOSITION II. 1 Hour.**

Course designed to meet the needs of students desiring to become composers or teachers of composition. Prerequisite: C or better in MUSI 3127.

**MUSI 3140. PRIVATE LESSONS IN VOICE-MUSICAL THEATRE. 1 Hour.**

This sequence of courses is required of students who are pursuing the BFA in Musical Theatre. These courses may not be used as substitute voice lessons for those students pursuing a Bachelor of Music degree. Offered as MUSI 3140 and THEA 3140; credit will be granted only in one department. Prerequisite: C or better in MUSI 2141 or THEA 2141. Open to Musical Theatre majors only or by permission of the Department Chair.

**MUSI 3141. PRIVATE LESSONS IN VOICE-MUSICAL THEATRE. 1 Hour.**

This sequence of courses is required of students who are pursuing the BFA in Musical Theatre. These courses may not be used as substitute voice lessons for those students pursuing a Bachelor of Music degree. Offered as MUSI 3141 and THEA 3141; credit will be granted only in one department. Prerequisite: C or better in MUSI 3140 or THEA 3140. Open to Musical Theatre majors only or by permission of the Department Chair.

**MUSI 3191. SECONDARY LESSONS IN STRINGS. 1 Hour.**

Open only to music majors in the All-Level Instrumental (Orchestra Emphasis) Program. Applied instruction in the fundamentals and techniques specific to string instruments. Taken twice; may not repeat study in any one instrument.

**MUSI 3200. MARCHING BAND TECHNIQUES. 2 Hours.**

Open to music majors only. A detailed study of the theory and history of marching band presentations.

**MUSI 3211. EARLY CHILDHOOD MUSIC. 2 Hours.**

Musical characteristics of children, folksong and composed literature, performance activities, song analysis, and techniques for reading and writing music. Open to music majors only. Prerequisite: C or better in MUSI 2186, MUSI 2326, and MUSI 3316.

**MUSI 3212. JAZZ TECHNIQUES. 2 Hours.**

A study of jazz techniques as they apply to solo and ensemble performance.

**MUSI 3213. INSTRUMENTAL MATERIALS AND TECHNIQUES I. 2 Hours.**

A study of literature, music selection, rehearsal planning, sound production, and performance practices for beginning and intermediate instrumental ensembles. Prerequisite: C or better in MUSI 4211.

**MUSI 3214. CHORAL MATERIALS AND TECHNIQUES I. 2 Hours.**

A study of literature, music selection, rehearsal planning, vocal production, and performance practices for beginning and intermediate choral ensembles. Prerequisite: C or better in MUSI 4211 and MUSI 4309.

**MUSI 3225. JAZZ IMPROVISATION I. 2 Hours.**

The melodic and harmonic foundations of contemporary jazz solo performance. May be repeated for credit as topics change. Prerequisite: C or better in MUSI 3125 or approval of instructor.

**MUSI 3226. JAZZ IMPROVISATION II. 2 Hours.**

A continuation of Jazz Improvisation I. This course explores advanced techniques of contemporary jazz solo performance. Prerequisite: C or better in MUSI 3225 and MUSI 3126 or faculty approval.

**MUSI 3236. PRIVATE LESSONS IN JAZZ GUITAR. 2 Hours.**

This sequence of courses meets the requirements of music majors whose concentration is jazz guitar. Prerequisite: C or better in MUSI 2237 and passing grade on the Sophomore Proficiency exam.

**MUSI 3237. PRIVATE LESSONS IN JAZZ GUITAR. 2 Hours.**

This sequence of courses meets the requirements of music majors whose concentration is jazz guitar. Prerequisite: C or better in MUSI 3236.

**MUSI 3238. PRIVATE LESSONS IN JAZZ DRUMSET. 2 Hours.**

This sequence of courses meets the requirements of music majors whose concentration is jazz drumset. Prerequisite: C or better in MUSI 2239 and passing grade on Sophomore Proficiency exam.

**MUSI 3239. APPLIED INSTRUCTION ON A SECONDARY INSTRUMENT. 2 Hours.**

Open to music majors only. Applied instruction that covers the fundamentals and techniques specific to a secondary instrument.

**MUSI 3240. PRIVATE LESSONS IN VOICE. 2 Hours.**

This sequence of courses is required of music majors whose concentration is voice. Prerequisite: C or better in MUSI 2241 and Passing Grade on Sophomore Proficiency Exam.

**MUSI 3241. PRIVATE LESSONS IN VOICE. 2 Hours.**

This sequence of courses is required of music majors whose concentration is voice. Prerequisite: C or better in MUSI 3240.

**MUSI 3242. PRIVATE LESSONS IN PIANO. 2 Hours.**

This sequence of courses is required of music majors whose concentration is piano. Prerequisite: C or better in MUSI 2243 and Passing Grade on Sophomore Proficiency Exam.

**MUSI 3243. PRIVATE LESSONS IN PIANO. 2 Hours.**

This sequence of courses is required of music majors whose concentration is piano. Prerequisite: C or better in MUSI 3242.

**MUSI 3244. PRIVATE LESSONS IN STRINGS. 2 Hours.**

This sequence of courses meets the requirements of music majors whose concentration is strings. Prerequisite: C or better in MUSI 2245 and Passing Grade on Sophomore Proficiency Exam.

**MUSI 3245. PRIVATE LESSONS IN STRINGS. 2 Hours.**

This sequence of courses meets the requirements of music majors whose concentration is strings. Prerequisite: C or better in MUSI 3244.

**MUSI 3246. PRIVATE LESSONS IN WOODWINDS. 2 Hours.**

This sequence of courses is required of music majors whose concentration is woodwinds. Prerequisite: C or better in MUSI 2247 and Passing Grade on Sophomore Proficiency Exam.

**MUSI 3247. PRIVATE LESSONS IN WOODWINDS. 2 Hours.**

This sequence of courses is required of music majors whose concentration is woodwinds. Prerequisite: C or better in MUSI 3246.

**MUSI 3248. PRIVATE LESSONS IN BRASS. 2 Hours.**

This sequence of courses is required of music majors whose concentration is brass. Prerequisite: C or better in MUSI 2249 and Passing Grade on Sophomore Proficiency Exam.

**MUSI 3249. PRIVATE LESSONS IN BRASS. 2 Hours.**

This sequence of courses is required of music majors whose concentration is brass. Prerequisite: C or better in MUSI 3248.

**MUSI 3250. PRIVATE LESSONS IN PERCUSSION. 2 Hours.**

This sequence of courses is required of music majors whose concentration is percussion. Prerequisite: C or better in MUSI 2251 and passing grade on Sophomore Proficiency Exam.

**MUSI 3251. PRIVATE LESSONS IN PERCUSSION. 2 Hours.**

This sequence of courses is required of music majors whose concentration is percussion. Prerequisite: C or better in MUSI 3250.

**MUSI 3252. PRIVATE LESSONS IN JAZZ BASS. 2 Hours.**

This sequence of courses meets the requirements of jazz studies majors whose concentration is jazz bass. Prerequisite: C or better in MUSI 2253 or MUSI 2145 and MUSI 2147, and passing grade on Sophomore Proficiency Exam.

**MUSI 3253. PRIVATE LESSONS IN JAZZ BASS. 2 Hours.**

This sequence of courses meets the requirements of jazz studies majors whose concentration is jazz bass. Prerequisite: C or better in MUSI 3252.



**MUSI 3254. PRIVATE LESSONS IN JAZZ PIANO. 2 Hours.**

This sequence of courses is required of and limited to music majors with jazz option for whom the principal instrument is piano. Prerequisite: C or better in MUSI 2143 and MUSI 2155 and passing grade on Sophomore Proficiency Exam.

**MUSI 3255. PRIVATE LESSONS IN JAZZ PIANO. 2 Hours.**

This sequence of courses is required of and limited to music majors with jazz option for whom the principal instrument is piano. Prerequisite: C or better in MUSI 3254.

**MUSI 3257. PRIVATE LESSONS IN ORGAN. 2 Hours.**

This sequence of courses is required of music majors whose concentration is organ. Prerequisite: C or better in MUSI 2258 and passing grade on Sophomore Proficiency Exam.

**MUSI 3258. PRIVATE LESSONS IN ORGAN. 2 Hours.**

This sequence of courses is required of music majors whose concentration is organ. Prerequisite: C or better in MUSI 3257.

**MUSI 3259. PRIVATE LESSONS IN JAZZ DRUMSET. 2 Hours.**

This sequence of courses meets the requirements of music majors whose concentration is jazz drumset. Prerequisite: C or better in MUSI 3238.

**MUSI 3267. PRIVATE LESSONS IN HARPSICHORD. 2 Hours.**

This sequence is required of music majors whose concentration is harpsichord. Prerequisite: C or better in MUSI 2268 and passing grade on Sophomore Proficiency Exam.

**MUSI 3268. PRIVATE LESSONS IN HARPSICHORD. 2 Hours.**

This sequence is required of music majors whose concentration is harpsichord. Prerequisite: C or better in MUSI 3267.

**MUSI 3294. STRING PEDAGOGY. 2 Hours.**

A study of teaching techniques as they apply to studio or class instruction in applied string music. Prerequisite: Faculty approval.

**MUSI 3295. PIANO PEDAGOGY I. 2 Hours.**

Open to music majors only. Teaching methods of beginning level private and class instruction. Prerequisite: Faculty approval.

**MUSI 3296. PIANO PEDAGOGY II. 2 Hours.**

Open to music majors only. Teaching methods of beginning level private and class instruction. Prerequisite: Faculty approval.

**MUSI 3300. MUSIC HISTORY I. 3 Hours.**

The music of western civilization from ancient times to 1750. Prerequisite: C or better in MUSI 2326 or faculty approval.

**MUSI 3301. MUSIC HISTORY II. 3 Hours.**

The music of western civilization from 1750 to the present. Prerequisite: C or better in MUSI 2326 or faculty approval.

**MUSI 3302. FORM AND ANALYSIS. 3 Hours.**

Structure and analysis of the major forms of music literature. Prerequisite: C or better in MUSI 2326 and a passing grade on the Music Theory Proficiency Exam.

**MUSI 3303. COUNTERPOINT. 3 Hours.**

Overview of modal counterpoint; detailed study of harmonic counterpoint including canon, invention, and fugue. Prerequisite: C or better in MUSI 2326 and a passing grade on the Music Theory Proficiency Exam.

**MUSI 3305. MUSIC FOR CHILDREN. 3 Hours.**

A study of musical activities and the role of music in childhood. Includes music fundamentals, folk song literature, and musical characteristics of children. Cannot be counted toward a Bachelor of Music Degree.

**MUSI 3308. INSTRUMENTAL CONDUCTING I. 3 Hours.**

A practical study of basic instrumental conducting and score reading techniques. Open to music majors only. Prerequisites: C or better in MUSI 2186, MUSI 2326 and successful completion of the second semester lessons or above.

**MUSI 3309. CHORAL CONDUCTING I. 3 Hours.**

A practical study of the technical and expressive skills required of choral conductors, as well as the development of score study techniques and error detection skills necessary to successfully conduct choral ensembles. Open to music majors only. Prerequisites: C or better in MUSI 2186, MUSI 2326 and successful completion of the Sophomore Proficiency Exam.

**MUSI 3316. STRATEGIES AND ASSESSMENT IN MUSIC EDUCATION. 3 Hours.**

Open to music education majors only. Current trends in music education will be examined. Topics include effective differentiated instruction, positive classroom management, strategies for working with diverse learners, and examination of major learning theories and principles of cognitive, social, emotional, physical and aesthetic development. This course will also examine a variety of assessment techniques that are used in a music classroom. Assessment tools such as rubrics, rating scales, National Standards, TEKS, STAAR, and TExES will be examined and implemented into lesson planning. Prerequisite: C or better in MUSI 2112.

**MUSI 3317. SINGING FOR THE ACTOR. 3 Hours.**

An applied study of the vocal apparatus, vocal placement, the voice/body relationship, character, working with text, phrasing, and auditioning as they relate to singing in musical theatre for the Broadway or West End theatre. Emphasis is placed on integrating singing and acting skills. Prerequisites: THEA 1307, THEA 2352 and permission of faculty. Same as offering THEA 3317; may not be repeated and credit will only be granted in one department.

**MUSI 3320. MUSIC AND TECHNOLOGY IN GAME AUDIO. 3 Hours.**

Explores basics of music and audio for computer games, including composition, workflow, working with animation, and dialog/non-music sound. May be repeated for credit as topics change. Prerequisite: C or better in MUSI 3394 or permission of instructor.

**MUSI 3321. KEYBOARD SYNTHESIZER PROGRAMMING AND TECHNIQUES. 3 Hours.**

Explores the framework, process, and implementation of electronic music synthesis in composition and performance idioms. Topics covered are electronic sound design, hardware and soft synths.

**MUSI 3322. INTRODUCTION TO SONGWRITING. 3 Hours.**

Open to music majors only. Addresses strategies, techniques, and the craft of composing popular song. Prerequisite: MUSI 3126 or MUSI 1326.

**MUSI 3323. BUSINESS OF MUSIC. 3 Hours.**

A study of the structure of the music business and relationships among occupations in the industry. Topics include publishing, copyright licensing, artist management, the record industry, music in film and broadcasting, and career development and planning.

**MUSI 3326. POST-TONAL ANALYSIS. 3 Hours.**

Study of pitch, harmony, rhythm, & form in music from Debussy to the present. Prerequisite: C or better in MUSI 2186 and MUSI 2326 and passing grade on the Music Theory Proficiency Exam.

**MUSI 3350. PRIVATE LESSONS IN VOICE. 3 Hours.**

Courses meet the requirements of performance majors in voice. Performance of a junior (half) recital must be completed prior to the end of the 3351 semester. Prerequisite: C or better in MUSI 2241 and passing grade on Sophomore Proficiency exam.

**MUSI 3351. PRIVATE LESSONS IN VOICE. 3 Hours.**

Courses meet the requirements of performance majors in voice. Performance of a junior (half) recital must be completed prior to the end of the 3351 semester. Prerequisite: C or better in MUSI 3350.

**MUSI 3352. PRIVATE LESSONS IN PIANO. 3 Hours.**

Courses meet the requirements of performance majors in piano. Performance of a junior (half) recital must be completed prior to the end of the 3353 semester. Prerequisite: C or better in MUSI 2243 and passing grade on Sophomore Proficiency exam.

**MUSI 3353. PRIVATE LESSONS IN PIANO. 3 Hours.**

Courses meet the requirements of performance majors in piano. Performance of a junior (half) recital must be completed prior to the end of the 3353 semester. Prerequisite: C or better in MUSI 3352.

**MUSI 3354. PRIVATE LESSONS IN STRINGS. 3 Hours.**

These courses meet the requirements of performance majors in strings. Performance of a junior (half) recital must be completed prior to the end of the 3355 semester. Prerequisite: C or better in MUSI 2245 and passing grade on Sophomore Proficiency exam.

**MUSI 3355. PRIVATE LESSONS IN STRINGS. 3 Hours.**

These courses meet the requirements of performance majors in strings. Performance of a junior (half) recital is required prior to the end of the 3355 semester. Prerequisite: C or better in MUSI 3354.

**MUSI 3356. PRIVATE LESSONS IN WOODWINDS. 3 Hours.**

Courses meet the requirements of performance majors in woodwinds. Performance of a junior (half) recital must be completed prior to the end of the 3357 semester. Prerequisite: C or better in MUSI 2247 and passing grade on Sophomore Proficiency Exam.

**MUSI 3357. PRIVATE LESSONS IN WOODWINDS. 3 Hours.**

Courses meet the requirements of performance majors in woodwinds. Performance of a junior (half) recital must be completed prior to the end of the 3357 semester. Prerequisite: C or better in MUSI 3356.

**MUSI 3358. PRIVATE LESSONS IN BRASS. 3 Hours.**

Courses meet the requirements of performance majors in brass. Performance of a junior (half) recital must be completed prior to the end of the 3359 semester. Prerequisite: C or better in MUSI 2249 and passing grade on Sophomore Proficiency exam.

**MUSI 3359. PRIVATE LESSONS IN BRASS. 3 Hours.**

Courses meet the requirements of performance majors in brass. Performance of a junior (half) recital must be completed prior to the end of the 3359 semester. Prerequisite: C or better in MUSI 3358.

**MUSI 3360. PRIVATE LESSONS IN PERCUSSION. 3 Hours.**

Courses meet the requirements of performance majors in percussion. Performance of a junior (half) recital must be completed prior to the end of the 3361 semester. Prerequisite: C or better in MUSI 2251 and passing grade on Sophomore Proficiency exam.

**MUSI 3361. PRIVATE LESSONS IN PERCUSSION. 3 Hours.**

Courses meet the requirements of performance majors in percussion. Performance of a junior (half) recital must be completed prior to the end of the 3361 semester. Prerequisite: C or better in MUSI 3360.

**MUSI 3367. PRIVATE LESSONS IN ORGAN. 3 Hours.**

Courses meet the requirements of performance majors in organ. Performance of a junior (half) recital must be completed prior to the end of the 3368 semester. Prerequisite: C or better in MUSI 2258 and passing grade on Sophomore Proficiency Exam.

**MUSI 3368. PRIVATE LESSONS IN ORGAN. 3 Hours.**

Courses meet the requirements of performance majors in organ. Performance of a junior (half) recital must be completed prior to the end of the 3368 semester. Prerequisite: C or better in MUSI 3367.

**MUSI 3377. PRIVATE LESSONS IN HARPSICHORD. 3 Hours.**

Courses meet the requirements of performance majors in harpsichord. Performance of a junior (half) recital must be completed prior to the end of the 3378 semester. Prerequisite: C or better in MUSI 2268.

**MUSI 3378. PRIVATE LESSONS IN HARPSICHORD. 3 Hours.**

Courses meet the requirements of performance majors in harpsichord. Performance of a junior (half) recital must be completed prior to the end of the 3378 semester. Prerequisite: C or better in MUSI 3377.

**MUSI 3390. LINEAR ANALYSIS. 3 Hours.**

An introduction to the methods of linear analysis and harmonic reduction. Seminar designed to meet the needs of students desiring to become theorists or teachers of theory. Prerequisite: C or better in MUSI 2186, MUSI 2326, and a passing grade on the Music Theory Proficiency Exam.

**MUSI 3391. ADVANCED SONATA THEORY. 3 Hours.**

An in-depth examination of sonata form drawing on the concepts of Caplin's formal functions and Hepokoski and Darcy's sonata theory, including intensive writing and analysis assignments. Seminar designed to meet the needs of students desiring to become theorists or teachers of theory. Prerequisite: C or better in MUSI 2186 and MUSI 2326 and passing grade on the Music Theory Proficiency Exam.

**MUSI 3392. COMPOSITION I. 3 Hours.**

Individual instruction designed to meet the needs of students desiring to become composers or teachers of composition. Prerequisite: B or better in MUSI 2227, MUSI 2325, MUSI 2326, and MUSI 2186 and a passing grade on the Music Theory Proficiency Exam.

**MUSI 3393. COMPOSITION II. 3 Hours.**

Individual instruction designed to meet the needs of students desiring to become composers or teachers of composition. Prerequisite: C or better in MUSI 3392.

**MUSI 3394. DIGITAL MUSIC TECHNOLOGY. 3 Hours.**

An introduction to the computer and to its use in the field of music. Topics include basic computer operation, information-management software, computer-assisted instruction in music, and music notation and sequencing software, MIDI (Musical Instrument Digital Interface).

**MUSI 3395. JAZZ COMPOSITION. 3 Hours.**

An introduction to jazz composition, focusing on no more than four distinct melodic voices plus rhythm section. Functional and non-functional harmonic and melodic techniques are explored. Prerequisite: C or better in MUSI 3226 or permission of instructor and successful completion of the Jazz Proficiency Exam.

**MUSI 3396. TOPICS IN RECORD LABEL AND STUDIO MANAGEMENT I. 3 Hours.**

Practical experience in the operations of a functioning record label (UTA Records). Topics include Copyright Law, Music Distribution, and Music Publishing. Prerequisite: Permission of instructor required.

**MUSI 3397. TOPICS IN RECORD LABEL AND ARTIST MANAGEMENT II. 3 Hours.**

Practical experience in the operations of a functioning record label (UTA Records). Topics include Music Licensing, Artist Management, Music Curation, and Content Creation. Prerequisite: Permission of instructor.

**MUSI 4101. GERMAN AND ENGLISH DICTION. 1 Hour.**

A guide to correct pronunciation of German and English in vocal music.

**MUSI 4102. VOCAL LITERATURE. 1 Hour.**

Survey of major solo vocal works from the Classical Era to the present. Prerequisite: C or better in MUSI 2241 or permission of instructor.

**MUSI 4111. ORCHESTRAL EXCERPTS. 1 Hour.**

Study of orchestral excerpts for individual instruments. Topics will vary by semester. May be repeated for credit. Permission of instructor required.

**MUSI 4117. MUSIC EDUCATION FIELD-BASED EXPERIENCE. 1 Hour.**

Supervised and directed professional practice in local schools. Weekly seminars are required. Field-based experience must be taken the semester immediately preceding student teaching residency. Prerequisite: Completion of all coursework except required College of Education courses.

**MUSI 4128. ADVANCED AUDIO RECORDING. 1 Hour.**

Further study and practical studio work for students who have successfully completed the required recording techniques sequence utilizing Studio 301 in an independent study format. Prerequisite: C or better in MUSI 4326.

**MUSI 4129. RECORDING ENSEMBLE. 1 Hour.**

This course is open to Music Industry Studies students. This ensemble provides practical and artistic experience in a frequently encountered recording studio setting. Prerequisite: C or better in MUSI 4390 or Approval of the ensemble director.

**MUSI 4140. PRIVATE LESSONS IN VOICE-MUSICAL THEATRE. 1 Hour.**

This sequence of courses is required of students who are pursuing the BFA in Musical Theatre. These courses may not be used as substitute voice lessons for those students pursuing a Bachelor of Music degree. Offered as MUSI 4140 and THEA 4140; credit will be granted only in one department. Prerequisite: C or better in MUSI 3141 or THEA 3141. Open to Musical Theatre majors only or by permission of the Department Chair.

**MUSI 4141. PRIVATE LESSONS IN VOICE-MUSICAL THEATRE. 1 Hour.**

This sequence of courses is required of students who are pursuing the BFA in Musical Theatre. These courses may not be used as substitute voice lessons for those students pursuing a Bachelor of Music degree. Offered as MUSI 4141 and THEA 4141; credit will be granted only in one department. Prerequisite: C or better in MUSI 4140 or THEA 4140. Open to Musical Theatre majors only or by permission of the Department Chair.

**MUSI 4188. ADVANCED CONDUCTING. 1 Hour.**

Open to music majors only. An intensive study of conducting that will include score-study techniques, left and right hand independence, video analysis, rehearsal observation, and other topics related to the art of conducting. Can fulfill one of the 3 elective hours for Performance majors. Prerequisite: MUSI 3308 or MUSI 3309, and permission of instructor.

**MUSI 4190. KEYBOARD ACCOMPANIMENT. 1 Hour.**

This course entails the student accompanying performances as specified and supervised by the instructor.

**MUSI 4191. CONFERENCE COURSE. 1 Hour.**

Special problems in music. Topic may change from semester to semester. May be repeated for credit. Prerequisite: Consent of the instructor or chair of the department.

**MUSI 4201. WOODWIND LITERATURE AND PEDAGOGY. 2 Hours.**

Survey of woodwind literature and pedagogy materials in preparation for career in performance and applied instruction. Prerequisite: Consent of the instructor or chair of the department.

**MUSI 4202. BRASS LITERATURE AND PEDAGOGY. 2 Hours.**

Survey of brass literature and pedagogy materials in preparation for career in performance and applied instruction.

**MUSI 4203. PERCUSSION LITERATURE/PEDAGOGY. 2 Hours.**

Survey of percussion literature and pedagogy materials in preparation for career in applied instruction.

**MUSI 4204. STRING LITERATURE/PEDAGOGY. 2 Hours.**

Survey of string literature and pedagogy materials in preparation for career in applied instruction.

**MUSI 4205. ADVANCED FUNCTIONAL PIANO. 2 Hours.**

Concentrated study of keyboard skills which include: sight reading, transposition, harmonization, and open score reading. Prerequisite: C or better in MUSI 2181 or faculty approval.

**MUSI 4206. KEYBOARD LITERATURE I. 2 Hours.**

Exploration of piano literature and performance practice topics from different historical periods.

**MUSI 4207. KEYBOARD LITERATURE II. 2 Hours.**

Continued exploration of piano literature and performance practice topics from different historical periods.

**MUSI 4208. GROUP PIANO METHODS. 2 Hours.**

Exploration of class piano methods used in teaching group classes.

**MUSI 4211. ELEMENTARY MUSIC. 2 Hours.**

Focus on perception as it relates to children's development and participation in music through singing and playing instruments. Prerequisite: C or better in MUSI 3211.

**MUSI 4213. INSTRUMENTAL MATERIALS AND TECHNIQUES II. 2 Hours.**

A study of literature, music selection, rehearsal planning, sound production, and performance practices for intermediate and advanced instrumental ensembles. Prerequisite: C or better in MUSI 3213.

**MUSI 4214. CHORAL MATERIALS AND TECHNIQUES II. 2 Hours.**

A study of literature, music selection, rehearsal planning, vocal production, and performance practices for intermediate and advanced choral ensembles. Prerequisite: C or better in MUSI 3214.

**MUSI 4225. JAZZ IMPROVISATION III - ADVANCED. 2 Hours.**

A continuation of Jazz Improvisation II. This course explores advanced techniques of contemporary jazz solo performance. Prerequisite: C or better in MUSI 3226 and successful completion of the Jazz Proficiency Exam.

**MUSI 4236. PRIVATE LESSONS IN JAZZ GUITAR. 2 Hours.**

This sequence of courses meets the requirements of music majors whose concentration is jazz guitar. Prerequisite: C or better in MUSI 3237.

**MUSI 4238. PRIVATE LESSONS IN JAZZ DRUMSET. 2 Hours.**

This sequence of courses meets the requirements of music majors whose concentration is jazz drumset. Prerequisite: C or better in MUSI 3259.

**MUSI 4240. PRIVATE LESSONS IN VOICE. 2 Hours.**

This sequence of courses is required of music majors whose concentration is voice. Performance of a senior (half) recital is required for completion of this course for all students in the concentration Bachelor of Music in Preparation for Teacher Certification. Prerequisite: C or better in MUSI 3241.

**MUSI 4241. PRIVATE LESSONS IN VOICE. 2 Hours.**

This sequence of courses is required of music majors whose concentration is voice. Prerequisite: C or better in MUSI 4240.

**MUSI 4242. PRIVATE LESSONS IN PIANO. 2 Hours.**

This sequence of courses is required of music majors whose concentration is piano. Performance of a senior (half) recital is required for completion of this course for all students in the concentration Bachelor of Music in Preparation for Teacher Certification. Prerequisite: C or better in MUSI 3243.

**MUSI 4243. PRIVATE LESSONS IN PIANO. 2 Hours.**

This sequence of courses is required of music majors whose concentration is piano. Prerequisite: C or better in MUSI 4242.

**MUSI 4244. PRIVATE LESSONS IN STRINGS. 2 Hours.**

This sequence of courses meets the requirements of music majors whose concentration is strings. Performance of a senior (half) recital is required for completion of this course for all students in the concentration Bachelor of Music in Preparation for Teacher Certification. Prerequisite: C or better in MUSI 3245.

**MUSI 4245. PRIVATE LESSONS IN STRINGS. 2 Hours.**

This sequence of courses meets the requirements of music majors whose concentration is strings. Prerequisite: C or better in MUSI 4244.

**MUSI 4246. PRIVATE LESSONS IN WOODWINDS. 2 Hours.**

This sequence of courses is required of music majors whose concentration is woodwinds. Performance of a senior (half) recital is required for completion of this course for all students in the concentration Bachelor of Music in Preparation for Teacher Certification. Prerequisite: C or better in MUSI 3247.

**MUSI 4247. PRIVATE LESSONS IN WOODWINDS. 2 Hours.**

This sequence of courses is required of music majors whose concentration is woodwinds. Prerequisite: C or better in MUSI 4246.

**MUSI 4248. PRIVATE LESSONS IN BRASS. 2 Hours.**

This sequence of courses is required of music majors whose concentration is brass. Performance of a senior (half) recital is required for completion of this course for all students in the concentration Bachelor of Music in Preparation for Teacher Certification. Prerequisite: C or better in MUSI 3249.

**MUSI 4249. PRIVATE LESSONS IN BRASS. 2 Hours.**

This sequence of courses is required of music majors whose concentration is brass. Prerequisite: C or better in MUSI 4248.

**MUSI 4250. PRIVATE LESSONS IN PERCUSSION. 2 Hours.**

This sequence of courses is required of music majors whose concentration is percussion. Performance of a senior (half) recital is required for completion of this course for all students in the concentration Bachelor of Music in Preparation for Teacher Certification. Prerequisite: C or better in MUSI 3251.

**MUSI 4251. PRIVATE LESSONS IN PERCUSSION. 2 Hours.**

This sequence of courses is required of music majors whose concentration is percussion. Prerequisite: C or better in MUSI 4250.

**MUSI 4252. PRIVATE LESSONS IN JAZZ BASS. 2 Hours.**

This sequence of courses meets the requirements of jazz studies majors whose concentration is jazz bass. Performance of a senior (half) recital is required for completion of this course for all students in the concentration Bachelor of Music in Preparation for Teacher Certification. Prerequisite: C or better in MUSI 3253.

**MUSI 4253. PRIVATE LESSONS IN JAZZ BASS. 2 Hours.**

This sequence of courses meets the requirements of jazz studies majors whose concentration is jazz bass. Prerequisite: C or better in MUSI 4252.

**MUSI 4254. PRIVATE LESSONS IN JAZZ PIANO. 2 Hours.**

This sequence of courses is required of and limited to music majors with jazz option for whom the principal instrument is piano. Prerequisite: C or better in MUSI 3255.

**MUSI 4257. PRIVATE LESSONS IN ORGAN. 2 Hours.**

This sequence of courses is required of music majors whose concentration is organ. Performance of a senior (half) recital is required for completion of this course for all students in the concentration Bachelor of Music in Preparation for Teacher Certification. Prerequisite: C or better in MUSI 3258.

**MUSI 4258. PRIVATE LESSONS IN ORGAN. 2 Hours.**

This sequence of courses is required of music majors whose concentration is organ. Prerequisite: C or better in MUSI 4257.

**MUSI 4267. PRIVATE LESSONS IN HARPSICHORD. 2 Hours.**

This sequence is required of music majors whose concentration is harpsichord. Performance of a senior (half) recital is required for completion of this course for all students in the concentration Bachelor of Music in Preparation for Teacher Certification. Prerequisite: C or better in MUSI 3268.

**MUSI 4268. PRIVATE LESSONS IN HARPSICHORD. 2 Hours.**

This sequence is required of music majors whose concentration is harpsichord. Prerequisite: C or better in MUSI 4267.

**MUSI 4270. PRIVATE LESSONS IN VOICE-MUSICAL THEATRE. 2 Hours.**

This sequence of courses is required of students who are pursuing the BFA in Musical Theatre. These courses may not be used as substitute voice lessons for those students pursuing a Bachelor of Music Degree. Prerequisite: Permission of advisor.

**MUSI 4271. PRIVATE LESSONS IN VOICE-MUSICAL THEATRE. 2 Hours.**

This sequence of courses is required of students who are pursuing the BFA in Musical Theatre. These courses may not be used as substitute voice lessons for those students pursuing a Bachelor of Music Degree. Prerequisite: Permission of advisor.

**MUSI 4280. SPECIAL TOPICS IN MUSIC. 2 Hours.**

Special studies in music. Topics will vary from semester to semester. May be repeated for credit when topics vary.



**MUSI 4291. CONFERENCE COURSE. 2 Hours.**

Special problems in music. Topic may change from semester to semester. May be repeated for credit. Prerequisite: Consent of the instructor or chair of the department.

**MUSI 4300. JAZZ PERSPECTIVES. 3 Hours.**

An in-depth study of the history, literature, and styles of the jazz idiom. Open to music majors only. Prerequisite: Successful completion of the Jazz Proficiency Exam.

**MUSI 4301. ORCHESTRATION. 3 Hours.**

Scoring for strings, woodwinds, brass, percussion, and voice as related to orchestra, band, and choir. Prerequisite: C or better in MUSI 2186, MUSI 2326 and a passing grade on the Music Theory Proficiency Exam.

**MUSI 4302. JAZZ ARRANGING. 3 Hours.**

Arranging in the jazz and commercial idioms with emphasis on the large jazz ensemble. Prerequisite: C or better in MUSI 3125, MUSI 3225, and MUSI 3395, or consent of the instructor, and successful completion of the Jazz Proficiency Exam.

**MUSI 4303. ADVANCED STRING CLASS. 3 Hours.**

Open to music majors only. An advanced study of orchestral string instruments with emphasis on advanced technique and pedagogy. Prerequisite: C or better in MUSI 3191.

**MUSI 4305. HISTORY OF MUSIC THEORY. 3 Hours.**

Theorists and theoretical tracts from the ancient Greeks to the present day. Prerequisite: C or better in MUSI 2186, MUSI 2326, and a passing grade on the Music Theory Proficiency exam.

**MUSI 4308. INSTRUMENTAL CONDUCTING II. 3 Hours.**

Open to music majors only. A study of advanced conducting techniques, including score reading, rehearsal techniques, ensemble concepts, articulations and musical style. Prerequisite: C or better in MUSI 3308.

**MUSI 4309. CHORAL CONDUCTING II. 3 Hours.**

Open to music majors only. Application of the technical and expressive aspects of choral conducting, score study techniques, error detection skills, and rehearsal planning and implementation techniques in a laboratory-conducting situation. Offered every spring odd year. Prerequisite: C or better in MUSI 3309.

**MUSI 4322. ARTS MANAGEMENT AND ENTREPRENEURSHIP. 3 Hours.**

This course is designed as an introduction in arts entrepreneurship and explore creating an artist-based business. Students will examine the breadth of professional opportunities and explore strategies for pursuing them. Prerequisite: MUSI 3323.

**MUSI 4324. HISTORY OF MUSICAL THEATRE. 3 Hours.**

A historical survey of American theatre music from the colonial period to the present. Open to all students as a fine arts elective.

**MUSI 4325. RECORDING TECHNIQUES II. 3 Hours.**

Students will continue to learn recording engineering through audio analysis, recording practice, and audio theory. Signal processing, analog tape techniques, mastering, and studio business will be discussed. Students will work independently on jazz and pop/rock recording projects in Studio 301. Prerequisite: C or better in MUSI 4390.

**MUSI 4326. RECORDING TECHNIQUES III. 3 Hours.**

This course builds upon the previous two courses by introducing students to more advanced aspects of audio engineering, such as combining MIDI and audio, syncing audio to video, advanced aural skills, and mixing automation. Students will be able to utilize Studio 301 and Irons Hall in order to pursue their recording work in a more independent fashion. Prerequisite: C or better in MUSI 4325.

**MUSI 4327. TECHNIQUES AND TECHNOLOGY IN FILM COMPOSITION. 3 Hours.**

Study in the technical and artistic requirements of film composition and the realization of film scores. Prerequisite: C or better in MUSI 3394.

**MUSI 4328. ELECTRONIC MUSIC COMPOSITION AND PERFORMANCE. 3 Hours.**

An exploration of strategies for composing electronic music that apply to a broad range of contemporary styles and genres. Through a series of guided exercises and projects, the class provides an opportunity for students to explore compositional approaches using electronic instruments and digital audio technologies. Prerequisite: C or better in MUSI 4325.

**MUSI 4329. SOUND FOR NEW MEDIA. 3 Hours.**

Explores the techniques and application of audio integration within media-centered environments, focusing on live broadcast audio applications over internet and other mediums for broadcast. Prerequisite: C or better in MUSI 4325.

**MUSI 4349. FORMAL-FUNCTION THEORY. 3 Hours.**

Introduction to William Caplin's Formal-Function Theory, including mastery of formal functions, harmonic progressions, the principal theme types, and full-movement forms. Seminar designed to meet the needs of students desiring to become theorists or teachers of theory. Prerequisites: C or better in MUSI 2186, MUSI 2326, and a passing grade on the Music Theory Proficiency exam.

**MUSI 4350. 20TH CENTURY FORM & TECHNIQUE. 3 Hours.**

Introduction to twentieth-century form and techniques, as well as relevant analytical methods and compositional strategies. Seminar designed to meet the needs of students desiring to become theorists or teacher of theory. This course formerly MUSI 4490. Prerequisite: C or better in MUSI 2186 and MUSI 2326 and passing grade on the Music Theory Proficiency Exam.

**MUSI 4351. MUSIC THEORY CAPSTONE/SEMINAR. 3 Hours.**

Seminar designed to meet the needs of students desiring to become theorists or teachers of theory; includes preparation and presentation of a senior research project in music theory in a conference setting. This course formerly MUSI 4491. Prerequisite: Grade of C or better in MUSI 4390 (formerly MUSI 4490).

**MUSI 4387. ANALYSIS OF POPULAR MUSIC. 3 Hours.**

This course will explore form, melody, harmony, and voice-leading in a variety of popular styles since the early 20th century. Prerequisite: C or better in MUSI 2326 and a passing grade on the Theory Proficiency exam.

**MUSI 4390. RECORDING TECHNIQUES I. 3 Hours.**

Live performance and studio recording techniques. Topics include microphone selection and placement, equalization techniques, overdubbing, console-mixing, sound synchronization, and related recording techniques. Prerequisite: C or better in MUSI 3394.

**MUSI 4391. CONFERENCE COURSE. 3 Hours.**

Special problems in music. Topic may change from semester to semester. May be repeated for credit. Prerequisite: Consent of the instructor or chair of the department.

**MUSI 4392. JAZZ STUDIES SENIOR RECITAL/PROJECT. 3 Hours.**

Senior recital or project for jazz studies majors. Designed in consultation with the Director of Jazz Studies. Prerequisites: completion of performance lesson requirements; consent of instructor or music department chair.

**MUSI 4393. CAPSTONE IN MUSIC THEORY. 3 Hours.**

Senior project in music theory, culminating in a professional presentation on a selected topic in music theory. Prerequisite: MUSI 4490.

**MUSI 4394. HONORS THESIS/SENIOR PROJECT. 3 Hours.**

Required of all students in the University Honors College. During the senior year, the student must complete a thesis or a project under the direction of a faculty member in the major department.

**MUSI 4395. INTERNSHIP. 3 Hours.**

The Internship course is designed to give students practical experience in a variety of music media and music business settings. The student must work with a local business for at least ten hours per week (140 hours total).

**MUSI 4450. PRIVATE LESSONS IN VOICE. 4 Hours.**

These courses meet the requirements of performance majors in voice. Performance of a senior (full) recital must be completed prior to the end of the 4451 semester. Prerequisite: C or better in MUSI 3351.

**MUSI 4451. PRIVATE LESSONS IN VOICE. 4 Hours.**

These courses meet the requirements of performance majors in voice. Performance of a senior (full) recital must be completed prior to the end of the 4451 semester. Prerequisite: C or better in MUSI 4450.

**MUSI 4452. PRIVATE LESSONS IN PIANO. 4 Hours.**

These courses meet the requirements of performance majors in piano. Performance of a senior (full) recital must be completed prior to the end of the 4453 semester. Prerequisite: C or better in MUSI 3353.

**MUSI 4453. PRIVATE LESSONS IN PIANO. 4 Hours.**

These courses meet the requirements of performance majors in piano. Performance of a senior (full) recital must be completed prior to the end of the 4453 semester. Prerequisite: C or better in MUSI 4452.

**MUSI 4454. PRIVATE LESSONS IN STRINGS. 4 Hours.**

These courses meet the requirements of performance majors in strings. Performance of a senior (full) recital must be completed prior to the end of the 4455 semester. Prerequisite: C or better in MUSI 3355.

**MUSI 4455. PRIVATE LESSONS IN STRINGS. 4 Hours.**

These courses meet the requirements of performance majors in strings. Performance of a senior (full) recital must be completed prior to the end of the 4455 semester. Prerequisite: C or better in MUSI 4454.

**MUSI 4456. PRIVATE LESSONS IN WOODWINDS. 4 Hours.**

These courses meet the requirements of performance majors in woodwinds. Performance of a senior (full) recital must be completed prior to the end of the 4457 semester. Prerequisite: C or better in MUSI 3357.

**MUSI 4457. PRIVATE LESSONS IN WOODWINDS. 4 Hours.**

These courses meet the requirements of performance majors in woodwinds. Performance of a senior (full) recital must be completed prior to the end of the 4457 semester. Prerequisite: C or better in MUSI 4456.

**MUSI 4458. PRIVATE LESSONS IN BRASS. 4 Hours.**

These courses meet the requirements of performance majors in brass. Performance of a senior (full) recital must be completed prior to the end of the 4459 semester. Prerequisite: C or better in MUSI 3359.

**MUSI 4459. PRIVATE LESSONS IN BRASS. 4 Hours.**

These courses meet the requirements of performance majors in brass. Performance of a senior (full) recital must be completed prior to the end of the 4459 semester. Prerequisite: C or better in MUSI 4458.

**MUSI 4460. PRIVATE LESSONS IN PERCUSSION. 4 Hours.**

These courses meet the requirements of performance majors in percussion. Performance of a senior (full) recital must be completed prior to the end of the 4461 semester. Prerequisite: C or better in MUSI 3361.

**MUSI 4461. PRIVATE LESSONS IN PERCUSSION. 4 Hours.**

These courses meet the requirements of performance majors in percussion. Performance of a senior (full) recital must be completed prior to the end of the 4461 semester. Prerequisite: C or better in MUSI 4460.

**MUSI 4467. PRIVATE LESSONS IN ORGAN. 4 Hours.**

These courses meet the requirements of performance majors in organ. Performance of a senior (full) recital must be completed prior to the end of the 4468 semester. Prerequisite: C or better in MUSI 3368.

**MUSI 4468. PRIVATE LESSONS IN ORGAN. 4 Hours.**

These courses meet the requirements of performance majors in organ. Performance of a senior (full) recital must be completed prior to the end of the 4468 semester. Prerequisite: C or better in MUSI 4467.

**MUSI 4477. PRIVATE LESSONS IN HARPSICHORD. 4 Hours.**

This course meets the requirements of performance majors in harpsichord. Performance of a senior (full) recital must be completed prior to the end of the 4478. Prerequisite: C or better in MUSI 3378.

**MUSI 4478. PRIVATE LESSONS IN HARPSICHORD. 4 Hours.**

These courses meet the requirements of performance majors in harpsichord. Performance of a senior (full) recital must be completed prior to the end of the 4478 semester. Prerequisite: C or better in MUSI 4477.

**MUSI 4492. COMPOSITION III. 4 Hours.**

Individual instruction designed to meet the needs of students desiring to become composers or teachers of composition. Prerequisite: C or better in MUSI 3393.

**MUSI 4493. COMPOSITION IV. 4 Hours.**

Individual instruction designed to meet the needs of students desiring to become composers or teachers of composition. Prerequisite: C or better in MUSI 4492.

**MUSI 5000. WIND SYMPHONY. 0 Hours.**

The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director and the graduate advisor.

**MUSI 5001. SYMPHONIC WINDS. 0 Hours.**

The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director and the graduate advisor.

**MUSI 5002. A CAPPELLA CHOIR. 0 Hours.**

The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director and the graduate advisor.

**MUSI 5004. UNIVERSITY SINGERS. 0 Hours.**

The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 5005. MUSICAL THEATRE/OPERA LAB. 0 Hours.**

Exploration of opera roles, staging techniques, and repertoire. Prerequisite: Approval of the ensemble director and the graduate advisor.

**MUSI 5007. JAZZ ORCHESTRA. 0 Hours.**

The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director and the graduate advisor.

**MUSI 5008. JAZZ ENSEMBLE. 0 Hours.**

The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director and the graduate advisor.

**MUSI 5010. STUDIO CLASS. 0 Hours.**

Departmental performance classes, master classes, guest artist performances and lectures related to performance specializations. Students enroll concurrently with private lesson in specialization.

**MUSI 5011. ORCHESTRA. 0 Hours.**

The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director and the graduate advisor.

**MUSI 5012. CHAMBER MUSIC. 0 Hours.**

This course is an in-depth study of the repertoire of standard chamber ensembles such as string quartets and piano trios, woodwind quintets and brass quintets. Weekly coaching with professors culminates in a public performance where students demonstrate skills in music performance. Prerequisite: Approval of Ensemble Director and Graduate Advisor.

**MUSI 5013. ORCHESTRAL EXCERPTS. 0 Hours.**

Study of orchestral excerpts for individual instruments. Topics will vary by semester. May be repeated for credit. Permission of instructor required.

**MUSI 5018. PERCUSSION ENSEMBLE. 0 Hours.**

The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Permission of Instructor.

**MUSI 5022. JAZZ COMBO. 0 Hours.**

The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director and the graduate advisor.

**MUSI 5100. WIND SYMPHONY. 1 Hour.**

The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 5101. SYMPHONIC WINDS. 1 Hour.**

The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 5102. A CAPPELLA CHOIR. 1 Hour.**

The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 5103. CHAMBER SINGERS. 1 Hour.**

The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 5104. UNIVERSITY SINGERS. 1 Hour.**

The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 5106. KEYBOARD ENSEMBLE. 1 Hour.**

The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 5107. JAZZ ORCHESTRA. 1 Hour.**

The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 5108. JAZZ ENSEMBLE. 1 Hour.**

The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 5109. VOCAL JAZZ. 1 Hour.**

The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 5110. JAZZ COMBO. 1 Hour.**

The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 5111. ORCHESTRA. 1 Hour.**

The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 5112. CHAMBER MUSIC. 1 Hour.**

This course is an in-depth study of the repertoire of standard chamber ensembles such as string quartets and piano trios, woodwind quintets and brass quintets. Weekly coaching with professors culminates in a public performance where students demonstrate skills in music performance. Prerequisite: Approval of Ensemble Director.

**MUSI 5113. ORCHESTRAL EXCERPTS. 1 Hour.**

Study of orchestral excerpts for individual instruments. Topics will vary by semester. May be repeated for credit. Permission of instructor required.

**MUSI 5114. SAX CHOIR. 1 Hour.**

The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Permission of Instructor.

**MUSI 5115. VOCAL COACHING. 1 Hour.**

Advanced instruction in diction, interpretation, and style for singers and collaborative instrumentalists. By permission of instructor.

**MUSI 5116. ELECTRIC GUITAR ENSEMBLE. 1 Hour.**

The music major must receive credit for the ensembles required in his/her option. The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 5117. MUSIC EDUCATION FIELD-BASED EXPERIENCE. 1 Hour.**

Supervised and directed professional practice in local schools. The student will be assigned to a public school site for five hours per week. Weekly seminars are required. This course must be taken the semester immediately preceding clinical student teaching.

**MUSI 5118. PERCUSSION ENSEMBLE. 1 Hour.**

The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Permission of Instructor.

**MUSI 5120. PRIVATE LESSONS IN VOICE. 1 Hour.**

This course provides private instruction in voice. This course may be repeated for credit as often as course content changes.

**MUSI 5121. PRIVATE LESSONS IN PIANO. 1 Hour.**

This course provides private instruction in piano. This course may be repeated for credit as often as course content changes.

**MUSI 5122. PRIVATE LESSONS IN ORGAN. 1 Hour.**

This course provides private instruction in organ. This course may be repeated for credit as often as course content changes.

**MUSI 5123. PRIVATE LESSONS IN HARPSICHORD. 1 Hour.**

This course provides private instruction in harpsichord. This course may be repeated for credit as often as course content changes.

**MUSI 5124. PRIVATE LESSONS IN JAZZ PIANO. 1 Hour.**

This course provides private instruction in jazz piano. This course may be repeated for credit as often as course content changes.

**MUSI 5125. PRIVATE LESSONS IN VIOLIN. 1 Hour.**

This course provides private instruction in violin. This course may be repeated for credit as often as course content changes.

**MUSI 5126. PRIVATE LESSONS IN VIOLA. 1 Hour.**

This course provides private instruction in violin. This course may be repeated for credit as often as course content changes.

**MUSI 5127. PRIVATE LESSONS IN CELLO. 1 Hour.**

This course provides private instruction in cello. This course may be repeated for credit as often as course content changes.

**MUSI 5128. PRIVATE LESSONS IN BASS. 1 Hour.**

This course provides private instruction in bass. This course may be repeated for credit as often as course content changes.

**MUSI 5129. PRIVATE LESSONS IN JAZZ BASS. 1 Hour.**

This course provides private instruction in jazz bass. This course may be repeated for credit as often as course content changes.

**MUSI 5130. PRIVATE LESSONS IN GUITAR. 1 Hour.**

This course provides private instruction in guitar. This course may be repeated for credit as often as course content changes.

**MUSI 5131. PRIVATE LESSONS IN CLARINET. 1 Hour.**

This course provides private instruction in clarinet. This course may be repeated for credit as often as course content changes.

**MUSI 5132. PRIVATE LESSONS IN OBOE. 1 Hour.**

This course provides private instruction in oboe. This course may be repeated for credit as often as course content changes.

**MUSI 5133. PRIVATE LESSONS IN FLUTE. 1 Hour.**

This course provides private instruction in flute. This course may be repeated for credit as often as course content changes.

**MUSI 5134. PRIVATE LESSONS IN SAXOPHONE. 1 Hour.**

This course provides private instruction in saxophone. This course may be repeated for credit as often as course content changes.

**MUSI 5135. PRIVATE LESSONS IN BASSOON. 1 Hour.**

This course provides private instruction in bassoon. This course may be repeated for credit as often as course content changes.

**MUSI 5136. PRIVATE LESSONS IN TRUMPET. 1 Hour.**

This course provides private instruction in trumpet. This course may be repeated for credit as often as course content changes.

**MUSI 5137. PRIVATE LESSONS IN FRENCH HORN. 1 Hour.**

This course provides private instruction in trumpet. This course may be repeated for credit as often as course content changes.

**MUSI 5138. PRIVATE LESSONS IN TROMBONE. 1 Hour.**

This course provides private instruction in trombone. This course may be repeated for credit as often as course content changes.

**MUSI 5139. PRIVATE LESSONS IN TUBA. 1 Hour.**

This course provides private instruction in tuba. This course may be repeated for credit as often as course content changes.

**MUSI 5140. PRIVATE LESSONS IN EUPHONIUM. 1 Hour.**

This course provides private instruction in euphonium. This course may be repeated for credit as often as course content changes.

**MUSI 5145. PRIVATE LESSONS IN JAZZ DRUMSET. 1 Hour.**

This course provides private instruction in jazz drumset. This course may be repeated for credit as often as course content changes.

**MUSI 5150. PEDAGOGY IN MUSIC THEORY. 1 Hour.**

Survey of materials and methods for teaching music theory at the undergraduate level. Observation of teaching methods and supervision of undergraduate teaching.

**MUSI 5160. FLUTE CHOIR. 1 Hour.**

The music major must receive credit for the ensembles required in his/her option. The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 5161. WOODWIND ENSEMBLE. 1 Hour.**

The music major must receive credit for the ensembles required in his/her option. The schedule of classes indicates which ensembles are offered each semester. Prerequisite: Approval of the ensemble director.

**MUSI 5171. ELECTIVE PERFORMANCE. 1 Hour.**

For students who desire elective private instruction in string, woodwinds, brass, keyboard, voice, or percussion.

**MUSI 5188. ADVANCED CONDUCTING. 1 Hour.**

Open to music majors only. An intensive study of conducting that will include score-study techniques, left and right hand independence, video analysis, rehearsal observation, and other topics related to the art of conducting. Permission of instructor required. Prerequisite: Permission of instructor.

**MUSI 5190. KEYBOARD ACCOMPANIMENT. 1 Hour.**

This course entails the student accompanying performances as specified and supervised by the instructor.



**MUSI 5191. CONFERENCE COURSE IN MUSIC. 1 Hour.**

Special problems in music. Topic may change from semester to semester. May be repeated for credit. Prerequisite: permission of instructor and Graduate Advisor.

**MUSI 5205. MUSIC THEATRE/OPERA LAB. 2 Hours.**

Exploration of opera roles, staging techniques, and repertoire. Prerequisite: Approval of the ensemble director.

**MUSI 5211. EARLY CHILDHOOD MUSIC. 2 Hours.**

Musical characteristics of children, folksong and composed literature, performance activities, song analysis, and techniques for reading and writing music.

**MUSI 5212. ELEMENTARY MUSIC. 2 Hours.**

Focus on perception as it relates to children's development and participation in music through singing and playing instruments.

**MUSI 5213. CHORAL MATERIALS AND TECHNIQUES I. 2 Hours.**

A study of literature, music selection, rehearsal planning, vocal production, and performance practices for beginning and intermediate choral ensembles.

**MUSI 5214. CHORAL MATERIALS AND TECHNIQUES II. 2 Hours.**

A study of literature, music selection, rehearsal planning, vocal production, and performance practices for intermediate and advanced choral ensembles.

**MUSI 5215. INSTRUMENTAL MATERIALS AND TECHNIQUES I. 2 Hours.**

A study of literature, music selection, rehearsal planning, sound production, and performance practices for beginning and intermediate instrumental ensembles.

**MUSI 5216. INSTRUMENTAL MATERIALS AND TECHNIQUES II. 2 Hours.**

A study of literature, music selection, rehearsal planning, sound production, and performance practices for intermediate and advanced instrumental ensembles.

**MUSI 5220. PRIVATE LESSONS IN VOICE. 2 Hours.**

This course provides private instruction in voice. This course may be repeated for credit as often as course content changes.

**MUSI 5221. PRIVATE LESSONS IN PIANO. 2 Hours.**

This course provides private instruction in piano. This course may be repeated for credit as often as course content changes.

**MUSI 5222. PRIVATE LESSONS IN ORGAN. 2 Hours.**

This course provides private instruction in organ. This course may be repeated for credit as often as course content changes.

**MUSI 5223. PRIVATE LESSONS IN HARPSICHORD. 2 Hours.**

This course provides private instruction in harpsichord. This course may be repeated for credit as often as course content changes.

**MUSI 5224. PRIVATE LESSONS IN JAZZ PIANO. 2 Hours.**

This course provides private instruction in jazz piano. This course may be repeated for credit as often as course content changes.

**MUSI 5225. PRIVATE LESSONS IN VIOLIN. 2 Hours.**

This course provides private instruction in violin. This course may be repeated for credit as often as course content changes.

**MUSI 5226. PRIVATE LESSONS IN VIOLA. 2 Hours.**

This course provides private instruction in viola. This course may be repeated for credit as often as course content changes.

**MUSI 5227. PRIVATE LESSONS IN CELLO. 2 Hours.**

This course provides private instruction in cello. This course may be repeated for credit as often as course content changes.

**MUSI 5228. PRIVATE LESSONS IN BASS. 2 Hours.**

This course provides private instruction in bass. This course may be repeated for credit as often as course content changes.

**MUSI 5229. PRIVATE LESSONS IN JAZZ BASS. 2 Hours.**

This course provides private instruction in jazz bass. This course may be repeated for credit as often as content changes.

**MUSI 5230. PRIVATE LESSONS IN GUITAR. 2 Hours.**

This course provides private instruction in guitar. This course may be repeated for credit as often as course content changes.

**MUSI 5231. PRIVATE LESSONS IN CLARINET. 2 Hours.**

This course provides private instruction in clarinet. This course may be repeated for credit as often as course content changes.

**MUSI 5232. PRIVATE LESSONS IN OBOE. 2 Hours.**

This course provides private instruction in oboe. This course may be repeated for credit as often as course content changes.

**MUSI 5233. PRIVATE LESSONS IN FLUTE. 2 Hours.**

This course provides private instruction in flute. This course may be repeated for credit as often as course content changes.

**MUSI 5234. PRIVATE LESSONS IN SAXOPHONE. 2 Hours.**

This course provides private instruction in saxophone. This course may be repeated for credit as often as course content changes.

**MUSI 5235. PRIVATE LESSONS IN BASSOON. 2 Hours.**

This course provides private instruction in bassoon. This course may be repeated for credit as often as course content changes.

**MUSI 5236. PRIVATE LESSONS IN TRUMPET. 2 Hours.**

This course provides private instruction in trumpet. This course may be repeated for credit as often as course content changes.

**MUSI 5237. PRIVATE LESSONS IN FRENCH HORN. 2 Hours.**

This course provides private instruction in French Horn. This course may be repeated for credit as often as course content change.

**MUSI 5238. PRIVATE LESSONS IN TROMBONE. 2 Hours.**

This course provides private instruction in trombone. This course may be repeated for credit as often as course content changes.

**MUSI 5239. PRIVATE LESSONS IN TUBA. 2 Hours.**

This course provides private instruction in tuba. This course may be repeated for credit as often as course content changes.

**MUSI 5240. PRIVATE LESSONS IN EUPHONIUM. 2 Hours.**

This course provides private instruction in euphonium. This course may be repeated for credit as often as course content changes.

**MUSI 5241. PRIVATE LESSONS IN PERCUSSION. 2 Hours.**

This course provides private instruction in percussion. This course may be repeated for credit as often as course content changes.

**MUSI 5242. PRIVATE LESSONS IN IMPROVISATION. 2 Hours.**

This course provides private instruction in improvisation. This course may be repeated for credit as often as course content changes.

**MUSI 5245. PRIVATE LESSONS IN JAZZ DRUMSET. 2 Hours.**

This course provides private instruction in jazz drumset. This course may be repeated for credit as often as course content changes.

**MUSI 5271. ELECTIVE LESSONS. 2 Hours.**

For students who desire elective private instruction in strings, woodwinds, brass, keyboard, voice, or percussion. May be repeated eight times for credit.

**MUSI 5291. CONFERENCE COURSE IN MUSIC. 2 Hours.**

Special problems in music. Topic may change from semester to semester. May be repeated for credit. Prerequisite: permission of instructor and Graduate Advisor.

**MUSI 5301. FORM AND STYLE ANALYSIS. 3 Hours.**

A survey of the forms and styles of Western art music employing relevant analytical techniques.

**MUSI 5302. THEORY & COMPOSITION SPECIAL TOPICS. 3 Hours.**

This course covers topics which vary from semester to semester, and includes in-depth study of selected topics in music theory. This course may be repeated for credit as often as the content changes. (Formerly MUSI 5330.).

**MUSI 5303. ADVANCED COUNTERPOINT. 3 Hours.**

Advanced work in specialized areas of counterpoint.

**MUSI 5305. HISTORY OF MUSIC THEORY. 3 Hours.**

Theorists and theoretical tracts from the ancient Greeks to the present day.

**MUSI 5308. MUSIC HISTORY SELECTED TOPICS. 3 Hours.**

This course will consist of an in-depth study of a particular genre, composer, or period. It may be repeated as the course content changes.

**MUSI 5316. STRATEGIES AND ASSESSMENT IN MUSIC EDUCATION. 3 Hours.**

Open to music education majors only. Current trends in music education will be examined. Topics include effective differentiated instruction, positive classroom management, strategies for working with diverse learners, and examination of major learning theories and principles of cognitive, social, emotional, physical and aesthetic development. This course will also examine a variety of assessment techniques that are used in a music classroom. Assessment tools such as rubrics, rating scales, National Standards, TEKS, STAAR, and TExES will be examined and implemented into lesson planning.

**MUSI 5320. PRIVATE LESSONS IN VOICE. 3 Hours.**

This course provides private instruction in voice. This course may be repeated for credit as often as course content changes.

**MUSI 5321. PRIVATE LESSONS IN PIANO. 3 Hours.**

This course provides private instruction in piano. This course may be repeated for credit as often as course content changes.

**MUSI 5322. PRIVATE LESSONS IN ORGAN. 3 Hours.**

This course provides private instruction in organ. This course may be repeated for credit as often as course content changes.

**MUSI 5323. PRIVATE LESSONS IN HARPSICHORD. 3 Hours.**

This course provides private instruction in harpsichord. This course may be repeated for credit as often as course content changes.

**MUSI 5324. PRIVATE LESSONS IN JAZZ PIANO. 3 Hours.**

This course provides private instruction in jazz piano. This course may be repeated for credit as often as course content changes.

**MUSI 5325. PRIVATE LESSONS IN VIOLIN. 3 Hours.**

This course provides private instruction in violin. This course may be repeated for credit as often as course content changes.

**MUSI 5326. PRIVATE LESSONS IN VIOLA. 3 Hours.**

This course provides private instruction in viola. This course may be repeated for credit as often as course content changes.

**MUSI 5327. PRIVATE LESSONS IN CELLO. 3 Hours.**

This course provides private instruction in cello. This course may be repeated for credit as often as course content changes.

**MUSI 5328. PRIVATE LESSONS IN BASS. 3 Hours.**

This course provides private instruction in bass. This course may be repeated for credit as often as course content changes.

**MUSI 5329. PRIVATE LESSONS IN JAZZ BASS. 3 Hours.**

This course provides private instruction in jazz bass. This course may be repeated for credit as often as course content changes.

**MUSI 5332. PRIVATE LESSONS IN OBOE. 3 Hours.**

This course provides private instruction in oboe. This course may be repeated for credit as often as course content changes.

**MUSI 5333. PRIVATE LESSONS IN FLUTE. 3 Hours.**

This course provides private instruction in flute. This course may be repeated for credit as often as course content changes.

**MUSI 5334. PRIVATE LESSONS IN SAXOPHONE. 3 Hours.**

This course provides private instruction in saxophone. This course may be repeated for credit as often as course content changes.

**MUSI 5335. PRIVATE LESSONS IN BASSOON. 3 Hours.**

This course provides private instruction in bassoon. This course may be repeated for credit as often as course content changes.

**MUSI 5336. PRIVATE LESSONS IN TRUMPET. 3 Hours.**

This course provides private instruction in trumpet. This course may be repeated for credit as often as course content changes.

**MUSI 5337. PRIVATE LESSONS IN FRENCH HORN. 3 Hours.**

This course provides private instruction in French Horn. This course may be repeated for credit as often as course content changes.

**MUSI 5338. PRIVATE LESSONS IN TROMBONE. 3 Hours.**

This course provides private instruction in trombone. This course may be repeated for credit as often as course content changes.

**MUSI 5339. PRIVATE LESSONS IN TUBA. 3 Hours.**

This course provides private instruction in tuba. This course may be repeated for credit as often as course content changes.

**MUSI 5340. PRIVATE LESSONS IN EUPHONIUM. 3 Hours.**

This course provides private instruction in euphonium. This course may be repeated for credit as often as course content changes.

**MUSI 5341. PRIVATE LESSONS IN PERCUSSION. 3 Hours.**

This course provides private instruction in percussion. This course may be repeated for credit as often as course content changes.

**MUSI 5342. PRIVATE LESSONS IN IMPROVISATION. 3 Hours.**

This course provides private instruction in improvisation. This course may be repeated for credit as often as course content changes.

**MUSI 5343. PRIVATE LESSONS IN GUITAR. 3 Hours.**

This course provides private instruction in guitar. This course may be repeated for credit as often as course content changes.

**MUSI 5344. PRIVATE LESSONS IN CLARINET. 3 Hours.**

This course provides private instruction in clarinet. This course may be repeated for credit as often as course content changes.

**MUSI 5345. PRIVATE LESSONS IN JAZZ DRUMSET. 3 Hours.**

This course provides private instruction in jazz drumset. This course may be repeated for credit as often as course content changes.

**MUSI 5347. PRIVATE LESSONS IN COMPOSITION. 3 Hours.**

Individual instruction designed to meet the needs of students desiring to become composers or teachers of composition.

**MUSI 5348. PRIVATE LESSONS IN JAZZ COMPOSITION. 3 Hours.**

This course provides private instruction in jazz composition and/or arranging. This course may be repeated for credit as often as course content changes.

**MUSI 5349. FORMAL-FUNCTION THEORY. 3 Hours.**

Introduction to William Caplin's Formal-Function Theory, including mastery of formal functions, harmonic progressions, the principal theme types, and full-movement forms.

**MUSI 5350. SELECTED TOPICS IN MUSIC PEDAGOGY. 3 Hours.**

This course covers topics which vary from semester to semester and includes studies of teaching techniques applied to pre-K, elementary grades, the junior high school, the high school, the junior college, and the college or university. This course may be repeated for credit as often as the content changes.

**MUSI 5351. PHILOSOPHY, HISTORY, AND CURRICULAR TRENDS IN MUSIC EDUCATION. 3 Hours.**

A study of philosophy and history of music education and how curricular trends provide the context for contemporary music education.

**MUSI 5352. PSYCHOLOGICAL FOUNDATIONS OF MUSIC EDUCATION. 3 Hours.**

A study of the psychological foundations of music education. An investigation of topics such as perception of and responses to music, the nature of musical attributes, music learning, and the measurement of musical behavior.

**MUSI 5353. PROJECT IN MUSIC EDUCATION. 3 Hours.**

For students enrolled in the non-thesis option. Offers the opportunity to complete a professional project in music education relevant to the student's background, interest, and/or needs. The project should include, but not necessarily be limited to, appropriate written documentation. May be repeated for credit, but not more than 3 hours will apply to the Master of Music degree. Enrollment is required each term in which the project is in progress.

**MUSI 5354. SELECTED TOPICS IN MUSIC LITERATURE. 3 Hours.**

This course covers topics which vary from semester to semester and includes studies in musical literature for the following: 1) Wind Band Literature; 2) Orchestral Literature; 3) Choral Literature; 4) World Music Literature; 5) Jazz Literature. This course may be repeated for credit as often as the content changes.

**MUSI 5355. REHEARSAL TECHNIQUES. 3 Hours.**

A study of rehearsal techniques, including tone development, phrasing, rehearsal score study, and rehearsal organization. Topics, which may vary by semester, are 1) Choral; 2) Instrumental; 3) Jazz. May be repeated for credit when topics vary. Topics may be taken concurrently.

**MUSI 5356. ORCHESTRAL EXCERPTS. 3 Hours.**

Study of orchestral excerpts for individual instruments. Topics will vary by semester. May be repeated for credit. Permission of instructor required.

**MUSI 5357. CURRENT TRENDS IN MUSIC EDUCATION. 3 Hours.**

Current trends, social foundations and issues in music education.

**MUSI 5358. TEACHING MUSIC IN HIGHER EDUCATION. 3 Hours.**

Components of successful teaching in higher education will be explored. Topics will include developing a syllabus, creating a vitae, and preparing a lecture.

**MUSI 5359. ADVANCED DICTION FOR SINGERS. 3 Hours.**

A study of performance diction for singers and the pronunciation of the language as it applies to public performance. Topics include English, French, Italian, and German. May be repeated for credit when topics vary.

**MUSI 5360. ADVANCED TECHNOLOGY FOR MUSICIANS. 3 Hours.**

Intensive and extensive student-centered study topics to be selected from MIDI sequencing, multimedia development, advanced music notation and digital sampling and synthesis.

**MUSI 5361. EARLY CHILDHOOD MUSIC. 3 Hours.**

Practical application in authentic early childhood experiences.

**MUSI 5362. INTRODUCTION TO RESEARCH IN MUSIC. 3 Hours.**

An introduction to the methods and materials of research in music, including instruction on appropriate style formats for papers and theses.

**MUSI 5363. RESEARCH IN MUSIC EDUCATION. 3 Hours.**

An introduction to historical, philosophical, descriptive, and experimental research in music education and present research practices in music education.

**MUSI 5364. ASSESSMENT IN MUSIC EDUCATION. 3 Hours.**

Assessment techniques that are appropriate to music study will be reviewed and examined. The focus will include interpreting standardized test results and the development of appropriate and effective measurement tools to use in music classrooms.

**MUSI 5365. MEANING & REPRESENTATION IN MUSIC. 3 Hours.**

This course will explore the basic questions of meaning in music, including the question of whether or not music can truly have meaning at all. Students will explore various philosophical, scientific, and musical (i.e. from composers and performers) viewpoints through readings, discussion, and writing.

**MUSI 5366. JAZZ STYLE AND ANALYSIS. 3 Hours.**

An in depth examination of the improvisational techniques used by prominent jazz musicians. Topics will include transcription and theoretical analysis over different periods and styles in jazz.

**MUSI 5371. PEDAGOGY OF MUSIC HISTORY. 3 Hours.**

Survey and practice materials and methods for teaching music history at the K-12 level.

**MUSI 5387. ANALYSIS OF POPULAR MUSIC. 3 Hours.**

This course will explore form, melody, harmony, and voice-leading in a variety of popular styles since the early 20th century.

**MUSI 5388. 20TH CENTURY FORM & TECHNIQUE. 3 Hours.**

Introduction to twentieth-century form and techniques, as well as relevant analytical methods and compositional strategies.

**MUSI 5389. POST-TONAL ANALYSIS. 3 Hours.**

Study of pitch, harmony, rhythm, & form in music from Debussy to the present.

**MUSI 5390. LINEAR ANALYSIS. 3 Hours.**

An introduction to the methods of linear analysis and harmonic reduction. Seminar designed to meet the needs of students desiring to become theorists or teachers of theory.

**MUSI 5391. CONFERENCE COURSE IN MUSIC. 3 Hours.**

Special problems in music. Topic may change from semester to semester. May be repeated for credit. Prerequisite: Permission of instructor and Graduate Advisor.

**MUSI 5392. ADVANCED SONATA THEORY. 3 Hours.**

An in-depth examination of sonata form drawing on the concepts of Caplin's formal functions and Hepokoski and Darcy's sonata theory, including intensive writing and analysis assignments.

**MUSI 5393. CONDUCTING. 3 Hours.**

Applied lessons in conducting. This course is an in-depth study of conducting technique as applied to choral or instrumental ensembles. It may be repeated for credit as the content changes.

**MUSI 5398. THESIS. 3 Hours.**

The graduate student must be registered for MUSI 5398 when in consultation over the thesis with the advisor or supervisory committee. Prerequisite: MUSI 5363 or MUSI 5362.

**MUSI 5698. THESIS. 6 Hours.**

The graduate student must be registered for MUSI 5698 in the semester or term in which the Master of Music degree will be conferred. Prerequisite: MUSI 5398.

## COURSES

**NE 3301. INTRODUCTION TO NUCLEAR ENGINEERING. 3 Hours.**

Fundamentals of radiation, radiation decay, binding energy, nuclear reactions, radiation interactions, shielding, radiation detections and measurement of radiation, applications of nuclear science and engineering such as principles of nuclear reactors, reactor generations I, II, III, IV, fusion reactor, radiation therapy, food irradiation, radionuclide production, radiopharmaceuticals, principles of positron emission tomography (PET). Prerequisite: PHYS 1444; MATH 3319 or MAE 3360.

**NE 4302. NUCLEAR REACTOR THEORY AND TECHNOLOGY OF THE NUCLEAR POWER PLANT. 3 Hours.**

The course covers the theoretical aspect of reactor theory and analysis along with the complete understanding of the nuclear reactor systems, major components, operations, control and overall safety aspect of nuclear power plant technology. The theoretical topics in the course will include the neutronics behavior of fission reactors, primarily from a one-speed diffusion perspective. Reactor kinetics and dynamics, criticality, fission product poisoning, reactivity control, reactor stability and introductory concepts in fuel management, followed by slowing down and one-speed diffusion theory. Use of industry adopted software and power plant simulation for evaluating basic reactor parameters. Prerequisite: NE 3301 or PHYS 3446 or permission of instructor.

**NE 4303. NUCLEAR POWER PLANT ENGINEERING. 3 Hours.**

Thermal hydraulic processes involved in the transfer of power from the reactor core to the secondary systems of nuclear power plants. Major topics include an overview of nuclear heat generation, fluid dynamics with respect to the flow in reactor channels, steady state radial and axial temperature distribution, thermal analysis of fuel elements and subchannel flow, Hot channel factors, two-phase flow dynamics. Prerequisite: NE 3301 or MAE 3314 or MAE 3309 or permission of instructor.

**NE 4391. SPECIAL TOPICS IN NUCLEAR ENGINEERING. 3 Hours.**

Special topics in the field of nuclear engineering. Topic may vary from semester to semester. May be repeated for credit when topic changes. Departmental approval required in advance to use for degree credit. Prerequisite: NE 3301 or consent of instructor.

## COURSES

**NURS 2200. CONCEPTS IN PROFESSIONAL NURSING. 2 Hours.**

Designed to introduce the student to specific professional concepts in nursing. Selected concepts and processes for professional nursing will include an introduction to nursing's theoretical, philosophical, ethical, and legal dimensions with an emphasis on professional formation. Course activities will focus on development of teamwork, communication skills, effective decision-making and reflective practice.

**NURS 2232. LEARNING PROFESSIONAL NURSING AND LIFE SKILLS. 2 Hours.**

This course focuses on the development and successful use of time management, test-taking skills, study methods, and additional student success strategies that can support students pursuing the BSN Prelicensure Program. Required for students who fail an upper-division nursing course. Prerequisite: Admission to the BSN Prelicensure program.

**NURS 3100. COOPERATIVE NURSING WORK EXPERIENCE. 1 Hour.**

Designed for nursing cooperative education students to integrate classroom study with career-related practical experience in the workplace. This course is graded as pass/fail. Prerequisite: Consent of instructor.

**NURS 3137. INDEPENDENT STUDY. 1 Hour.**

Topic and mode of study are agreed upon by the student and instructor. May be repeated with various topics. Must earn C or better for credit. Prerequisite: Consent of instructor.

**NURS 3147. SPECIALIZED TOPICS IN NURSING. 1 Hour.**

Areas of special interest. May be repeated with varied topics. Must complete with C or better for credit. Prerequisite: Junior standing and consent of instructor.

**NURS 3200. COOPERATIVE NURSING WORK EXPERIENCE. 2 Hours.**

Designed for nursing cooperative education students to integrate classroom study with career-related practical experience in the workplace. This course is graded as pass/fail. Prerequisite: Consent of instructor.



**NURS 3237. INDEPENDENT STUDY. 2 Hours.**

Topic and mode of study are agreed upon by the student and instructor. May be repeated with various topics. Must earn C or better for credit.

Prerequisite: Consent of instructor.

**NURS 3247. SPECIALIZED TOPICS IN NURSING. 2 Hours.**

Areas of special interest. May be repeated with varied topics. Must earn C or better for credit. Prerequisite: Junior standing and consent of instructor.

**NURS 3261. NURSING OF OLDER ADULTS. 2 Hours.**

Selected concepts and issues related to aging and its impact on society and health care. Introduction to gerontologic nursing principles. Clinical application in diverse settings across the continuum of care. Prerequisite: NURS 3632, NURS 3320.

**NURS 3300. COOPERATIVE NURSING WORK EXPERIENCE. 3 Hours.**

Designed for nursing cooperative education students to integrate classroom study with career-related practical experience in the workplace. Must earn a C or better to earn credit. Prerequisite: Admission into nursing degree program.

**NURS 3309. MEDICAL TERMINOLOGY FOR HEALTHCARE PROVIDERS. 3 Hours.**

This course will enable the student to speak, use, and understand commonly used terms in the healthcare field. This course can be used as the upper division elective. Formerly taught as BIOL 3309. Credit will not be given for both.

**NURS 3315. RN-BSN HOLISTIC HEALTH ASSESSMENT ACROSS THE LIFESPAN. 3 Hours.**

Theory and practice of holistic health assessment of individuals and families across the life span designed for the registered nurse. RN-BSN students only. Prerequisite: NURS 3345.

**NURS 3320. HOLISTIC HEALTH ASSESSMENT ACROSS THE LIFESPAN. 3 Hours.**

Theory and practice of holistic health assessment of individuals and families across the life span with emphasis on normal findings. Prerequisite: or Corequisite: NURS 3632.

**NURS 3321. NURSING RESEARCH. 3 Hours.**

Basic concepts, processes and applications of nursing research. Research role of the nurse in decision making and clinical practice. Prerequisite: NURS 3632.

**NURS 3322. HUMAN FACTORS IN HEALTHCARE. 3 Hours.**

This course provides an overview of human factors concepts and principles essential for healthcare professionals. Topics include the basics of patient safety and human factors principles in patient safety improvement at individual, team and organizational levels, such as psychological safety, visual design, and human performance limitations.

**NURS 3325. RN-BSN HOLISTIC CARE OF THE OLDER ADULT. 3 Hours.**

Introduction to gerontologic nursing principles and standards. Selected concepts and issues related to aging and its impact on society and health care. RN-BSN students only. Previously listed as NURS 3322. Prerequisite: NURS 3345.

**NURS 3333. PROMOTING HEALTHY LIFESTYLES. 3 Hours.**

Focus on health promotion and disease prevention strategies that promote healthy lifestyles and empower individuals, families, and populations to achieve optimal health and wellness. Positive health communication techniques for behavioral change, including motivational interviewing are discussed.

**NURS 3335. RN-BSN PROMOTING HEALTHY LIFESTYLES. 3 Hours.**

Focus on health promotion and disease preventions strategies that promote healthy lifestyles and empower individuals, families, and populations to achieve optimal health and wellness. The role of the nurse in health promotion is emphasized. Students will examine the impact of nurses' overall wellness on patient safety. RN-BSN students only. Previously NURS 3435. Prerequisite: NURS 3345.

**NURS 3337. INDEPENDENT STUDY. 3 Hours.**

Topic and mode of study are agreed upon by the student and instructor. May be repeated with various topics. Must earn a grade of C or better for credit.

Prerequisite: Consent of Instructor.

**NURS 3344. ENHANCING NURSING PRACTICE AND SAFETY WITH HISPANIC PATIENTS THROUGH BETTER COMMUNICATION. 3 Hours.**

Explores and augments the understanding of factors which facilitate or inhibit effective communication with Spanish-speaking clients. Focus on vocabulary specific to assessment and intervention with persons whose primary language is Spanish.

**NURS 3345. ROLE TRANSITION TO PROFESSIONAL NURSING. 3 Hours.**

Course addresses the role transition to Professional Nursing, nursing theory, ethics, decision making, critical thinking/clinical judgment, introduction to evidence-based practice, and informatics/technology in practice. Identifies strategies for personal and professional empowerment. Prerequisite: Admission into nursing degree program.

**NURS 3347. SPECIALIZED TOPICS IN NURSING. 3 Hours.**

Areas of special interest. May be repeated with varied topics. Must earn a C or better to earn credit.

**NURS 3352. THE LEGACY OF THE FAMILY. 3 Hours.**

Explore and enhance understanding and application of the principles of family science knowledge in therapeutic relationships with families across the lifespan.

**NURS 3364. INTRODUCTION TO PROFESSIONAL AND CLINICAL CONCEPTS IN NURSING. 3 Hours.**

Designed to introduce the student to specific professional concepts in nursing as well as academic success strategies. Selected concepts and processes for professional nursing will include an introduction to nursing's theoretical, philosophical, ethical, and legal dimensions with an emphasis on professional formation. Course activities will focus on development of teamwork, communication skills, effective decision making and reflective practice.

**NURS 3365. PHARMACOLOGY IN NURSING PRACTICE. 3 Hours.**

Introduction to current concepts of pharmacology and their relationship to nursing practice. Included are basic principles of drug actions, side effects for major drug classifications, and the role of the nurse in drug therapeutics. Prerequisite: Admission into the upper division nursing program.

**NURS 3366. PATHOPHYSIOLOGIC PROCESSES: IMPLICATIONS FOR NURSING. 3 Hours.**

Pathophysiologic alterations, their interactions, and effects on persons across the life span as a basis for therapeutic nursing interventions. Must be taken no more than three years prior to acceptance into the nursing program. Prerequisite: BIOL 2457, BIOL 2458, CHEM 1451.

**NURS 3375. RN-BSN HEALTH POLICY, LEGAL ASPECTS AND INFORMATICS IN NURSING. 3 Hours.**

This course provides an introduction to legal and ethical concepts, values, and behaviors necessary for transitioning to a professional nursing role. Topics include health care policy development, legal overview and peer-review process, health care informatics, economic and political issues, laws, rules, challenges, boundaries, malpractice and societal issues and trends influencing health care. Prerequisite: NURS 3345.

**NURS 3381. PSYCHIATRIC MENTAL HEALTH NURSING OF INDIVIDUALS, FAMILIES, AND GROUPS. 3 Hours.**

Application of the nursing process with emphasis on critical thinking, therapeutic nursing interventions, and effective communication and interpersonal skills as they relate to persons with psychiatric mental health conditions. Prerequisite: NURS 3632, NURS 3320 and NURS 3365.

**NURS 3385. NURSING CARE OF THE PERIOPERATIVE PATIENT. 3 Hours.**

This course is designed to expose the undergraduate nursing student to the world of peri-operative nursing, including the role of the registered nurse in preoperative, intraoperative, and postoperative care delivery environments. Prerequisite: Must have completed Junior 1 semester.

**NURS 3437. INDEPENDENT STUDY. 4 Hours.**

Topic and mode of study are agreed upon by the student and instructor. May be repeated with various topics. Must earn C or better for credit. Prerequisite: Consent of instructor.

**NURS 3447. SPECIALIZED TOPICS IN NURSING. 4 Hours.**

Areas of special interest. May be repeated with varied topics. Must earn C or better for credit. Prerequisite: Consent of instructor.

**NURS 3537. INDEPENDENT STUDY. 5 Hours.**

Topic and mode of study are agreed upon by the student and instructor. May be repeated with various topics. Must earn C or better for credit. Prerequisite: Consent of instructor.

**NURS 3547. SPECIALIZED TOPICS IN NURSING. 5 Hours.**

Areas of special interest. May be repeated with varied topics. Must earn C or better for credit. Prerequisite: Junior standing and consent of instructor.

**NURS 3632. CLINICAL NURSING FOUNDATIONS. 6 Hours.**

Basic therapeutic nursing interventions with individuals and families in diverse settings using nursing process framework. Prerequisite: Acceptance into the upper division nursing program. Co-req: NURS 3365 and NURS 3320.

**NURS 3637. INDEPENDENT STUDY. 6 Hours.**

Topic and mode of study are agreed upon by the student and instructor. May be offered with any combination of lecture/lab hours. May be repeated with various topics. Must earn C or better for credit. Prerequisite: Consent of instructor.

**NURS 3647. SPECIALIZED TOPICS IN NURSING. 6 Hours.**

Areas of special interest. May be repeated with varied topics. Must earn C or better for credit. Prerequisite: junior standing and consent of instructor.

**NURS 3661. NURSING OF ADULTS. 6 Hours.**

Application of the nursing process with emphasis on critical thinking, therapeutic nursing interventions, and effective communication for persons experiencing medical-surgical problems. Theory and clinical application in diverse settings. Prerequisite: NURS 3632, NURS 3320 and NURS 3365.

**NURS 4100. COOPERATIVE NURSING WORK EXPERIENCE. 1 Hour.**

Designed for nursing cooperative education students to integrate classroom study with career-related practical experience in the workplace. Prerequisite: Consent of instructor.

**NURS 4199. ROLE DEVELOPMENT IN PROFESSIONAL NURSING SEMINAR. 1 Hour.**

The course addresses professional nursing role development integrating concepts of professional comportment. Prerequisite: NURS 3661, NURS 3381.

**NURS 4200. COOPERATIVE NURSING WORK EXPERIENCE. 2 Hours.**

Designed for nursing cooperative education students to integrate classroom study with career-related practical experience in the workplace. Prerequisite: Consent of instructor.

**NURS 4300. COOPERATIVE NURSING WORK EXPERIENCE. 3 Hours.**

Designed for nursing cooperative education student to integrate classroom study with career-related practical experience in the workplace. Prerequisite: NURS-EL 3300 or NURS 3300.

**NURS 4323. HEALTH POLICY, LEGAL ASPECTS AND INFORMATICS IN NURSING. 3 Hours.**

This course provides an introduction to legal and ethical concepts, values, and behaviors necessary for transitioning to a professional nursing role. Topics include health care policy development, legal overview and peer-review process, health care informatics, economic and political issues, laws, rules, challenges, boundaries, malpractice and societal issues and trends influencing health care. Prerequisite: NURS 4331 and NURS 4341 OR NURS 4331 and NURS 4581 OR NURS 4341 and NURS 4581.

**NURS 4325. RN-BSN NURSING RESEARCH. 3 Hours.**

Basic concepts, processes and applications of nursing research. Research role of the nurse in decision making and clinical practice. RN-BSN students only. Prerequisite: ENGL 2338 or equivalent, Math 1308 or equivalent, and NURS 3345 or NURS 3645.

**NURS 4331. NURSING OF CHILDREN AND ADOLESCENTS. 3 Hours.**

Nursing care for infants, children, adolescents, and their families. Theory and clinical application in diverse settings. Prerequisite: NURS 3661, NURS 3381, NURS 3321.

**NURS 4341. NURSING OF THE CHILDBEARING FAMILY. 3 Hours.**

Application of the nursing process with emphasis on critical thinking, communication and therapeutic nursing interventions as related to care of individuals and families during the childbearing experience. Prerequisite: NURS 3381, NURS 3661, NURS 3321.

**NURS 4350. CAPSTONE: TRANSITION TO PROFESSIONAL NURSING. 3 Hours.**

Focus on the synthesis of knowledge acquired throughout the curriculum and the enactment of the professional nurse role in a concentrated practicum. Prerequisite: or Corequisite: NURS 4351, NURS 4462, NURS 4323.

**NURS 4351. BSN NURSING LEADERSHIP AND MANAGEMENT. 3 Hours.**

Exploration of organizational strategies, leadership theories and societal trends with implications for decision making in health care. Introduction to management skills needed by professional nurses in diverse settings. Prerequisites: NURS 4331, NURS 4341, NURS 4581.

**NURS 4370. RURAL HEALTH BARRIERS AND SOLUTIONS. 3 Hours.**

Students completing Certificate coursework will receive academic credit that may be applied toward a bachelor's degree in nursing (BSN) or non-nursing students may receive the stand-alone certificate in Rural Health Care.

**NURS 4371. RURAL HEALTH ISSUES AND POLICY. 3 Hours.**

Students completing Certificate coursework will receive academic credit that may be applied toward a bachelor's degree in nursing (BSN) or non-nursing students may receive the stand-alone certificate in Rural Health Care.

**NURS 4393. NURSING CERTIFICATION. 3 Hours.****NURS 4455. RN-BSN NURSING LEADERSHIP & MANAGEMENT. 4 Hours.**

Exploration of organizational strategies, leadership theories and societal trends with implications for decision making in health care. Introduction to management skills needed by professional nurses with clinical application in diverse settings. RN-BSN students only. Prerequisite: NURS 3345.

**NURS 4462. POPULATION AND COMMUNITY HEALTH NURSING. 4 Hours.**

Integrate knowledge from nursing theory and public health science in assessing health care needs of aggregates, communities, and society. Prerequisite: NURS 4331, NURS 4341, NURS 4581.

**NURS 4465. RN-BSN POPULATION AND COMMUNITY HEALTH NURSING. 4 Hours.**

Integrates knowledge from nursing theory and public health science in assessing health care needs of aggregates, communities, and society for the Registered Nurse. RN-BSN students only. Prerequisite: NURS 3345.

**NURS 4581. NURSING OF ADULTS WITH COMPLEX NEEDS. 5 Hours.**

Use of critical thinking, therapeutic nursing interventions and communication skills in promoting quality of life for persons with complex health needs. Application of nursing roles in diverse settings. Prerequisite: NURS 3661, NURS 3381, NURS 3321, NURS 3261.

**NURS 4685. RN-BSN CAPSTONE. 6 Hours.**

Synthesis of knowledge acquired in the RN-BSN curriculum and development of the Nurse Role with evolving professional issues, health care environment, lifelong learning, and promotion of the Nursing profession designed for Registered Nurses RN-BSN student only. Prerequisite: NURS 4325, NURS 4455 Corequisite: NURS 4465.

**NURS 5110. NEONATAL ASSESSMENT LAB. 1 Hour.**

Conduct comprehensive health assessment in the neonatal population. Prerequisite: NURS 5220 or concurrent enrollment or permission of instructor or Certificate Program Standing.

**NURS 5112. THERAPY CONCEPTS FOR PSYCHIATRIC MENTAL HEALTH NURSE PRACTITIONERS. 1 Hour.**

This course provides evidenced based practice principles of non-pharmacological individual, family and group therapies for psychiatric disorders and mental health problems across the lifespan. Prerequisite: NURS 5315, NURS 5410 or concurrent enrollment, NURS 5140 or concurrent enrollment, or Certificate Program Standing.

**NURS 5120. ADULT-GERONTOLOGY ASSESSMENT LAB. 1 Hour.**

Conduct comprehensive health assessment in the adult-gerontology population. Prerequisite: NURS 5220 or concurrent enrollment or Certificate Program Standing.

**NURS 5130. PEDIATRIC ASSESSMENT LAB. 1 Hour.**

Conduct comprehensive health assessment in the pediatric population. Prerequisite: NURS 5220 or concurrent enrollment or Certificate Program Standing.

**NURS 5140. PSYCHIATRIC ASSESSMENT LAB FOR THE PSYCHIATRIC MENTAL HEALTH NURSE PRACTITIONER. 1 Hour.**

Introduces the PMHNP student to the psychiatric mental health assessment applied to the pediatric, adult, and geriatric patient with a mental health disorder through knowledge acquisition and skill development. Prerequisite: NURS 5220, NURS 5120, and NURS 5130, NURS 5410 or concurrent enrollment, NURS 5112 or concurrent enrollment, or Certificate Program Standing.

**NURS 5150. ADVANCED CARE OF A CLIENT POPULATION. 1 Hour.**

Conduct comprehensive advanced health assessments of a client population and provide a teaching intervention of a priority health need. Prerequisite: NURS 5220 or NURS 5300.

**NURS 5170. INDEPENDENT STUDY IN NURSING. 1 Hour.**

Detailed in-depth study in a specific topic area. Topic and mode of study are agreed upon by student(s) and instructor prior to registration. May be repeated for credit when topics vary. Graded F, P, R. Prerequisite: Graduate standing.

**NURS 5190. TOPICS IN NURSING. 1 Hour.**

Selected topics in advanced nursing. May be repeated for credit as topics change.

**NURS 5204. NEONATAL NURSING I. 2 Hours.**

Clinical management of the high-risk neonate with a focus on the perinatal and transition periods as well as stabilization of the ill newborn at birth. Includes fluid and electrolyte management, nutrition, and identification of the indications and complications associated with invasive skills and procedures relevant to the high-risk neonate. Prerequisite: NURS 5315; NURS 5316 or NURS 5220 or concurrent enrollment and NURS 5110 or concurrent enrollment or Certificate Program Standing.

**NURS 5213. PSYCHOPHARMACOLOGY FOR THE PSYCHIATRIC MENTAL HEALTH NURSE PRACTITIONER. 2 Hours.**

This course provides advanced study of clinical psycho-pharmacological therapeutics for the psychiatric mental health nurse practitioner. Foundations of advanced psychopharmacology in common and complex mental health disorders and conditions in populations across the lifespan are explored. Prerequisite: NURS 5334, NURS 5410, NURS 5140, NURS 5112, NURS 5222 or concurrent enrollment, NURS 5223 or concurrent enrollment.

**NURS 5220. ADVANCED HEALTH ASSESSMENT AND DIAGNOSTIC REASONING. 2 Hours.**

Apply theoretical foundations of comprehensive health assessment across the lifespan. Prerequisite: Graduate or Certificate Program Standing. NURS 5315 or Special Permission.

**NURS 5222. CHILD, ADOLESCENT, AND SPECIAL POPULATIONS PSYCHIATRIC MENTAL HEALTH FOR THE PMHNP. 2 Hours.**

This course provides the scientific foundations and evidence-based practice principles necessary for managing children, adolescents, and special populations (and/or at risk for) various commonly occurring and complex psychiatric disorders and mental health problems as well as comorbid medical illnesses. Prerequisite: NURS 5410, NURS 5213, NURS 5112, NURS 5223 or concurrent enrollment, or Certificate Program Standing.

**NURS 5223. ADULT AND GERIATRIC PSYCHIATRIC MENTAL HEALTH FOR THE PMHNP. 2 Hours.**

This course provides the scientific foundations and evidence-based practice principles necessary for managing adult and geriatric populations with (and/or at risk) for commonly occurring and complex psychiatric disorders and mental health problems as well as co-morbid medical illnesses. Prerequisite: NURS 5410, NURS 5140, NURS 5213 or concurrent enrollment, NURS 5222 or concurrent enrollment, or Certificate Program Standing.

**NURS 5270. INDEPENDENT STUDY IN NURSING. 2 Hours.**

Detailed in-depth study in a specific topic area. Topic and mode of study are agreed upon by student(s) and instructor prior to registration. May be repeated for credit when topics vary. Graded F, P, R. Prerequisite: Graduate Standing and permission of instructor.

**NURS 5290. TOPICS IN NURSING. 2 Hours.**

Selected topics in advanced nursing. May be repeated for credit as topics change.

**NURS 5300. ADVANCED ASSESSMENT, PATHOPHYSIOLOGY, AND PHARMACOLOGY FOR NURSE EDUCATORS. 3 Hours.**

Focus on the development and integration of advanced knowledge of health assessment, pathophysiology, and pharmacology across the lifespan. Prerequisite: Graduate standing.

**NURS 5302. CURRICULUM DEVELOPMENT IN NURSING EDUCATION. 3 Hours.**

Explore the nature of nursing education. Focus on the curriculum process and its application to nursing education programs. Prerequisite: Graduate standing.

**NURS 5308. NURSING INFORMATICS. 3 Hours.**

Focus on application of computer technology that supports the dissemination of health care data, information and knowledge. Selected software packages/applications are presented and used. Prerequisite: NURS 5367.

**NURS 5310. TEACHING AND LEARNING THEORIES AND STRATEGIES IN NURSING EDUCATION. 3 Hours.**

Teaching/Learning theories, strategies, and evaluation for educators. Prerequisite: Graduate standing.

**NURS 5311. NURSING MANAGEMENT IN THE HEALTH CARE ENVIRONMENT. 3 Hours.**

Considers development of management and organizational theories as applied to health care organizations and their environment. Prerequisite: NURS 5367.

**NURS 5312. ASSESSMENT AND EVALUATION STRATEGIES IN NURSING EDUCATION. 3 Hours.**

Integration of concepts of assessment and evaluation into a nursing evaluation framework. Prerequisite: Graduate standing.

**NURS 5315. ADVANCED PATHOPHYSIOLOGY. 3 Hours.**

Builds on a previous understanding of anatomy and physiology and focuses on developing advanced knowledge of physiologic and pathophysiologic concepts across the life span. Prerequisite: Graduate Standing.

**NURS 5318. ADVANCED PATHOPHYSIOLOGY FOR NURSE EDUCATORS. 3 Hours.**

This course develops advanced knowledge of pathophysiology. Principles of advanced physiology and pathophysiology are applied to disease processes, plans of care, and teaching plans. This course prepares Nurse Educators to educate clients, students, colleagues to facilitate patients and/or their support systems understanding of the disease process plan of care. Prerequisite: NURS 5367 and NURS 5310 and NURS 5329 and NURS 5302 and NURS 5312.

**NURS 5319. ADVANCED PHARMACOLOGY FOR NURSE EDUCATORS. 3 Hours.**

This course develops advanced knowledge of clinical pharmacological therapeutics through the evaluation of classes of drugs and pharmacologic plans of care. This course prepares Nurse Educators to educate clients, students, and colleagues to facilitate patients and/or their support systems understanding of the pharmacologic plan of care. Prerequisite: NURS 5318.

**NURS 5324. PSYCHIATRIC MENTAL CLINICAL PRACTICE I. 3 Hours.**

This course provides application of theoretical knowledge and clinical skills to patients with commonly occurring psychiatric and mental health disorders across the life span in the context of advanced nursing practice. Prerequisite: NURS 5222 and NURS 5223 or Certificate Program Standing. Good academic standing (GPA 3.0).

**NURS 5325. PSYCHIATRIC MENTAL HEALTH CLINICAL PRACTICE II. 3 Hours.**

This course provides application of theoretical knowledge and clinical skills to patients with various commonly occurring and complex psychiatric and mental health disorders across the life span in the context of advanced nursing practice. Prerequisite: NURS 5324 or concurrent enrollment, or Certificate Program Standing. Good academic standing (GPA 3.0).

**NURS 5327. EXPLORATION OF SCIENCE AND THEORIES FOR NURSING. 3 Hours.**

This course provides a critical examination of the philosophical and theoretical bases for nursing science. Prerequisite: Graduate standing.

**NURS 5329. ROLE OF THE NURSE EDUCATOR. 3 Hours.**

Investigation of the roles and functions of the nurse educator. Prerequisite: Graduate program standing.

**NURS 5334. ADVANCED PHARMACOLOGY FOR NURSE PRACTITIONERS. 3 Hours.**

Study of clinical pharmacological therapeutics for advanced nursing practice. Prerequisites: NURS 5315 or Certificate Program Standing.

**NURS 5337. FAMILY CLINICAL PRACTICE 1. 3 Hours.**

Initial clinical preceptorship in selected primary health practice sites with opportunities to apply knowledge and concepts of advanced nursing practice implementing the family nurse practitioner role in evidenced based patient care. Prerequisite: NURS 5432, NURS 5433, NURS 5434 and Good academic standing (GPA 3.0) or certificate program standing.

**NURS 5338. FAMILY CLINICAL PRACTICE 2. 3 Hours.**

Continued clinical preceptorship with opportunities for increased clinical knowledge in selected primary health practice sites with opportunities to apply knowledge and concepts of advanced nursing practice implementing the family nurse practitioner role in evidenced based patient care. Prerequisite: NURS 5432, NURS 5433, NURS 5434, NURS 5337 or concurrent enrollment; Good academic standing (GPA 3.0) or Certificate Program standing.

**NURS 5339. ROLES AND FUNCTIONS OF THE NURSE ADMINISTRATOR. 3 Hours.**

Examine and implement administrative and managerial roles in health care organizations. Prerequisite: NURS 5311.

**NURS 5340. MANAGEMENT SEMINAR AND PRACTICE. 3 Hours.**

Synthesize management, organizational, and leadership concepts and theories in selected health care settings. Prerequisite: NURS 5308; NURS 5311; NURS 5339; NURS 5341; NURS 5343; NURS 5342; NURS 5382. Good Academic Standing (3.0 GPA).

**NURS 5341. FINANCIAL MANAGEMENT IN NURSING. 3 Hours.**

Analyze and apply financial management concepts to financial planning, budgeting, and reimbursement systems in health care. Prerequisite: NURS 5311 or admission into Masters of Science in Health Informatics (MSH-HI) program.

**NURS 5342. MANAGEMENT OF NURSING OPERATIONS. 3 Hours.**

Examine strategic planning for health care systems. Prerequisite: NURS 5311 or admission into Masters of Science in Health Informatics (MSN-HI) program.

**NURS 5343. NURSING LEADERSHIP AND COMPLEX HEALTH CARE SYSTEMS. 3 Hours.**

Analyze leadership strategies in current and predicted health care systems including dimensions of workforce and workplace issues, leadership, and evidenced-based decision-making. Prerequisite: NURS 5367.

**NURS 5348. NURSING CARE AT THE END OF LIFE. 3 Hours.**

Addresses concepts of palliative care of patients with life limiting disease and their families. Explores the physiology of end stage disease processes, clinical approaches to pain and symptom management, societal issues and trends in end of life care, models of care delivery and the impact of personal values and beliefs about death. Prerequisite: Graduate Standing.



**NURS 5350. ROLE OF THE NURSE IN ADVANCED PRACTICE. 3 Hours.**

Theory and application of the multiple roles of the advanced practice nurse within the health care system. Prerequisite: Graduate Standing.

**NURS 5352. ADULT GERONTOLOGY PRIMARY CARE CLINICAL PRACTICE 1. 3 Hours.**

Clinical experience in primary and long term health care settings with focus on managing adolescents, adults, and elders with common episodic acute and chronic health care needs. Prerequisite: NURS 5462 or concurrent enrollment; Good academic standing (GPA 3.0) or certificate program standing.

**NURS 5353. ADULT GERONTOLOGY PRIMARY CARE CLINICAL PRACTICE 2. 3 Hours.**

Continued clinical experience in primary and long term health care settings with focus on managing adolescents, adults, and elders with common episodic acute and chronic health care needs. Prerequisite: NURS 5462 and NURS 5352 or concurrent enrollment and Good academic standing (GPA 3.0) or certificate program standing.

**NURS 5354. ADULT GERONTOLOGY ACUTE CARE CLINICAL PRACTICE 1. 3 Hours.**

Clinical experience in specialty practice and high acuity health care settings with focus on managing adolescents, adults, and elders with common secondary and tertiary health care needs. Prerequisite: NURS 5463 or concurrent enrollment and Good academic standing (GPA 3.0) or certificate program standing.

**NURS 5355. ADULT GERONTOLOGY ACUTE CARE CLINICAL PRACTICE 2. 3 Hours.**

Continued clinical experience in specialty practice and high acuity health care settings with focus on managing adolescents, adults, and elders with common secondary and tertiary health care needs. Prerequisite: NURS 5354 or concurrent enrollment; Good academic standing (GPA 3.0) or certificate program standing.

**NURS 5356. GLOBAL HEALTH POLICY, HEALTH LITERACY, AND MODELS OF CARE FOR OLDER ADULTS. 3 Hours.**

This course will focus on healthcare policy issues and models of healthcare delivery for older adults at the state, national and global levels. Prerequisite: Graduate Standing.

**NURS 5357. ADVANCED CLINICAL MANAGEMENT OF OLDER ADULTS WITH COMPLEX MULTIMORBIDITY. 3 Hours.**

This course will focus upon an inter-professional approach to develop advanced knowledge in the chronic health care management of older adults, their families, and communities in a variety of health care settings. Prerequisite: Graduate Standing or permission of instructor.

**NURS 5358. ADVANCED CLIN MGMT OF OLDER ADULTS W/COMPLEX MULTIMORBIDITY DURING ACUTE ILLNESS CRISIS. 3 Hours.**

This course will focus upon an inter-professional approach to develop advanced knowledge in aging issues and paradigms of care for the older adult; in addition, this course will accentuate the management of older adults with acute health problems, their families, and communities in a variety of health care settings. Prerequisite: Graduate Standing or permission of instructor.

**NURS 5360. SIMULATION APPLICATION IN NURSING. 3 Hours.**

This course provides an in-depth exploration of simulation as a teaching and learning strategy in nursing education. Students will critically analyze various types of simulation, weighing their advantages and disadvantages to determine the most effective approaches for different educational contexts. Prerequisite: NURS 5364 or NURS 5367, NURS 5220 or NURS 5300.

**NURS 5362. TEACHING PRACTICUM. 3 Hours.**

Nursing education preceptorship in selected health care sites with opportunities to apply clinical and educational knowledge, skills, and concepts in a guided, progressive context of nursing education. Graded Pass/Not Pass - F, I, P, W Prerequisite: Completion of all courses in the Nursing Education Program and Good academic standing (GPA 3.0).

**NURS 5363. PERSONAL AND PROFESSIONAL LEADERSHIP DEVELOPMENT. 3 Hours.**

This course illustrates the interconnectedness of personal, professional, and leadership development to practice as an advanced-level nurse. This course enables learners to identify resources to assess their well-being and leadership style. You will learn how interprofessional practice, emotional intelligence, conflict management, and communication are critical in advanced nursing practice. The goal is to provide a sustained foundation to build stepping stones for progressive, lifelong learning.

**NURS 5364. RESEARCH, THEORY, EVIDENCE-BASED PRACTICE (EBP) AND QUALITY IMPROVEMENT (QI). 3 Hours.**

Exploration of the components of research and theory for translation of the best evidence to be used in evidence-based practice and quality improvement projects for clinical practice.

**NURS 5365. SOCIAL DETERMINANTS OF HEALTH AND POPULATION MANAGEMENT. 3 Hours.**

The course focuses on epidemiology, integrating perspectives on social determinants of health, health equity, data analytics, informatics, and the role of artificial intelligence in enhancing healthcare outcomes. The course highlights the significance of interprofessional partnerships in optimizing patient care. It also addresses patient safety, aiming to reduce preventable harm and enhancing healthcare quality through patient generated data. At the healthcare system level, the course examines population health along with policies and strategies for operational efficiencies and improved economics.

**NURS 5366. PRINCIPLES OF RESEARCH IN NURSING. 3 Hours.**

This course focuses on integration of theoretical and empirical principles of nursing research to generate evidence for nursing practice. Prerequisite: Graduate Standing.

**NURS 5367. EVIDENCE BASED PRACTICE. 3 Hours.**

Preparation to lead evidence-based practice teams, to interpret best evidence, to plan for change, to evaluate outcomes, and to disseminate the project. Prerequisite: Graduate standing; NURS 5366 and NURS 5327.

**NURS 5368. ADDRESSING CHALLENGES AND ADVANCING SOLUTIONS IN RURAL HEALTH. 3 Hours.**

Students completing Certificate coursework will receive academic credit that may be applied toward a Master's degree in nursing (MSN) or non-nursing students may receive the stand alone certificate in Rural Health Care.

**NURS 5369. RURAL HEALTH DISPARITIES AND POLICY IMPLICATIONS. 3 Hours.**

Students completing Certificate coursework will receive academic credit that may be applied toward a Master's degree in nursing (MSN) or non-nursing students may receive the stand alone certificate in Rural Health Care.

**NURS 5370. INDEPENDENT STUDY IN NURSING. 3 Hours.**

Detailed in-depth study in a specific topic area. Topic and mode of study are agreed upon by student(s) and instructor prior to registration. May be repeated for credit when topics vary. Graded F,R,P,W. Permission of instructor. Graduate standing.

**NURS 5371. PEDIATRIC PRIMARY CARE CLINICAL PRACTICE 1. 3 Hours.**

Initial clinical preceptorship in selected primary health practice sites with opportunities to apply knowledge and concepts of advanced nursing practice implementing the pediatric nurse practitioner role in evidenced based patient care. Prerequisite: NURS 5465. Good academic standing (GPA 3.0) or Certificate program standing.

**NURS 5372. PEDIATRIC PRIMARY CARE CLINICAL PRACTICE 2. 3 Hours.**

Continue clinical preceptorship in selected primary health practice sites with opportunities to apply knowledge and concepts of advanced nursing practice implementing the pediatric nurse practitioner role in evidenced based patient care. Prerequisite: NURS 5371 or concurrent enrollment. Good academic standing (GPA 3.0) or Certificate Program Standing.

**NURS 5373. PEDIATRIC ACUTE CARE CLINICAL PRACTICE 1. 3 Hours.**

Initial clinical preceptorship in selected acute and chronic care health practice sites with opportunities to apply knowledge and concepts of advanced nursing practice implementing the pediatric acute care nurse practitioner role in evidenced based patient care. Prerequisite: NURS 5467 or concurrent enrollment. NURS 5466 or concurrent enrollment. Good academic standing (GPA 3.0) or Certificate program standing.

**NURS 5374. PEDIATRIC ACUTE CARE CLINICAL PRACTICE 2. 3 Hours.**

Continue clinical preceptorship in selected acute and chronic care health practice sites with opportunities to apply knowledge and concepts of advanced nursing practice implementing the pediatric nurse practitioner role in evidenced based patient care. Prerequisite: NURS 5466; NURS 5373 or concurrent enrollment. Good academic standing (GPA 3.0) or Certificate program standing.

**NURS 5380. INDEPENDENT STUDY IN RESEARCH. 3 Hours.**

Detailed study and participation in a faculty sponsored research project. Topic and mode of study are agreed upon by the student and instructor prior to registration. Permission of instructor. Graded F,R,P,W.

**NURS 5382. NURSING AND HEALTH CARE POLICY: ISSUES AND ANALYSIS. 3 Hours.**

Analyze historical, current, and predicted national, state, and local health care policy processes. Prerequisite: NURS 5367.

**NURS 5388. STATISTICS FOR HEALTH CARE. 3 Hours.**

This course provides students with the basic knowledge and skills to effectively use biostatistics in different research design and data analysis, and to understand articles in related professional journals. Topics include choosing correct statistical methods and study designs in nursing research and practice; descriptive statistics; probability and probability distributions; estimation and hypothesis testing, simple linear regression, introduction to analysis of variance and an introduction to the use of statistical software packages. Prerequisite: Undergraduate Statistics.

**NURS 5390. TOPICS IN NURSING. 3 Hours.**

Selected topics in advanced nursing. May be repeated for credit as topics change.

**NURS 5392. GENOMICS AND NANOTECHNOLOGY IN HEALTH CARE PRACTICE. 3 Hours.**

Genomics and nanotechnology are emerging as principal drivers to improve human diagnosis and treatment modalities. This course is designed to introduce tools used in these fields. Health care outcomes, in relation to innovations produced from these fields, will be described. Prerequisite: Graduate standing.

**NURS 5393. ADVANCED CLINICAL NURSING PRACTICE I. 3 Hours.**

Development of advanced knowledge base of specialized clinical concepts and the application of this knowledge in selected clinical areas. Prerequisite: Graduate standing.

**NURS 5395. HEART FAILURE PATHOPHYSIOLOGY AND EXERCISE REHABILITATION. 3 Hours.**

The goal of this course is to provide students with fundamental knowledge related to heart failure (HF) pathophysiology, and the role of evidence based exercise rehabilitation to improve overall health related physical fitness and quality of life. Prerequisite: Graduate Standing or Approval of Instructor.

**NURS 5396. CURRENT BIOTECHNOLOGY IN HEALTH CARE. 3 Hours.**

The goal of this course is to provide students with fundamental knowledge and current advances of biotechnology in medicine and healthcare, and train them how to apply these new technologies in their pertinent fields. Prerequisite: Graduate Standing. Approval of instructor.

**NURS 5397. ETHICAL RESEARCH AND THE PROPOSED IRB/IACUC PROTOCOL. 3 Hours.**

Ethical research practices that the learner will be able to demonstrate through a written research protocol using good clinical practice (GCP) to ensure protection of subjects/animals. Related topics include social-behavioral and biomedical research certifications, and issues related to scientific misconduct. Prerequisite: Graduate standing or permission of instructor.

**NURS 5398. THESIS. 3 Hours.**

Graded F,R.

**NURS 5410. INTRODUCTION TO PSYCHIATRIC MENTAL HEALTH FOR THE PMHNP. 4 Hours.**

This course provides the neuroscientific foundations for various psychiatric disorders and mental health problems across the lifespan. An analysis of the relationships between the neurobiology, neurophysiology, genetic, and epigenetic aspects of various psychiatric disorders and mental health problems will be explored. Prerequisite: NURS 5315, NURS 5220, NURS 5120, NURS 5130, or Certificate Program Standing.

**NURS 5432. FAMILY I. 4 Hours.**

This course focuses on advanced concepts and knowledge for nurse practitioner primary care management of designated acute, chronic and complex health problems of individuals and families across the lifespan. Particular emphasis will be on pediatric wellness, women's health, men's health, and geriatrics concepts and conditions. Prerequisite: NURS 5418 or NURS 5220 and NURS 5120 and NURS 5130; NURS 5334 or Certificate Program standing.

**NURS 5433. FAMILY II. 4 Hours.**

This course focuses on advanced concepts and knowledge for nurse practitioner primary care management of commonly occurring conditions seen in primary care patients across the lifespan. Prerequisite: NURS 5418 or NURS 5220 and NURS 5120 and NURS 5130; NURS 5334 or Certificate Program standing.

**NURS 5434. FAMILY III. 4 Hours.**

This course focuses on advanced concepts and knowledge for nurse practitioner primary care management of designated acute, chronic and complex health problems of individuals and families across the lifespan. Particular emphasis will be on adult wellness, psychiatric, and cardiometabolic concepts and conditions. Prerequisite: NURS 5418 or NURS 5220 and NURS 5120 and NURS 5130; NURS 5334 or Certificate Program standing.

**NURS 5447. NEONATAL NURSING III. 4 Hours.**

This course focuses on advanced concepts of pharmacological and technological therapies and evidence based knowledge for the management of designated complex acute and chronic health problems affecting infants (birth to 2 years of age) and their families including ethical issues. Prerequisite: NURS 5537 or Certificate Program Standing.

**NURS 5450. NEONATAL NP CLINICAL PRACTICE. 4 Hours.**

Integration of clinical management of the high-risk neonate through clinical preceptorships in selected health practice sites with application of knowledge, skills and concepts in a guided, progressive context of advanced nursing practice. The ratio of credit to clinical hours is 1:4. Prerequisites: NURS 5334 and NURS 5316 or NURS 5220 and NURS 5110 and NURS 5204 and NURS 5537 or concurrent enrollment and Good academic standing (GPA 3.0) or Certificate Program Standing.

**NURS 5461. ADULT GERONTOLOGY MANAGEMENT ACROSS THE CONTINUUM OF CARE. 4 Hours.**

Foundations of advanced knowledge of common acute and chronic health problems in adolescents, adults, and elders across health care settings. Prerequisite: NURS 5220; NURS 5120 and NURS 5334, and NURS 5367 or concurrent enrollment, or Certificate Program Standing.

**NURS 5462. ADULT GERONTOLOGY PRIMARY CARE. 4 Hours.**

Focus on an inter-professional approach and the development of advanced knowledge in the primary care management of adults from adolescence through old age, their families, and communities in a variety of health care settings. Prerequisite: NURS 5461 or Certificate Program Standing.

**NURS 5463. ADULT GERONTOLOGY ACUTE CARE. 4 Hours.**

Focuses on a collaborative, inter-professional approach in the evaluation, diagnosis, and management of adolescents, adults, and gerontological patients who are experiencing acute, critical, and complex chronic illnesses across the continuum of care. Prerequisite: NURS 5461 or Certificate Program Standing.

**NURS 5465. PRIMARY PEDIATRIC CARE. 4 Hours.**

This course focuses on advanced concepts and knowledge for nurse practitioners management of designated minor acute, chronic and chronic health problems of pediatric patients and their families in primary care healthcare settings. Prerequisite: NURS 5334; NURS 5220; NURS 5130; NURS 5367 or concurrent enrollment.

**NURS 5466. PEDIATRIC ACUTE CARE. 4 Hours.**

This course focuses on advanced concepts and knowledge for nurse practitioner management of designated critical, acute, chronic and complex health problems of pediatric patients and their families in an acute care facility. Prerequisite: NURS 5465.

**NURS 5467. PEDIATRIC COMPLEX CARE. 4 Hours.**

This course focuses on advanced concepts and knowledge for nurse practitioner management of designated acute, chronic and complex health problems of pediatric patients and their families in multiple healthcare settings. Prerequisite: NURS 5465 or concurrent enrollment or Certificate program standing.

**NURS 5470. INDEPENDENT STUDY IN NURSING. 4 Hours.**

Detailed in-depth study in a specific topic area. Topic and mode of study are agreed upon by student(s) and instructor prior to registration. May be repeated for credit when topics vary. Prerequisite: Permission of instructor. Graded F,R,P,W.

**NURS 5537. NEONATAL NURSING II. 5 Hours.**

This course focuses on advanced concepts of pharmacological and technological therapies and evidence based knowledge for the management of designated complex, acute health problems affecting infants (birth to 2 years of age). Graded (A,B,C,D,F,I,W). Prerequisite: NURS 5204 and NURS 5334 and NURS 5316 or NURS 5220 and NURS 5110; NURS 5367 or concurrent enrollment or Certificate Program Standing.

**NURS 5610. NEONATAL NP ADVANCED PRACTICUM. 6 Hours.**

Clinical preceptorships in selected health practice sites with opportunities to apply knowledge, skills and concepts in a guided, progressive context of neonatal advanced nursing practice. The ratio of credit to clinical hours is 1:4. Prerequisite: NURS 5447 and NURS 5450. Good Academic Standing (GPA 3.0) or Certificate Program Standing.

**NURS 5640. ADULT GERONTOLOGY ACUTE CARE NP ADVANCED PRACTICUM. 6 Hours.**

Clinical preceptorships in selected health practice sites with opportunities to apply knowledge, skills and concepts in a guided, progressive context of adult gerontology acute care advanced nursing practice. The ratio of credit to clinical hours is 1:4. Prerequisite: For NURS 5640: NURS 5354 and NURS 5355. Good Academic Standing (GPA 3.0) or Certificate Program Standing. For NURSC 5640: NURSC 5354 and NURSC 5355. Good Academic Standing (GPA 3.0) or Certificate Program Standing.

**NURS 5645. ADULT GERONTOLOGY PRIMARY CARE NP ADVANCED PRACTICUM. 6 Hours.**

Clinical preceptorships in selected health practice sites with opportunities to apply knowledge, skills and concepts in a guided, progressive context of adult gerontology primary care advanced nursing practice. The ratio of credit to clinical hours is 1:4. Prerequisite: For NURS 5645: NURS 5352 and NURS 5353. Good Academic Standing (GPA 3.0) or Certificate Program Standing. For NURSC 5645: NURSC 5352 and NURSC 5353. Good Academic Standing (GPA 3.0) or Certificate Program Standing.

**NURS 5650. PSYCHIATRIC MENTAL HEALTH NP ADVANCED PRACTICUM. 6 Hours.**

Clinical preceptorships in selected health practice sites with opportunities to apply knowledge, skills and concepts in a guided, progressive context of family psychiatric mental health care advanced nursing practice. The ratio of credit to clinical hours is 1:4. Prerequisite: NURS 5324 and NURS 5325. Good Academic Standing (GPA 3.0) or Certificate Program Standing.

**NURS 5660. FAMILY NP ADVANCED PRACTICUM. 6 Hours.**

Clinical preceptorships in selected health practice sites with opportunities to apply knowledge, skills and concepts in a guided, progressive context of Family Primary Care Advanced Nursing Practice. The ratio of credit to clinical hours is 1:4. Prerequisite: For NURS 5660: NURS 5337 and NURS 5338. Good Academic Standing (GPA 3.0) or Certificate Program Standing. For NURSC 5660: NURSC 5337 and NURSC 5338. Good Academic Standing (GPA 3.0) or Certificate Program Standing. For NURSG: NURSG 5337 and NURSG 5338. Good Academic Standing (GPA 3.0) or Certificate Program Standing.

**NURS 5670. INDEPENDENT STUDY IN NURSING. 6 Hours.**

Detailed in-depth study in a specific topic area. Topic and mode of study are agreed upon by student(s) and instructor prior to registration. May be repeated for credit when topics vary. Prereq: Permission of instructor. Graded F,R,P,W.

**NURS 5680. PEDIATRIC ACUTE CARE NP ADVANCED PRACTICUM. 6 Hours.**

Clinical preceptorships in selected health practice sites with opportunities to apply knowledge, skills and concepts in a guided, progressive context of pediatric acute care advanced nursing practice. The ratio of credit to clinical hours is 1:4. Prerequisite: For NURS 5680: NURS 5373 and NURS 5374. Good Academic Standing (GPA 3.0) or Certificate Program standing. For NURSC 5680: NURSC 5373 and NURSC 5374. Good Academic Standing (GPA 3.0) or Certificate Program standing.

**NURS 5685. PEDIATRIC PRIMARY CARE NP ADVANCED PRACTICUM. 6 Hours.**

Clinical preceptorships in selected health practice sites with opportunities to apply knowledge, skills and concepts in a guided, progressive context of pediatric primary care advanced nursing practice. The ratio of credit to clinical hours is 1:4. Prerequisite: For NURS 5685: NURS 5371 and NURS 5372. Good Academic Standing (GPA 3.0) or Certificate Program Standing. For NURSC 5685: NURSC 5371 and NURSC 5372. Good Academic Standing (GPA 3.0) or Certificate Program Standing.

**NURS 5698. THESIS. 6 Hours.**

Graded F, R, P.

**NURS 6102. ISSUES IN STUDYING HEALTH & CULTURE OF SCIENCE. 1 Hour.**

Professional, ethical, legal, financial, cultural, and socio-political issues associated with conducting and disseminating research. Prerequisite: Graduate Standing. Enrolled in Nursing PhD program.

**NURS 6170. INDEPENDENT STUDY IN NURSING. 1 Hour.**

Detailed in-depth study in a specific topic area. Topic and mode of study are agreed upon by student(s) and instructor prior to registration. May be repeated for credit when topics vary. Graded F,R, P.

**NURS 6190. SPECIAL TOPICS IN NURSING. 1 Hour.**

Selected topics in advanced nursing. May be repeated for credit as topics change.

**NURS 6203. ISSUES IN STUDYING HEALTH & CULTURE OF SCIENCE. 2 Hours.**

Professional, ethical, legal, financial, cultural, and socio-political issues associated with conducting and disseminating research. Prerequisite: Graduate Standing. Enrolled in Nursing PhD program. Students who are unable to enroll in more than 6 credit hours during Fall & Spring semesters must enroll in this summer course.

**NURS 6270. INDEPENDENT STUDY IN NURSING. 2 Hours.**

Detailed in-depth study in a specific topic area. Topic and mode of study are agreed upon by student(s) and instructor prior to registration. May be repeated for credit when topics vary. Graded F, R, P.

**NURS 6290. TOPICS IN NURSING. 2 Hours.**

Selected topics in advanced nursing. May be repeated for credit as topics change.

**NURS 6301. THEORY IN NURSING SCIENCE. 3 Hours.**

Analysis and evaluation of theory used to guide health-related research; synthesis of health-related research guided by theory. Prerequisite: Graduate standing.

**NURS 6304. MEASUREMENT IN HEALTH RESEARCH. 3 Hours.**

This course presents the process involved in identifying different sources of data and variables and the use of conceptual models to influence choice and measurement of variables. The course presents the processes for designing, testing and/or selecting instruments, methods and procedures for measuring variables in clinical, educational and research settings. Prerequisite: NURS 6319 or permission of instructor. Course is predicated on prior learning related to basic statistics. Corequisites: NURS 6318 or permission of instructor. Course is predicated on prior learning related to basic statistics.

**NURS 6305. QUALITATIVE RESEARCH. 3 Hours.**

Philosophical foundation for and methodological issues in using qualitative approaches for scientific and knowledge development. Prerequisite: Graduate standing.

**NURS 6306. RESEARCH DESIGN. 3 Hours.**

Application of advanced nursing research methods to design studies that improve health outcomes. Prerequisites: Graduate statistics.

**NURS 6307. POPULATION HEALTH. 3 Hours.**

This course focuses on analyzing determinants of health, then designing health strategies to improve outcomes of populations. Prerequisite: Doctoral Standing. Graduate Level Statistics (with minimum of a B). 6327 if in DNP Program.

**NURS 6308. STATE OF THE SCIENCE. 3 Hours.**

Application of criteria for appraising strengths and weaknesses of published studies; Synthesis of research literature on a selected topic. Prerequisite: Graduate standing.

**NURS 6310. DISSERTATION PROPOSAL DEVELOPMENT SEMINAR. 3 Hours.**

Development and critique of doctoral dissertation proposal. Prerequisite: Completion of all Nursing PhD required courses.

**NURS 6311. MANUSCRIPT DEVELOPMENT FOR PUBLICATION. 3 Hours.**

This course provides a frame for which students focus their prose in order to disseminate their work to a broad audience of clinical, education, or research oriented practitioners. This course allows participants to critique peers' work to enhance their own skills as a peer reviewer, to enhance their career, and support other authors' writing efforts. The participants will write and explore the differences between peer reviewing and editing by critiquing sample review comments. Prerequisite: Approval of instructor. Doctoral Graduate standing.

**NURS 6318. PARAMETRIC STATISTICS FOR HEALTHCARE RESEARCH. 3 Hours.**

This course provides basic knowledge and skills to select the appropriate biostatistical analysis for different research designs, analyze data, interpret statistical results, and understand research articles in professional journals. Emphasis will be placed on common research designs in health care research; analysis of variance (ANOVA), factorial ANOVA, ANCOVA, MANCOVA, simple linear regression, multiple linear regression, and power analysis. Proficiency in the use of a statistical software package as well as a power analysis software package will be achieved. Prerequisite: Graduate-level introductory statistics course.

**NURS 6319. PSYCHOMETRIC AND NONPARAMETRIC STATISTICS FOR HEALTHCARE RESEARCH. 3 Hours.**

This course provides basic knowledge and skills to select the appropriate biostatistical analysis for different research designs, analyze data, interpret statistical results, and understand research articles in professional journals. Emphasis will be placed on reliability and validity of instruments commonly used in healthcare; assumptions testing including non-normality; nonparametric statistics for dependent samples and independent samples; logistic regression; and survival analysis. Proficiency in the use of a statistical software package will be achieved. Prerequisite: Graduate-level introductory statistics course.

**NURS 6320. LEADERSHIP IN HEALTH CARE SYSTEMS. 3 Hours.**

This course focuses on the DNP nurse influencing health systems change at any level. Prerequisite: Doctoral Standing. Prerequisite or co-requisite with NURS 6327 if full time.

**NURS 6322. TRANSLATIONAL RESEARCH. 3 Hours.**

This course provides a review of differences in QI, EBP, and Research as a foundation for translation of evidence. New practice-based clinical inquiry methods and strategies are explored to promote application of translational Research in the DNP role. Prerequisite: Doctoral Standing. Graduate Level Statistics (with minimum of a B). NURS 6327, NURS 6320.

**NURS 6323. EVIDENCE APPRAISAL. 3 Hours.**

In this course, students will use analytical methods to critically appraise existing research and literature to select and implement the best evidence for practice. Prerequisite: Doctoral Standing. Graduate Level Statistics (with minimum of a B). NURS 6327, NURS 6320, and NURS 6322.

**NURS 6324. CLINICAL INFORMATION SYSTEMS. 3 Hours.**

This course focuses on the selection, assessment, and use of information systems, technology, and data to evaluate and monitor outcomes of care, care systems, and quality improvement. Prerequisite: Doctoral Standing. Graduate Level Statistics (with minimum of a B) NURS 6327, NURS 6320.

**NURS 6326. PROJECT PROPOSAL DEVELOPMENT. 3 Hours.**

In this course the student will propose an evidence-based scholarly project. Upon completion 180 Practicum Hours will be applied to NURS 6620/6621 Practicums. Prerequisite: Pre-requisites in order of occurrence NURS 6320, NURS 6322, NURS 6323.



**NURS 6327. CLINICAL SCHOLARSHIP TO IMPROVE HEALTHCARE OUTCOMES. 3 Hours.**

This course will develop clinical scholarship and analytical methods to improve healthcare outcomes. Prerequisite: Graduate Standing; Graduate Level Statistics (with minimum of a B).

**NURS 6330. DATA SCIENCE AND POPULATION DATABASES. 3 Hours.**

This course is designed to prepare students to analyze population-based health data including the theoretical framework behind the design and administration of such studies. The focus is on datasets containing health and behavioral variables. At the conclusion of this course, students will be prepared to produce descriptive and inferential statistics about a defined population using data collected using complex survey design. With the collaboration of the instructor, this course culminates in the development, analysis, and reporting of a research project conducted using a population health database. Prerequisite: NURS 6318, NURS 6319.

**NURS 6331. DNP PRACTICUM I PRACTICE. 3 Hours.**

During this course, students implement evidence-based solutions that influence health outcomes. Prerequisite: NURS 6307, NURS 6320, NURS 6321, NURS 6322, NURS 6323, NURS 6324, NURS 6326, NURS 6382. DNP status and good academic standing (GPA 3.0).

**NURS 6333. DNP PRACTICUM II PRACTICE. 3 Hours.**

This course is applicable for students who have passed 6326 Project Proposal Development without approval from the Graduate Nursing Review Committee regarding implementation of a DNP Project. In this course students have faculty supervision in creating a successful DNP Project Proposal. Upon completion, 180 Practicum hours will be applied to NURS 6620/6621 Practicums. Prerequisite: NURS 6326.

**NURS 6370. INDEPENDENT STUDY IN NURSING. 3 Hours.**

Detailed in-depth study in a specific topic area. Topic and mode of study are agreed upon by student(s) and instructor prior to registration. May be repeated for credit when topics vary. Graded F, R, P.

**NURS 6381. RESEARCH PRACTICUM. 3 Hours.**

With the active guidance and under the supervision of an active researcher, the student will complete at least 75 hours of research activities, such as designing studies, seeking IRB and organizational approvals, obtaining informed consent, collecting and analyzing data, conducting laboratory experiments, or disseminating findings. This is practical research experience in preparation for the student's dissertation in the PhD Program in Nursing. Prerequisite: Doctoral standing. By permission of Research Advisor.

**NURS 6382. HEALTH CARE POLICY. 3 Hours.**

Critique policies and processes to provide leadership in developing and implementing policies and/or regulations that influence institutional, local, state, federal, and/or international healthcare outcomes. Prerequisite: Doctoral Standing. Graduate Level Statistics (with minimum of a B). NURS 6327 if in DNP program.

**NURS 6390. TOPICS IN NURSING. 3 Hours.**

Selected topics in advanced nursing. May be repeated for credit as topics change.

**NURS 6399. DISSERTATION. 3 Hours.**

Graded F, R. Prerequisite: Admission to candidacy for the Doctor in Nursing degree.

**NURS 6470. INDEPENDENT STUDY IN NURSING. 4 Hours.**

Detailed in-depth study in a specific topic area. Topic and mode of study are agreed upon by student(s) and instructor prior to registration. May be repeated for credit when topics vary. Graded F, R, P.

**NURS 6490. TOPICS IN NURSING. 4 Hours.**

Selected topics in advanced nursing. May be repeated for credit as topics change.

**NURS 6620. DNP PRACTICUM I. 6 Hours.**

During this course, students implement evidence-based solutions that influence health outcomes. Prerequisite: NURS 6307, NURS 6320, NURS 6322, NURS 6323, NURS 6324, NURS 6326, NURS 6327, and NURS 6382. Good academic standing (GPA 3.0).

**NURS 6621. DNP PRACTICUM II. 6 Hours.**

During this course, students evaluate evidence-based solutions that influence health outcomes. Prerequisite: NURS 6620 and DNP status, Good academic standing (3.0).

**NURS 6699. DISSERTATION. 6 Hours.**

Graded F, R, P, W. Prerequisite: Admission to candidacy for the Doctor in Nursing degree.

**NURS 6999. DISSERTATION. 9 Hours.**

Graded F, R, P. Prerequisite: Admission to candidacy for the Doctor in Nursing degree.

**NURS 7399. DOCTORAL DEGREE COMPLETION. 3 Hours.**

This course may be taken during the semester in which a student expects to complete all requirements for the doctoral degree and graduate. Enrolling in this course meets minimum enrollment requirements for graduation, for holding fellowships awarded by The Office of Graduate Studies and for full-time GTA or GRA positions. Students should verify that enrollment in this course meets other applicable enrollment requirements. To remain eligible in their final semester of study for grants, loans or other forms of financial aid administered by the Financial Aid Office must enroll in a minimum of 5 hours as required by the Office of Financial Aid. Other funding sources may also require more than 3-hours of enrollment. Additional hours may also be required to meet to requirements set by immigration law or by the policies of the student's degree program. Students should contact the Financial Aid Office, other sources of funding, Office of International Education and/or their graduate advisor to verify enrollment requirements before registering for this course. This course may only be taken twice. Students who do not complete all graduation requirements while enrolled in this course must enroll in a minimum of 6 dissertation hours (6699 or 6999) in their graduation term. Graded P/F/R.

**COURSES****NURS-EL 3300. COOPERATIVE NURSING WORK EXPERIENCE. 3 Hours.**

Designed for nursing cooperative education students to integrate classroom study with career-related practical experience in the workplace. Must earn a C or better to earn credit. Prerequisite: Admission into nursing degree program.

**NURS-EL 3347. SPECIALIZED TOPICS IN NURSING. 3 Hours.**

Areas of special interest. May be repeated with varied topics. Must earn a C or better to earn credit.

**NURS-EL 3352. THE LEGACY OF THE FAMILY. 3 Hours.**

Explore and enhance understanding and application of the principles of family science knowledge in therapeutic relationships with families across the lifespan.

**COURSES****NURS-HI 3358. FUNDAMENTAL TELEHEALTH SKILLS. 3 Hours.**

This course is designed to provide students with foundational knowledge of skills required for effective telehealth application and delivery. Prerequisite: undergraduate status or special student status.

**NURS-HI 3359. INTRODUCTION TO HEALTH INFORMATICS. 3 Hours.**

This course provides the foundation for the study of health informatics and covers topics such as health information management, clinical information systems (inpatient, outpatient, nursing, laboratory, pharmacy, radiology, etc.), decision support systems, clinical research and health-assessment systems, technology assessment, population health, ethics, security and confidentiality, social determinants of health and emerging trends. Prerequisite: undergraduate status or special student status.

**NURS-HI 3360. INTERPROFESSIONAL COLLABORATIVE PRACTICE. 3 Hours.**

This course is designed to provide students with foundational knowledge of interprofessional collaborative practice. Students will explore values and ethics for interprofessional practice, roles and responsibilities for collaborative practice, interprofessional communication strategies, and the interprofessional teamwork and team-based practice. This course will provide a framework for deliberate interprofessional collaborative practice with other health professionals to maintain a climate of mutual respect and shared values in today's complex health care environment, with the common goal of improving patient outcomes. Prerequisite: undergraduate status or special student status.

**NURS-HI 5383. PRINCIPLES OF HEALTHCARE INFORMATICS. 3 Hours.**

Health information management, clinical information systems, decision support systems, clinical research and health assessment systems, technology assessment, and healthcare accounting. Focus is on US healthcare and the role of informatics within the U.S. healthcare system. Prerequisite: Graduate standing.

**NURS-HI 5384. HEALTHCARE DATA MANAGEMENT AND ANALYTICS. 3 Hours.**

Development, integration, and management of healthcare information systems, patient care systems, and healthcare delivery applications. Utilizes case studies and real-life application scenarios. Prerequisite: Graduate Standing.

**NURS-HI 5385. HEALTH INFORMATION SYSTEMS MANAGEMENT. 3 Hours.**

Introduction to project management principles and tools used for managing the development of healthcare analytics projects and information systems. Application of systems theory, hardware requirements, personnel requirements, vendor, negotiations, software, database, telecommunications, and use of the internet. Prerequisite: NURS-HI 5383 or instructor approval.

**NURS-HI 5386. SOCIAL DETERMINANTS OF HEALTH AND HEALTHCARE INFORMATICS. 3 Hours.**

Introduce the concepts of SDOH and explore the relationships between SDOH and Health informatics. Include how healthcare informatics can be employed to bridge the gaps experienced by vulnerable populations. Prerequisite: Graduate Standing.

**NURS-HI 5687. INFORMATICS PRACTICUM. 6 Hours.**

Synthesize principles and concepts of healthcare informatics as it applies to the nurse informatics role. Prerequisite: GPA 3.0; NURS 5327, NURS 5388, NURS 5367, NURS 5366, NURS 5342, NURS 5334, NURS-HI 5383, NURS-HI 5384, NURS-HI 5385, NURS-HI 5386.

## COURSES

### **NURS-IS 3137. INDEPENDENT STUDY. 1 Hour.**

Topic and mode of study are agreed upon by the student and instructor. May be repeated with various topics. Must earn C or better for credit. Prerequisite: Consent of instructor.

### **NURS-IS 3237. INDEPENDENT STUDY. 2 Hours.**

Topic and mode of study are agreed upon by the student and instructor. May be repeated with various topics. Must earn C or better for credit. Prerequisite: Consent of instructor.

### **NURS-IS 3337. INDEPENDENT STUDY. 3 Hours.**

Topic and mode of study are agreed upon by the student and instructor. May be repeated with various topics. Must earn a grade of C or better for credit. Prerequisite: Consent of Instructor.

### **NURS-IS 5170. INDEPENDENT STUDY IN NURSING. 1 Hour.**

Detailed in-depth study in a specific topic area. Topic and mode of study are agreed upon by student(s) and instructor prior to registration. May be repeated for credit when topics vary. Graded F, P, R. Prerequisite: Graduate standing.

### **NURS-IS 5270. INDEPENDENT STUDY IN NURSING. 2 Hours.**

Detailed in-depth study in a specific topic area. Topic and mode of study are agreed upon by student(s) and instructor prior to registration. May be repeated for credit when topics vary. Graded F, P, R. Prerequisite: Graduate Standing and permission of instructor.

## COURSES

### **NURS-SS 2232. LEARNING PROFESSIONAL NURSING AND LIFE SKILLS. 2 Hours.**

This course focuses on the development and successful use of time management, test-taking skills, study methods, and additional student success strategies that can support students pursuing the BSN Prelicensure Program. Required for students who fail an upper-division nursing course. Prerequisite: Admission to the BSN Prelicensure program.

## COURSES

### **NURS-UL 3333. PROMOTING HEALTHY LIFESTYLES. 3 Hours.**

Focus on health promotion and disease prevention strategies that promote healthy lifestyles and empower individuals, families, and populations to achieve optimal health and wellness. Positive health communication techniques for behavioral change, including motivational interviewing are discussed.

### **NURS-UL 3352. THE LEGACY OF THE FAMILY. 3 Hours.**

Explore and enhance understanding and application of the principles of family science knowledge in therapeutic relationships with families across the lifespan.

### **NURS-UL 3365. PHARMACOLOGY IN NURSING PRACTICE. 3 Hours.**

Introduction to current concepts of pharmacology and their relationship to nursing practice. Included are basic principles of drug actions, side effects for major drug classifications, and the role of the nurse in drug therapeutics. Prerequisite: Admission into the upper division nursing program.

### **NURS-UL 3366. PATHOPHYSIOLOGIC PROCESSES: IMPLICATIONS FOR NURSING. 3 Hours.**

Pathophysiologic alterations, their interactions, and effects on persons across the life span as a basis for therapeutic nursing interventions. Must be taken no more than three years prior to acceptance into the nursing program. Prerequisite: BIOL 2457, BIOL 2458, CHEM 1451.

### **NURS-UL 3632. CLINICAL NURSING FOUNDATIONS. 6 Hours.**

Basic therapeutic nursing interventions with individuals and families in diverse settings using nursing process framework. Prerequisite: Acceptance into the upper division nursing program. Co-req: NURS 3365 and NURS 3320.

## COURSES

### **NURSC 5120. ADULT-GERONTOLOGY ASSESSMENT LAB. 1 Hour.**

Conduct comprehensive health assessment in the adult-gerontology population. Prerequisite: NURS 5220 or concurrent enrollment or Certificate Program Standing.

### **NURSC 5130. PEDIATRIC ASSESSMENT LAB. 1 Hour.**

Conduct comprehensive health assessment in the pediatric population. Prerequisite: NURS 5220 or concurrent enrollment or Certificate Program Standing.

### **NURSC 5150. ADVANCED CARE OF A CLIENT POPULATION. 1 Hour.**

Conduct comprehensive advanced health assessments of a client population and provide a teaching intervention of a priority health need. Prerequisite: NURS 5220 or NURS 5300.

### **NURSC 5220. ADVANCED HEALTH ASSESSMENT AND DIAGNOSTIC REASONING. 2 Hours.**

Apply theoretical foundations of comprehensive health assessment across the lifespan. Prerequisite: Graduate or Certificate Program Standing. NURS 5315 or Special Permission.

### **NURSC 5302. CURRICULUM DEVELOPMENT IN NURSING EDUCATION. 3 Hours.**

Explore the nature of nursing education. Focus on the curriculum process and its application to nursing education programs. Prerequisite: Graduate standing.

**NURSC 5308. NURSING INFORMATICS. 3 Hours.**

Focus on application of computer technology that supports the dissemination of health care data, information and knowledge. Selected software packages/applications are presented and used. Prerequisite: NURS 5367.

**NURSC 5310. TEACHING AND LEARNING THEORIES AND STRATEGIES IN NURSING EDUCATION. 3 Hours.**

Teaching/Learning theories, strategies, and evaluation for educators. Prerequisite: Graduate standing.

**NURSC 5311. NURSING MANAGEMENT IN THE HEALTH CARE ENVIRONMENT. 3 Hours.**

Considers development of management and organizational theories as applied to health care organizations and their environment. Prerequisite: NURS 5367.

**NURSC 5312. ASSESSMENT AND EVALUATION STRATEGIES IN NURSING EDUCATION. 3 Hours.**

Integration of concepts of assessment and evaluation into a nursing evaluation framework. Prerequisite: Graduate standing.

**NURSC 5315. ADVANCED PATHOPHYSIOLOGY. 3 Hours.**

Builds on a previous understanding of anatomy and physiology and focuses on developing advanced knowledge of physiologic and pathophysiologic concepts across the life span. Prerequisite: Graduate Standing.

**NURSC 5324. PSYCHIATRIC MENTAL CLINICAL PRACTICE I. 3 Hours.**

This course provides application of theoretical knowledge and clinical skills to patients with commonly occurring psychiatric and mental health disorders across the life span in the context of advanced nursing practice. Prerequisite: NURS 5222 and NURS 5223 or Certificate Program Standing. Good academic standing (GPA 3.0).

**NURSC 5325. PSYCHIATRIC MENTAL HEALTH CLINICAL PRACTICE II. 3 Hours.**

This course provides application of theoretical knowledge and clinical skills to patients with various commonly occurring and complex psychiatric and mental health disorders across the life span in the context of advanced nursing practice. Prerequisite: NURS 5324 or concurrent enrollment, or Certificate Program Standing. Good academic standing (GPA 3.0).

**NURSC 5329. ROLE OF THE NURSE EDUCATOR. 3 Hours.**

Investigation of the roles and functions of the nurse educator. Prerequisite: Graduate program standing.

**NURSC 5334. ADVANCED PHARMACOLOGY FOR NURSE PRACTITIONERS. 3 Hours.**

Study of clinical pharmacological therapeutics for advanced nursing practice. Prerequisites: NURS 5315 or Certificate Program Standing.

**NURSC 5337. FAMILY CLINICAL PRACTICE 1. 3 Hours.**

Initial clinical preceptorship in selected primary health practice sites with opportunities to apply knowledge and concepts of advanced nursing practice implementing the family nurse practitioner role in evidenced based patient care. Prerequisite: NURS 5432, NURS 5433, NURS 5434 and Good academic standing (GPA 3.0) or certificate program standing.

**NURSC 5338. FAMILY CLINICAL PRACTICE 2. 3 Hours.**

Continued clinical preceptorship with opportunities for increased clinical knowledge in selected primary health practice sites with opportunities to apply knowledge and concepts of advanced nursing practice implementing the family nurse practitioner role in evidenced based patient care. Prerequisite: NURS 5432, NURS 5433, NURS 5434, NURS 5337 or concurrent enrollment; Good academic standing (GPA 3.0) or Certificate Program standing.

**NURSC 5339. ROLES AND FUNCTIONS OF THE NURSE ADMINISTRATOR. 3 Hours.**

Examine and implement administrative and managerial roles in health care organizations. Prerequisite: NURS 5311.

**NURSC 5340. MANAGEMENT SEMINAR AND PRACTICE. 3 Hours.**

Synthesize management, organizational, and leadership concepts and theories in selected health care settings. Prerequisite: NURS 5308; NURS 5311; NURS 5339; NURS 5341; NURS 5343; NURS 5342; NURS 5382. Good Academic Standing (3.0 GPA).

**NURSC 5341. FINANCIAL MANAGEMENT IN NURSING. 3 Hours.**

Analyze and apply financial management concepts to financial planning, budgeting, and reimbursement systems in health care. Prerequisite: NURS 5311 or admission into Masters of Science in Health Informatics (MSH-HI) program.

**NURSC 5342. MANAGEMENT OF NURSING OPERATIONS. 3 Hours.**

Examine strategic planning for health care systems. Prerequisite: NURS 5311 or admission into Masters of Science in Health Informatics (MSN-HI) program.

**NURSC 5343. NURSING LEADERSHIP AND COMPLEX HEALTH CARE SYSTEMS. 3 Hours.**

Analyze leadership strategies in current and predicted health care systems including dimensions of workforce and workplace issues, leadership, and evidenced-based decision-making. Prerequisite: NURS 5367.

**NURSC 5350. ROLE OF THE NURSE IN ADVANCED PRACTICE. 3 Hours.**

Theory and application of the multiple roles of the advanced practice nurse within the health care system. Prerequisite: Graduate Standing.

**NURSC 5352. ADULT GERONTOLOGY PRIMARY CARE CLINICAL PRACTICE 1. 3 Hours.**

Clinical experience in primary and long term health care settings with focus on managing adolescents, adults, and elders with common episodic acute and chronic health care needs. Prerequisite: NURS 5462 or concurrent enrollment; Good academic standing (GPA 3.0) or certificate program standing.

**NURSC 5353. ADULT GERONTOLOGY PRIMARY CARE CLINICAL PRACTICE 2. 3 Hours.**

Continued clinical experience in primary and long term health care settings with focus on managing adolescents, adults, and elders with common episodic acute and chronic health care needs. Prerequisite: NURS 5462 and NURS 5352 or concurrent enrollment and Good academic standing (GPA 3.0) or certificate program standing.

**NURSC 5354. ADULT GERONTOLOGY ACUTE CARE CLINICAL PRACTICE 1. 3 Hours.**

Clinical experience in specialty practice and high acuity health care settings with focus on managing adolescents, adults, and elders with common secondary and tertiary health care needs. Prerequisite: NURS 5463 or concurrent enrollment and Good academic standing (GPA 3.0) or certificate program standing.

**NURSC 5355. ADULT GERONTOLOGY ACUTE CARE CLINICAL PRACTICE 2. 3 Hours.**

Continued clinical experience in specialty practice and high acuity health care settings with focus on managing adolescents, adults, and elders with common secondary and tertiary health care needs. Prerequisite: NURS 5354 or concurrent enrollment; Good academic standing (GPA 3.0) or certificate program standing.

**NURSC 5362. TEACHING PRACTICUM. 3 Hours.**

Nursing education preceptorship in selected health care sites with opportunities to apply clinical and educational knowledge, skills, and concepts in a guided, progressive context of nursing education. Graded Pass/Not Pass - F, I, P, W Prerequisite: Completion of all courses in the Nursing Education Program and Good academic standing (GPA 3.0).

**NURSC 5367. EVIDENCE BASED PRACTICE. 3 Hours.**

Preparation to lead evidence-based practice teams, to interpret best evidence, to plan for change, to evaluate outcomes, and to disseminate the project. Prerequisite: Graduate standing; NURS 5366 and NURS 5327.

**NURSC 5371. PEDIATRIC PRIMARY CARE CLINICAL PRACTICE 1. 3 Hours.**

Initial clinical preceptorship in selected primary health practice sites with opportunities to apply knowledge and concepts of advanced nursing practice implementing the pediatric nurse practitioner role in evidenced based patient care. Prerequisite: NURS 5465. Good academic standing (GPA 3.0) or Certificate program standing.

**NURSC 5372. PEDIATRIC PRIMARY CARE CLINICAL PRACTICE 2. 3 Hours.**

Continue clinical preceptorship in selected primary health practice sites with opportunities to apply knowledge and concepts of advanced nursing practice implementing the pediatric nurse practitioner role in evidenced based patient care. Prerequisite: NURS 5371 or concurrent enrollment. Good academic standing (GPA 3.0) or Certificate Program Standing.

**NURSC 5373. PEDIATRIC ACUTE CARE CLINICAL PRACTICE 1. 3 Hours.**

Initial clinical preceptorship in selected acute and chronic care health practice sites with opportunities to apply knowledge and concepts of advanced nursing practice implementing the pediatric acute care nurse practitioner role in evidenced based patient care. Prerequisite: NURS 5467 or concurrent enrollment. NURS 5466 or concurrent enrollment. Good academic standing (GPA 3.0) or Certificate program standing.

**NURSC 5374. PEDIATRIC ACUTE CARE CLINICAL PRACTICE 2. 3 Hours.**

Continue clinical preceptorship in selected acute and chronic care health practice sites with opportunities to apply knowledge and concepts of advanced nursing practice implementing the pediatric nurse practitioner role in evidenced based patient care. Prerequisite: NURS 5466; NURS 5373 or concurrent enrollment. Good academic standing (GPA 3.0) or Certificate program standing.

**NURSC 5382. NURSING AND HEALTH CARE POLICY: ISSUES AND ANALYSIS. 3 Hours.**

Analyze historical, current, and predicted national, state, and local health care policy processes. Prerequisite: NURS 5367.

**NURSC 5388. STATISTICS FOR HEALTH CARE. 3 Hours.**

This course provides students with the basic knowledge and skills to effectively use biostatistics in different research design and data analysis, and to understand articles in related professional journals. Topics include choosing correct statistical methods and study designs in nursing research and practice; descriptive statistics; probability and probability distributions; estimation and hypothesis testing, simple linear regression, introduction to analysis of variance and an introduction to the use of statistical software packages. Prerequisite: Undergraduate Statistics.

**NURSC 5432. FAMILY I. 4 Hours.**

This course focuses on advanced concepts and knowledge for nurse practitioner primary care management of designated acute, chronic and complex health problems of individuals and families across the lifespan. Particular emphasis will be on pediatric wellness, women's health, men's health, and geriatrics concepts and conditions. Prerequisite: NURS 5418 or NURS 5220 and NURS 5120 and NURS 5130; NURS 5334 or Certificate Program standing.

**NURSC 5433. FAMILY II. 4 Hours.**

This course focuses on advanced concepts and knowledge for nurse practitioner primary care management of commonly occurring conditions seen in primary care patients across the lifespan. Prerequisite: NURS 5418 or NURS 5220 and NURS 5120 and NURS 5130; NURS 5334 or Certificate Program standing.

**NURSC 5434. FAMILY III. 4 Hours.**

This course focuses on advanced concepts and knowledge for nurse practitioner primary care management of designated acute, chronic and complex health problems of individuals and families across the lifespan. Particular emphasis will be on adult wellness, psychiatric, and cardiometabolic concepts and conditions. Prerequisite: NURS 5418 or NURS 5220 and NURS 5120 and NURS 5130; NURS 5334 or Certificate Program standing.



**NURSC 5450. NEONATAL NP CLINICAL PRACTICE. 4 Hours.**

Integration of clinical management of the high-risk neonate through clinical preceptorships in selected health practice sites with application of knowledge, skills and concepts in a guided, progressive context of advanced nursing practice. The ratio of credit to clinical hours is 1:4. Prerequisites: NURS 5334 and NURS 5316 or NURS 5220 and NURS 5110 and NURS 5204 and NURS 5537 or concurrent enrollment and Good academic standing (GPA 3.0) or Certificate Program Standing.

**NURSC 5461. ADULT GERONTOLOGY MANAGEMENT ACROSS THE CONTINUUM OF CARE. 4 Hours.**

Foundations of advanced knowledge of common acute and chronic health problems in adolescents, adults, and elders across health care settings. Prerequisite: NURS 5220; NURS 5120 and NURS 5334, and NURS 5367 or concurrent enrollment, or Certificate Program Standing.

**NURSC 5462. ADULT GERONTOLOGY PRIMARY CARE. 4 Hours.**

Focus on an inter-professional approach and the development of advanced knowledge in the primary care management of adults from adolescence through old age, their families, and communities in a variety of health care settings. Prerequisite: NURS 5461 or Certificate Program Standing.

**NURSC 5463. ADULT GERONTOLOGY ACUTE CARE. 4 Hours.**

Focuses on a collaborative, inter-professional approach in the evaluation, diagnosis, and management of adolescents, adults, and gerontological patients who are experiencing acute, critical, and complex chronic illnesses across the continuum of care. Prerequisite: NURS 5461 or Certificate Program Standing.

**NURSC 5465. PRIMARY PEDIATRIC CARE. 4 Hours.**

This course focuses on advanced concepts and knowledge for nurse practitioners management of designated minor acute, chronic and chronic health problems of pediatric patients and their families in primary care healthcare settings. Prerequisite: NURS 5334; NURS 5220; NURS 5130; NURS 5367 or concurrent enrollment.

**NURSC 5466. PEDIATRIC ACUTE CARE. 4 Hours.**

This course focuses on advanced concepts and knowledge for nurse practitioner management of designated critical, acute, chronic and complex health problems of pediatric patients and their families in an acute care facility. Prerequisite: NURS 5465.

**NURSC 5467. PEDIATRIC COMPLEX CARE. 4 Hours.**

This course focuses on advanced concepts and knowledge for nurse practitioner management of designated acute, chronic and complex health problems of pediatric patients and their families in multiple healthcare settings. Prerequisite: NURS 5465 or concurrent enrollment or Certificate program standing.

**NURSC 5610. NEONATAL NP ADVANCED PRACTICUM. 6 Hours.**

Clinical preceptorships in selected health practice sites with opportunities to apply knowledge, skills and concepts in a guided, progressive context of neonatal advanced nursing practice. The ratio of credit to clinical hours is 1:4. Prerequisite: NURS 5447 and NURS 5450. Good Academic Standing (GPA 3.0) or Certificate Program Standing.

**NURSC 5640. ADULT GERONTOLOGY ACUTE CARE NP ADVANCED PRACTICUM. 6 Hours.**

Clinical preceptorships in selected health practice sites with opportunities to apply knowledge, skills and concepts in a guided, progressive context of adult gerontology acute care advanced nursing practice. The ratio of credit to clinical hours is 1:4. Prerequisite: For NURS 5640: NURS 5354 and NURS 5355. Good Academic Standing (GPA 3.0) or Certificate Program Standing. For NURSC 5640: NURSC 5354 and NURSC 5355. Good Academic Standing (GPA 3.0) or Certificate Program Standing.

**NURSC 5645. ADULT GERONTOLOGY PRIMARY CARE NP ADVANCED PRACTICUM. 6 Hours.**

Clinical preceptorships in selected health practice sites with opportunities to apply knowledge, skills and concepts in a guided, progressive context of adult gerontology primary care advanced nursing practice. The ratio of credit to clinical hours is 1:4. Prerequisite: For NURS 5645: NURS 5352 and NURS 5353. Good Academic Standing (GPA 3.0) or Certificate Program Standing. For NURSC 5645: NURSC 5352 and NURSC 5353. Good Academic Standing (GPA 3.0) or Certificate Program Standing.

**NURSC 5650. PSYCHIATRIC MENTAL HEALTH NP ADVANCED PRACTICUM. 6 Hours.**

Clinical preceptorships in selected health practice sites with opportunities to apply knowledge, skills and concepts in a guided, progressive context of family psychiatric mental health care advanced nursing practice. The ratio of credit to clinical hours is 1:4. Prerequisite: NURS 5324 and NURS 5325. Good Academic Standing (GPA 3.0) or Certificate Program Standing.

**NURSC 5660. FAMILY NP ADVANCED PRACTICUM. 6 Hours.**

Clinical preceptorships in selected health practice sites with opportunities to apply knowledge, skills and concepts in a guided, progressive context of Family Primary Care Advanced Nursing Practice. The ratio of credit to clinical hours is 1:4. Prerequisite: For NURS 5660: NURS 5337 and NURS 5338. Good Academic Standing (GPA 3.0) or Certificate Program Standing. For NURSC 5660: NURSC 5337 and NURSC 5338. Good Academic Standing (GPA 3.0) or Certificate Program Standing. For NURSG: NURSG 5337 and NURSG 5338. Good Academic Standing (GPA 3.0) or Certificate Program Standing.

**NURSC 5680. PEDIATRIC ACUTE CARE NP ADVANCED PRACTICUM. 6 Hours.**

Clinical preceptorships in selected health practice sites with opportunities to apply knowledge, skills and concepts in a guided, progressive context of pediatric acute care advanced nursing practice. The ratio of credit to clinical hours is 1:4. Prerequisite: For NURS 5680: NURS 5373 and NURS 5374. Good Academic Standing (GPA 3.0) or Certificate Program standing. For NURSC 5680: NURSC 5373 and NURSC 5374. Good Academic Standing (GPA 3.0) or Certificate Program standing.

**NURSC 5685. PEDIATRIC PRIMARY CARE NP ADVANCED PRACTICUM. 6 Hours.**

Clinical preceptorships in selected health practice sites with opportunities to apply knowledge, skills and concepts in a guided, progressive context of pediatric primary care advanced nursing practice. The ratio of credit to clinical hours is 1:4. Prerequisite: For NURS 5685: NURS 5371 and NURS 5372. Good Academic Standing (GPA 3.0) or Certificate Program Standing. For NURSC 5685: NURSC 5371 and NURSC 5372. Good Academic Standing (GPA 3.0) or Certificate Program Standing.

**COURSES****NURSCIS 5170. INDEPENDENT STUDY IN NURSING. 1 Hour.**

Detailed in-depth study in a specific topic area. Topic and mode of study are agreed upon by student(s) and instructor prior to registration. May be repeated for credit when topics vary. Graded F, P, R. Prerequisite: Graduate standing.

**NURSCIS 5270. INDEPENDENT STUDY IN NURSING. 2 Hours.**

Detailed in-depth study in a specific topic area. Topic and mode of study are agreed upon by student(s) and instructor prior to registration. May be repeated for credit when topics vary. Graded F, P, R. Prerequisite: Graduate Standing and permission of instructor.

**NURSCIS 5370. INDEPENDENT STUDY IN NURSING. 3 Hours.**

Detailed in-depth study in a specific topic area. Topic and mode of study are agreed upon by student(s) and instructor prior to registration. May be repeated for credit when topics vary. Graded F,R,P,W. Permission of instructor. Graduate standing.

**COURSES****NURSG 5150. ADVANCED CARE OF A CLIENT POPULATION. 1 Hour.**

Conduct comprehensive advanced health assessments of a client population and provide a teaching intervention of a priority health need. Prerequisite: NURS 5220 or NURS 5300.

**NURSG 5220. ADVANCED HEALTH ASSESSMENT AND DIAGNOSTIC REASONING. 2 Hours.**

Apply theoretical foundations of comprehensive health assessment across the lifespan. Prerequisite: Graduate or Certificate Program Standing. NURS 5315 or Special Permission.

**NURSG 5302. CURRICULUM DEVELOPMENT IN NURSING EDUCATION. 3 Hours.**

Explore the nature of nursing education. Focus on the curriculum process and its application to nursing education programs. Prerequisite: Graduate standing.

**NURSG 5308. NURSING INFORMATICS. 3 Hours.**

Focus on application of computer technology that supports the dissemination of health care data, information and knowledge. Selected software packages/applications are presented and used. Prerequisite: NURS 5367.

**NURSG 5310. TEACHING AND LEARNING THEORIES AND STRATEGIES IN NURSING EDUCATION. 3 Hours.**

Teaching/Learning theories, strategies, and evaluation for educators. Prerequisite: Graduate standing.

**NURSG 5311. NURSING MANAGEMENT IN THE HEALTH CARE ENVIRONMENT. 3 Hours.**

Considers development of management and organizational theories as applied to health care organizations and their environment. Prerequisite: NURS 5367.

**NURSG 5312. ASSESSMENT AND EVALUATION STRATEGIES IN NURSING EDUCATION. 3 Hours.**

Integration of concepts of assessment and evaluation into a nursing evaluation framework. Prerequisite: Graduate standing.

**NURSG 5315. ADVANCED PATHOPHYSIOLOGY. 3 Hours.**

Builds on a previous understanding of anatomy and physiology and focuses on developing advanced knowledge of physiologic and pathophysiologic concepts across the life span. Prerequisite: Graduate Standing.

**NURSG 5318. ADVANCED PATHOPHYSIOLOGY FOR NURSE EDUCATORS. 3 Hours.**

This course develops advanced knowledge of pathophysiology. Principles of advanced physiology and pathophysiology are applied to disease processes, plans of care, and teaching plans. This course prepares Nurse Educators to educate clients, students, colleagues to facilitate patients and/or their support systems understanding of the disease process plan of care. Prerequisite: NURS 5367 and NURS 5310 and NURS 5329 and NURS 5302 and NURS 5312.

**NURSG 5319. ADVANCED PHARMACOLOGY FOR NURSE EDUCATORS. 3 Hours.**

This course develops advanced knowledge of clinical pharmacological therapeutics through the evaluation of classes of drugs and pharmacologic plans of care. This course prepares Nurse Educators to educate clients, students, and colleagues to facilitate patients and/or their support systems understanding of the pharmacologic plan of care. Prerequisite: NURS 5318.

**NURSG 5324. PSYCHIATRIC MENTAL CLINICAL PRACTICE I. 3 Hours.**

This course provides application of theoretical knowledge and clinical skills to patients with commonly occurring psychiatric and mental health disorders across the life span in the context of advanced nursing practice. Prerequisite: NURS 5222 and NURS 5223 or Certificate Program Standing. Good academic standing (GPA 3.0).

**NURSG 5325. PSYCHIATRIC MENTAL HEALTH CLINICAL PRACTICE II. 3 Hours.**

This course provides application of theoretical knowledge and clinical skills to patients with various commonly occurring and complex psychiatric and mental health disorders across the life span in the context of advanced nursing practice. Prerequisite: NURS 5324 or concurrent enrollment, or Certificate Program Standing. Good academic standing (GPA 3.0).

**NURSG 5327. EXPLORATION OF SCIENCE AND THEORIES FOR NURSING. 3 Hours.**

This course provides a critical examination of the philosophical and theoretical bases for nursing science. Prerequisite: Graduate standing.

**NURSG 5329. ROLE OF THE NURSE EDUCATOR. 3 Hours.**

Investigation of the roles and functions of the nurse educator. Prerequisite: Graduate program standing.

**NURSG 5334. ADVANCED PHARMACOLOGY FOR NURSE PRACTITIONERS. 3 Hours.**

Study of clinical pharmacological therapeutics for advanced nursing practice. Prerequisites: NURS 5315 or Certificate Program Standing.

**NURSG 5339. ROLES AND FUNCTIONS OF THE NURSE ADMINISTRATOR. 3 Hours.**

Examine and implement administrative and managerial roles in health care organizations. Prerequisite: NURS 5311.

**NURSG 5340. MANAGEMENT SEMINAR AND PRACTICE. 3 Hours.**

Synthesize management, organizational, and leadership concepts and theories in selected health care settings. Prerequisite: NURS 5308; NURS 5311; NURS 5339; NURS 5341; NURS 5343; NURS 5342; NURS 5382. Good Academic Standing (3.0 GPA).

**NURSG 5341. FINANCIAL MANAGEMENT IN NURSING. 3 Hours.**

Analyze and apply financial management concepts to financial planning, budgeting, and reimbursement systems in health care. Prerequisite: NURS 5311 or admission into Masters of Science in Health Informatics (MSH-HI) program.

**NURSG 5342. MANAGEMENT OF NURSING OPERATIONS. 3 Hours.**

Examine strategic planning for health care systems. Prerequisite: NURS 5311 or admission into Masters of Science in Health Informatics (MSN-HI) program.

**NURSG 5343. NURSING LEADERSHIP AND COMPLEX HEALTH CARE SYSTEMS. 3 Hours.**

Analyze leadership strategies in current and predicted health care systems including dimensions of workforce and workplace issues, leadership, and evidenced-based decision-making. Prerequisite: NURS 5367.

**NURSG 5350. ROLE OF THE NURSE IN ADVANCED PRACTICE. 3 Hours.**

Theory and application of the multiple roles of the advanced practice nurse within the health care system. Prerequisite: Graduate Standing.

**NURSG 5352. ADULT GERONTOLOGY PRIMARY CARE CLINICAL PRACTICE 1. 3 Hours.**

Clinical experience in primary and long term health care settings with focus on managing adolescents, adults, and elders with common episodic acute and chronic health care needs. Prerequisite: NURS 5462 or concurrent enrollment; Good academic standing (GPA 3.0) or certificate program standing.

**NURSG 5353. ADULT GERONTOLOGY PRIMARY CARE CLINICAL PRACTICE 2. 3 Hours.**

Continued clinical experience in primary and long term health care settings with focus on managing adolescents, adults, and elders with common episodic acute and chronic health care needs. Prerequisite: NURS 5462 and NURS 5352 or concurrent enrollment and Good academic standing (GPA 3.0) or certificate program standing.

**NURSG 5354. ADULT GERONTOLOGY ACUTE CARE CLINICAL PRACTICE 1. 3 Hours.**

Clinical experience in specialty practice and high acuity health care settings with focus on managing adolescents, adults, and elders with common secondary and tertiary health care needs. Prerequisite: NURS 5463 or concurrent enrollment and Good academic standing (GPA 3.0) or certificate program standing.

**NURSG 5355. ADULT GERONTOLOGY ACUTE CARE CLINICAL PRACTICE 2. 3 Hours.**

Continued clinical experience in specialty practice and high acuity health care settings with focus on managing adolescents, adults, and elders with common secondary and tertiary health care needs. Prerequisite: NURS 5354 or concurrent enrollment; Good academic standing (GPA 3.0) or certificate program standing.

**NURSG 5360. SIMULATION APPLICATION IN NURSING. 3 Hours.**

This course provides an in-depth exploration of simulation as a teaching and learning strategy in nursing education. Students will critically analyze various types of simulation, weighing their advantages and disadvantages to determine the most effective approaches for different educational contexts. Prerequisite: NURS 5364 or NURS 5367, NURS 5220 or NURS 5300.

**NURSG 5362. TEACHING PRACTICUM. 3 Hours.**

Nursing education preceptorship in selected health care sites with opportunities to apply clinical and educational knowledge, skills, and concepts in a guided, progressive context of nursing education. Graded Pass/Not Pass - F, I, P, W Prerequisite: Completion of all courses in the Nursing Education Program and Good academic standing (GPA 3.0).

**NURSG 5366. PRINCIPLES OF RESEARCH IN NURSING. 3 Hours.**

This course focuses on integration of theoretical and empirical principles of nursing research to generate evidence for nursing practice. Prerequisite: Graduate Standing.

**NURSG 5367. EVIDENCE BASED PRACTICE. 3 Hours.**

Preparation to lead evidence-based practice teams, to interpret best evidence, to plan for change, to evaluate outcomes, and to disseminate the project. Prerequisite: Graduate standing; NURS 5366 and NURS 5327.

**NURSG 5371. PEDIATRIC PRIMARY CARE CLINICAL PRACTICE 1. 3 Hours.**

Initial clinical preceptorship in selected primary health practice sites with opportunities to apply knowledge and concepts of advanced nursing practice implementing the pediatric nurse practitioner role in evidenced based patient care. Prerequisite: NURS 5465. Good academic standing (GPA 3.0) or Certificate program standing.

**NURSG 5372. PEDIATRIC PRIMARY CARE CLINICAL PRACTICE 2. 3 Hours.**

Continue clinical preceptorship in selected primary health practice sites with opportunities to apply knowledge and concepts of advanced nursing practice implementing the pediatric nurse practitioner role in evidenced based patient care. Prerequisite: NURS 5371 or concurrent enrollment. Good academic standing (GPA 3.0) or Certificate Program Standing.

**NURSG 5373. PEDIATRIC ACUTE CARE CLINICAL PRACTICE 1. 3 Hours.**

Initial clinical preceptorship in selected acute and chronic care health practice sites with opportunities to apply knowledge and concepts of advanced nursing practice implementing the pediatric acute care nurse practitioner role in evidenced based patient care. Prerequisite: NURS 5467 or concurrent enrollment. NURS 5466 or concurrent enrollment. Good academic standing (GPA 3.0) or Certificate program standing.

**NURSG 5374. PEDIATRIC ACUTE CARE CLINICAL PRACTICE 2. 3 Hours.**

Continue clinical preceptorship in selected acute and chronic care health practice sites with opportunities to apply knowledge and concepts of advanced nursing practice implementing the pediatric nurse practitioner role in evidenced based patient care. Prerequisite: NURS 5466; NURS 5373 or concurrent enrollment. Good academic standing (GPA 3.0) or Certificate program standing.

**NURSG 5382. NURSING AND HEALTH CARE POLICY: ISSUES AND ANALYSIS. 3 Hours.**

Analyze historical, current, and predicted national, state, and local health care policy processes. Prerequisite: NURS 5367.

**NURSG 5388. STATISTICS FOR HEALTH CARE. 3 Hours.**

This course provides students with the basic knowledge and skills to effectively use biostatistics in different research design and data analysis, and to understand articles in related professional journals. Topics include choosing correct statistical methods and study designs in nursing research and practice; descriptive statistics; probability and probability distributions; estimation and hypothesis testing, simple linear regression, introduction to analysis of variance and an introduction to the use of statistical software packages. Prerequisite: Undergraduate Statistics.

**NURSG 5432. FAMILY I. 4 Hours.**

This course focuses on advanced concepts and knowledge for nurse practitioner primary care management of designated acute, chronic and complex health problems of individuals and families across the lifespan. Particular emphasis will be on pediatric wellness, women's health, men's health, and geriatrics concepts and conditions. Prerequisite: NURS 5418 or NURS 5220 and NURS 5120 and NURS 5130; NURS 5334 or Certificate Program standing.

**NURSG 5433. FAMILY II. 4 Hours.**

This course focuses on advanced concepts and knowledge for nurse practitioner primary care management of commonly occurring conditions seen in primary care patients across the lifespan. Prerequisite: NURS 5418 or NURS 5220 and NURS 5120 and NURS 5130; NURS 5334 or Certificate Program standing.

**NURSG 5434. FAMILY III. 4 Hours.**

This course focuses on advanced concepts and knowledge for nurse practitioner primary care management of designated acute, chronic and complex health problems of individuals and families across the lifespan. Particular emphasis will be on adult wellness, psychiatric, and cardiometabolic concepts and conditions. Prerequisite: NURS 5418 or NURS 5220 and NURS 5120 and NURS 5130; NURS 5334 or Certificate Program standing.

**NURSG 5450. NEONATAL NP CLINICAL PRACTICE. 4 Hours.**

Integration of clinical management of the high-risk neonate through clinical preceptorships in selected health practice sites with application of knowledge, skills and concepts in a guided, progressive context of advanced nursing practice. The ratio of credit to clinical hours is 1:4. Prerequisites: NURS 5334 and NURS 5316 or NURS 5220 and NURS 5110 and NURS 5204 and NURS 5537 or concurrent enrollment and Good academic standing (GPA 3.0) or Certificate Program Standing.

**NURSG 5461. ADULT GERONTOLOGY MANAGEMENT ACROSS THE CONTINUUM OF CARE. 4 Hours.**

Foundations of advanced knowledge of common acute and chronic health problems in adolescents, adults, and elders across health care settings. Prerequisite: NURS 5220; NURS 5120 and NURS 5334, and NURS 5367 or concurrent enrollment, or Certificate Program Standing.

**NURSG 5610. NEONATAL NP ADVANCED PRACTICUM. 6 Hours.**

Clinical preceptorships in selected health practice sites with opportunities to apply knowledge, skills and concepts in a guided, progressive context of neonatal advanced nursing practice. The ratio of credit to clinical hours is 1:4. Prerequisite: NURS 5447 and NURS 5450. Good Academic Standing (GPA 3.0) or Certificate Program Standing.

**NURSG 5640. ADULT GERONTOLOGY ACUTE CARE NP ADVANCED PRACTICUM. 6 Hours.**

Clinical preceptorships in selected health practice sites with opportunities to apply knowledge, skills and concepts in a guided, progressive context of adult gerontology acute care advanced nursing practice. The ratio of credit to clinical hours is 1:4. Prerequisite: For NURS 5640: NURS 5354 and NURS 5355. Good Academic Standing (GPA 3.0) or Certificate Program Standing. For NURSC 5640: NURSC 5354 and NURSC 5355. Good Academic Standing (GPA 3.0) or Certificate Program Standing.

**NURSG 5645. ADULT GERONTOLOGY PRIMARY CARE NP ADVANCED PRACTICUM. 6 Hours.**

Clinical preceptorships in selected health practice sites with opportunities to apply knowledge, skills and concepts in a guided, progressive context of adult gerontology primary care advanced nursing practice. The ratio of credit to clinical hours is 1:4. Prerequisite: For NURS 5645: NURS 5352 and NURS 5353. Good Academic Standing (GPA 3.0) or Certificate Program Standing. For NURSC 5645: NURSC 5352 and NURSC 5353. Good Academic Standing (GPA 3.0) or Certificate Program Standing.

**NURSG 5650. PSYCHIATRIC MENTAL HEALTH NP ADVANCED PRACTICUM. 6 Hours.**

Clinical preceptorships in selected health practice sites with opportunities to apply knowledge, skills and concepts in a guided, progressive context of family psychiatric mental health care advanced nursing practice. The ratio of credit to clinical hours is 1:4. Prerequisite: NURS 5324 and NURS 5325. Good Academic Standing (GPA 3.0) or Certificate Program Standing.

**NURSG 5680. PEDIATRIC ACUTE CARE NP ADVANCED PRACTICUM. 6 Hours.**

Clinical preceptorships in selected health practice sites with opportunities to apply knowledge, skills and concepts in a guided, progressive context of pediatric acute care advanced nursing practice. The ratio of credit to clinical hours is 1:4. Prerequisite: For NURS 5680: NURS 5373 and NURS 5374. Good Academic Standing (GPA 3.0) or Certificate Program standing. For NURSC 5680: NURSC 5373 and NURSC 5374. Good Academic Standing (GPA 3.0) or Certificate Program standing.

**NURSG 5685. PEDIATRIC PRIMARY CARE NP ADVANCED PRACTICUM. 6 Hours.**

Clinical preceptorships in selected health practice sites with opportunities to apply knowledge, skills and concepts in a guided, progressive context of pediatric primary care advanced nursing practice. The ratio of credit to clinical hours is 1:4. Prerequisite: For NURS 5685: NURS 5371 and NURS 5372. Good Academic Standing (GPA 3.0) or Certificate Program Standing. For NURSC 5685: NURSC 5371 and NURSC 5372. Good Academic Standing (GPA 3.0) or Certificate Program Standing.

**COURSES****NURSGIS 5170. INDEPENDENT STUDY IN NURSING. 1 Hour.**

Detailed in-depth study in a specific topic area. Topic and mode of study are agreed upon by student(s) and instructor prior to registration. May be repeated for credit when topics vary. Graded F, P, R. Prerequisite: Graduate standing.

**NURSGIS 5270. INDEPENDENT STUDY IN NURSING. 2 Hours.**

Detailed in-depth study in a specific topic area. Topic and mode of study are agreed upon by student(s) and instructor prior to registration. May be repeated for credit when topics vary. Graded F, P, R. Prerequisite: Graduate Standing and permission of instructor.

**NURSGIS 5370. INDEPENDENT STUDY IN NURSING. 3 Hours.**

Detailed in-depth study in a specific topic area. Topic and mode of study are agreed upon by student(s) and instructor prior to registration. May be repeated for credit when topics vary. Graded F,R,P,W. Permission of instructor. Graduate standing.

**COURSES****NURSU 3300. COOPERATIVE NURSING WORK EXPERIENCE. 3 Hours.**

Designed for nursing cooperative education students to integrate classroom study with career-related practical experience in the workplace. Must earn a C or better to earn credit. Prerequisite: Admission into nursing degree program.

**NURSU 3309. MEDICAL TERMINOLOGY FOR HEALTHCARE PROVIDERS. 3 Hours.**

This course will enable the student to speak, use, and understand commonly used terms in the healthcare field. This course can be used as the upper division elective. Formerly taught as BIOL 3309. Credit will not be given for both.

**NURSU 3315. RN-BSN HOLISTIC HEALTH ASSESSMENT ACROSS THE LIFESPAN. 3 Hours.**

Theory and practice of holistic health assessment of individuals and families across the life span designed for the registered nurse. RN-BSN students only. Prerequisite: NURS 3345.

**NURSU 3325. RN-BSN HOLISTIC CARE OF THE OLDER ADULT. 3 Hours.**

Introduction to gerontologic nursing principles and standards. Selected concepts and issues related to aging and its impact on society and health care. RN-BSN students only. Previously listed as NURS 3322. Prerequisite: NURS 3345.

**NURSU 3335. RN-BSN PROMOTING HEALTHY LIFESTYLES. 3 Hours.**

Focus on health promotion and disease preventions strategies that promote healthy lifestyles and empower individuals, families, and populations to achieve optimal health and wellness. The role of the nurse in health promotion is emphasized. Students will examine the impact of nurses' overall wellness on patient safety. RN-BSN students only. Previously NURS 3435. Prerequisite: NURS 3345.

**NURSU 3345. ROLE TRANSITION TO PROFESSIONAL NURSING. 3 Hours.**

Course addresses the role transition to Professional Nursing, nursing theory, ethics, decision making, critical thinking/clinical judgment, introduction to evidence-based practice, and informatics/technology in practice. Identifies strategies for personal and professional empowerment. Prerequisite: Admission into nursing degree program.

**NURSU 3352. THE LEGACY OF THE FAMILY. 3 Hours.**

Explore and enhance understanding and application of the principles of family science knowledge in therapeutic relationships with families across the lifespan.



**NURSU 3375. RN-BSN HEALTH POLICY, LEGAL ASPECTS AND INFORMATICS IN NURSING. 3 Hours.**

This course provides an introduction to legal and ethical concepts, values, and behaviors necessary for transitioning to a professional nursing role. Topics include health care policy development, legal overview and peer-review process, health care informatics, economic and political issues, laws, rules, challenges, boundaries, malpractice and societal issues and trends influencing health care. Prerequisite: NURS 3345.

**NURSU 4300. COOPERATIVE NURSING WORK EXPERIENCE. 3 Hours.**

Designed for nursing cooperative education student to integrate classroom study with career-related practical experience in the workplace. Prerequisite: NURS-EL 3300 or NURS 3300.

**NURSU 4325. RN-BSN NURSING RESEARCH. 3 Hours.**

Basic concepts, processes and applications of nursing research. Research role of the nurse in decision making and clinical practice. RN-BSN students only. Prerequisite: ENGL 2338 or equivalent, Math 1308 or equivalent, and NURS 3345 or NURS 3645.

**NURSU 4455. RN-BSN NURSING LEADERSHIP & MANAGEMENT. 4 Hours.**

Exploration of organizational strategies, leadership theories and societal trends with implications for decision making in health care. Introduction to management skills needed by professional nurses with clinical application in diverse settings. RN-BSN students only. Prerequisite: NURS 3345.

**NURSU 4465. RN-BSN POPULATION AND COMMUNITY HEALTH NURSING. 4 Hours.**

Integrates knowledge from nursing theory and public health science in assessing health care needs of aggregates, communities, and society for the Registered Nurse. RN-BSN students only. Prerequisite: NURS 3345.

**NURSU 4685. RN-BSN CAPSTONE. 6 Hours.**

Synthesis of knowledge acquired in the RN-BSN curriculum and development of the Nurse Role with evolving professional issues, health care environment, lifelong learning, and promotion of the Nursing profession designed for Registered Nurses RN-BSN student only. Prerequisite: NURS 4325, NURS 4455 Corequisite: NURS 4465.

## COURSES

**OPMA 3306. OPERATIONS MANAGEMENT. 3 Hours.**

Introduction to concepts and problem-solving techniques important in operations management and production management. Topics include demand forecasting, capacity management, resource allocation, inventory management, supply chain management, quality control, project management. Prerequisite: Concurrent enrollment with BSTAT 3321 or BSTAT 3322.

**OPMA 3308. OPERATIONS PLANNING AND CONTROL. 3 Hours.**

Course covers operations planning and control systems in manufacturing and service organizations. Topics include inventory control, material requirements planning, Just-in-Time and lean manufacturing, production scheduling, capacity planning, operations planning and control software. Prerequisite: OPMA 3306.

**OPMA 3310. PROJECT MANAGEMENT. 3 Hours.**

Course covers concepts and issues important in effectively managing projects. Topics include project selection, project planning, negotiation, budgeting, scheduling, resource allocation, project control, project auditing, and project termination. Corequisite: OPMA 3306.

**OPMA 4191. STUDIES IN OPERATIONS MANAGEMENT. 1 Hour.**

Advanced studies, on an individual basis, in the various fields of operations management. May be repeated for credit with consent of department chair. Prerequisite: 90 credit hours and permission of instructor.

**OPMA 4291. STUDIES IN OPERATIONS MANAGEMENT. 2 Hours.**

Advanced studies, on an individual basis, in the various fields of operations management. May be repeated for credit with consent of department chair. Prerequisite: 90 credit hours and permission of instructor.

**OPMA 4302. SUPPLY CHAIN LOGISTICS. 3 Hours.**

Physical supply, in-plant movement and storage, and physical distribution which comprise logistics systems in industry. Topics include facility location, transportation, warehousing, inventory control, distribution networks, and logistics information systems. Prerequisite: OPMA 3306.

**OPMA 4303. INTRODUCTION TO MANAGEMENT SCIENCES. 3 Hours.**

Introduction to optimization and quantitative analysis of business problems. Topics include applications of linear and integer programming, network analysis, simulation, game theory, queuing theory, and other operations research tools. Prerequisite: OPMA 3306, may be taken concurrently.

**OPMA 4307. QUALITY PLANNING AND ANALYSIS. 3 Hours.**

Quality of products and services needed by society, to include consideration of quality costs and improvements, designing for quality, process controls, inspections, testing, acceptance sampling, management controls, and quality information systems. Prerequisite: OPMA 3306 and BUSA 3321/STAT 3321.

**OPMA 4309. GLOBAL SUPPLY CHAIN MANAGEMENT. 3 Hours.**

Course covers concepts and issues important in managing supply chains. A strategic view is taken of the way companies coordinate their operations with suppliers and customers in a global marketplace. The strategic use of information systems to better manage supply chains is also covered. Prerequisite: OPMA 3306 and OPMA 4302.

**OPMA 4310. SUPPLY CHAIN ANALYTICS-THEORY AND PRACTICE. 3 Hours.**

Analytics is used to assist decision makers to make well-informed data-driven decisions. The course covers Analytics techniques and tools used in Supply Chain. It covers various quantitative techniques and advanced technologies, such as data mining, big data, statistics, etc. In addition to learning concepts, students will also learn widely used advanced tools hands-on. Prerequisite: OPMA 3306 and basic computer knowledge.

**OPMA 4312. PURCHASING MANAGEMENT. 3 Hours.**

Examines the purchasing management role and responsibilities in the firm. This will cover issues of quality, solicitation techniques, source selection, pricing principles, legal aspects, value analysis, purchasing systems and ongoing administration of commercial, industrial and government contracts. Prerequisite: OPMA 3306 and OPMA 4302.

**OPMA 4314. SERVICE OPERATIONS. 3 Hours.**

Service operations make up the fastest-growing segment in economies throughout the developed world. This course is intended to help emerging business leaders understand challenges and opportunities inherent in the unique nature of service operations. This course emphasizes both strategic and tactical decision-making, with a focus on the effective design, delivery and improvement of service outputs. Prerequisite: OPMA 3306.

**OPMA 4331. SEMINAR IN OPERATIONS MANAGEMENT. 3 Hours.**

Readings and discussion of special topics in operations management. May be repeated for credit with consent of department chair. Prerequisite: Junior or senior standing and consent of instructor.

**OPMA 4391. STUDIES IN OPERATIONS MANAGEMENT. 3 Hours.**

Advanced studies, on an individual basis, in the various fields of operations management. May be repeated for credit with consent of department chair. Prerequisite: 90 credit hours and permission of instruction.

**OPMA 4393. OPERATIONS MANAGEMENT INTERNSHIP. 3 Hours.**

Practical training in operations management. Analysis of theory applied to real life situations. May be used as an advanced business elective only; graded on a pass/fail basis. No credit will be given for previous experience or activities. May not be repeated for credit. Prerequisite: Junior standing and consent of department internship advisor.

**OPMA 5199. GRADUATE OPERATIONS MANAGEMENT INTERNSHIP. 1 Hour.**

Practical training in operations management. Analysis of theory applied to real life situations. Course counts as an elective and has a pass/fail grade. No credit will be given for previous experience or activities.

**OPMA 5299. GRADUATE OPERATIONS MANAGEMENT INTERNSHIP. 2 Hours.**

Practical training in operations management. Analysis of theory applied to real life situations. Course counts as an elective and has a pass/fail grade. No credit will be given for previous experience or activities.

**OPMA 5321. INTRODUCTION TO MANAGEMENT SCIENCES. 3 Hours.**

Introduction to optimization and quantitative analysis of business problems. Topics include applications of linear and integer programming, network analysis, simulation, game theory, queuing theory, and other operations research tools.

**OPMA 5361. OPERATIONS MANAGEMENT. 3 Hours.**

Introduction to concepts and problem-solving techniques important in production management and operations management. Topics include demand forecasting, capacity management, resource allocation, inventory management, supply chain management, quality control, and project management. Prerequisite: BSTAT 5301 or equivalent.

**OPMA 5362. SERVICES OPERATIONS. 3 Hours.**

Service operations make up the fastest-growing segment in economies throughout the developed world. This course is intended to help emerging business leaders understand challenges and opportunities inherent in the unique nature of service operations. This course emphasizes both strategic and tactical decision-making, with a focus on the effective design, delivery and improvement of service outputs. Prerequisite: OPMA 5361.

**OPMA 5363. OPERATIONS PLANNING AND CONTROL. 3 Hours.**

Course covers operations planning and control systems in manufacturing and service organizations. Topics include inventory control, material requirements planning, Just-In-Time and lean manufacturing, production scheduling, capacity planning, and operations planning and control software. Previous introductory course in operations management suggested.

**OPMA 5364. PROJECT MANAGEMENT. 3 Hours.**

Course covers concepts and issues important in effectively managing projects. Topics include project selection, project planning, negotiation, budgeting, scheduling, resource allocation, project control, project auditing, and project termination.

**OPMA 5365. PURCHASING MANAGEMENT. 3 Hours.**

Examines the purchasing management role and responsibilities in the firm. This will cover issues of quality, solicitation techniques, source selection, pricing principles, legal aspects, value analysis, purchasing systems and ongoing administration of commercial, industrial and government contracts. Prerequisite: OPMA 5361 and OPMA 5369.

**OPMA 5367. QUALITY MANAGEMENT. 3 Hours.**

Course focuses on quality of products and services needed by society. Topics include consideration of quality cost and improvements, designing for quality, process controls, inspections, testing, acceptance sampling, management controls, and quality information systems. Previous introductory course in statistics suggested.

**OPMA 5368. GLOBAL SUPPLY CHAIN MANAGEMENT. 3 Hours.**

Course covers concepts and issues important in managing supply chains. A strategic view is taken of the way companies coordinate their operations with suppliers and customers in a global marketplace. The strategic use of information systems to better manage supply chains is also covered. Previous introductory course in operations management suggested. Prerequisite: OPMA 5361 and OPMA 5369.

**OPMA 5369. SUPPLY CHAIN LOGISTICS. 3 Hours.**

Course covers physical supply, in-plant movement and storage, and physical distribution of materials, which comprise logistics systems in industry. Topics include facility location, transportation, warehousing, inventory control, distribution networks, and logistics information systems. Previous introductory course in operations management suggested. Prerequisite: OPMA 5361 or equivalent.

**OPMA 5379. ORGANIZATIONAL RESEARCH PROJECT. 3 Hours.**

Students conduct a research project at a local organization, focusing on applications of business concepts studied in their coursework. Prerequisite: Cohort MBA Major.

**OPMA 5382. INDEPENDENT STUDIES IN OPERATIONS MANAGEMENT. 3 Hours.**

Extensive analysis of an Operations Management topic.

**OPMA 5389. INDEPENDENT STUDIES IN MILITARY ACQUISITION. 3 Hours.**

This course is reserved for military officers in the Training with Industry or I-Grade programs at UT Arlington. Studies consist of an acquisition practicum with training at an assigned agency and a required seminar at UT Arlington.

**OPMA 5392. SELECTED TOPICS IN OPERATIONS MANAGEMENT. 3 Hours.**

In-depth study of selected topics in operations management. May be repeated when topics vary.

**OPMA 5399. GRADUATE OPERATIONS MANAGEMENT INTERNSHIP. 3 Hours.**

Practical training in operations management. Analysis of theory applied to real life situations. Course counts as an elective and has a pass/fail grade. No credit will be given for previous experience or activities.

**OPMA 5689. INDEPENDENT STUDIES IN MILITARY ACQUISITION. 6 Hours.**

This course is reserved for military officers in the Training with Industry or I-GRAD programs at UT Arlington. Studies consist of an acquisition practicum with training at an assigned agency and a required seminar at UT Arlington.

**OPMA 5989. INDEPENDENT STUDIES IN MILITARY ACQUISITION. 9 Hours.**

This course is reserved for military officers in the Training with Industry or I-Grade programs at UT Arlington. Studies consist of an acquisition practicum with training at an assigned agency and a required seminar at UT Arlington.

**OPMA 6370. SEMINAR IN OPERATIONS MANAGEMENT. 3 Hours.**

Doctoral seminar that is a comprehensive and integrative study of operations management that focuses on theoretical frameworks, applications of models, and methods of analysis. Prerequisite: Doctoral standing.

**OPMA 6371. INTEGRATED OPERATIONS STRATEGY AND RESEARCH. 3 Hours.**

Linkages between the manufacturing and strategy development functions. Research issues within production/operations management. Current techniques/designs for achieving effective research. Prerequisite: Doctoral standing and previous introductory course in operations management suggested.

**OPMA 6380. RESEARCH IN OPERATIONS MANAGEMENT. 3 Hours.**

Independent research under the supervision of a faculty member. May be repeated for credit. Prerequisite: Doctoral standing.

**OPMA 6382. INDEPENDENT STUDIES IN OPERATIONS MANAGEMENT. 3 Hours.**

Extensive analysis of an operations management topic.

**OPMA 6392. SPECIAL TOPICS IN OPERATIONS MANAGEMENT. 3 Hours.**

Advanced doctoral level topics in Operations Management. May be repeated when topics vary. Prerequisite: Doctoral standing.

## COURSES

**PAPP 4307. URBAN GEOGRAPHY. 3 Hours.**

Emphasizes real aspects associated with urban physical environments and social, behavioral and financial processes that shape these environments.

**PAPP 5160. URBAN MANAGEMENT/PLANNING INTERNSHIP. 1 Hour.**

Intended to enhance readiness for professional work through exposure to planning practice in a one semester log internship (100 hrs in the spring or fall semester or 75 hrs in the summer). Integrates work experience and coursework through journaling and reflective practice. Requirements: (1) student secures an internship from a planning related employer and approval from the student's major professor prior to enrolling in the course; (2) the intern must provide performance evaluation by the job supervisor and the intern's evaluation of the internship experience. Enrollment open to students with no previous formal planning experience. Credit not available for previous internship or planning experience. P/F grade.

**PAPP 5300. FOUNDATION OF URBAN THEORY. 3 Hours.**

Social theories that explain the life cycle of urban communities as they develop, expand, and are sustained or decay are presented and contrasted. Special consideration is given to role of social policy. Topics such as poverty, race, neighborhoods, and environment are addressed.

**PAPP 5301. FOUNDATIONS OF URBAN POLITICS AND ECONOMICS. 3 Hours.**

Examines the major political and economic institutions and processes in urban communities and their effect on urban policy.

**PAPP 5302. FOUNDATIONS OF URBAN RESEARCH AND ANALYSIS. 3 Hours.**

An introduction to research methodologies, both quantitative and qualitative, and statistical techniques useful in the analysis of urban trends and administrative programs.

**PAPP 5303. THE METROPLEX: SURVEY OF URBAN AFFAIRS, PLANNING, ADMINISTRATION. 3 Hours.**

The Metroplex provides an ideal laboratory for study with more than 100 cities and other governmental units, thousands of neighborhoods and business enterprises, major concentration of minorities and dozens of ethnic groups. An in-depth orientation on urban dynamics utilizing senior faculty members, governmental and community leaders, and current research reports and studies.

**PAPP 5304. URBAN POLITICS. 3 Hours.**

Examination of the city as a political system, including the impact of urbanization and fragmentation on policies; input dimensions, including voting patterns and interest group development; decision-making structures, especially types of community power structures and the impact of the reform movement on structural processes. Also offered as POLS 5305; credit will be granted only once.

**PAPP 5305. THEORIES OF URBAN SOCIETY. 3 Hours.**

Several theoretical perspectives of the community and community organization examined. Special emphasis given to theories from human ecology, organization and stratification, and social welfare.

**PAPP 5306. THE URBAN ECONOMY. 3 Hours.**

Internal dynamics of the growth and development of the urban system and its relation to the national economy. National and urban economic policy, urban growth and land use, market imperfections, urban financial issues, and the environmental implications of urban growth studied through lecture, game simulation and policy debates.

**PAPP 5307. URBAN GEOGRAPHY. 3 Hours.**

Emphasizes real aspects associated with urban physical environments and social, behavioral and financial processes that shape these environments.

**PAPP 5308. URBAN HISTORY. 3 Hours.**

Extensive reading primarily in the history of the urbanization and metropolitanization of the people of the United States. Historical methods as exemplified in the works of leading historians and analyzed; examples of the scholarship of selected historians and treatises on selected cities, regions, and urban institutions studied.

**PAPP 5309. LOCAL POLITICS IN THE INTERGOVERNMENTAL SETTING. 3 Hours.**

Critical analysis of the implications of federalism, and the changing nature of intergovernmental relations on state and local management, administration, planning, and policy making.

**PAPP 5310. URBAN POLICY AND THE LAW. 3 Hours.**

Critical analysis of federal government and selected state and local government policies and programs designed to influence the course of change and the future development of cities and urban areas. The role of "private" governments in affecting policy explored.

**PAPP 5311. PUBLIC POLICY FORMATION AND ANALYSIS. 3 Hours.**

The course covers the policy process, policy formulation and provides an introduction to the tools and techniques of policy analysis, using multiple theoretical and analytical perspectives. The primary focus is on U.S. policy, with an emphasis on state and local policy issues. The course aims to provide students with a foundation in the theory, process, and tools of policy analysis, so that they are able to think critically about applied public policy problems and the role of policy analysts. Students will also gain practical skills in the development and presentation of policy analysis and recommendations.

**PAPP 5312. ECONOMIC POLICY. 3 Hours.**

Examines structure of the U.S. economic system and its impact on welfare of consumers, workers, and industry; public policy efforts to provide for management of critical economic variables are evaluated for effectiveness and equity as they impact different interest groups.

**PAPP 5313. COMMUNITY DEVELOPMENT. 3 Hours.**

Focuses on current problems of community development and neighborhood revitalization. Housing, community assets, the roles of community development corporations and social capital in cities, and community economic development will be analyzed. Federal, state, and local policies, with grassroots initiatives evaluated for effectiveness on promoting alternatives for community building and organizing. Also offered as PLAN 5324; credit will be granted only once.

**PAPP 5314. HEALTH POLICY. 3 Hours.**

Current health policy and programs, examination of historical development, economic and legal aspects, interest groups and health constituencies.

**PAPP 5315. URBAN EDUCATION POLICY. 3 Hours.**

Examines current education policy and programs, including public school districts, charter schools, and vouchers; economic and political aspects; role of adult education programs in improving human capital.

**PAPP 5316. HUMAN SERVICES. 3 Hours.**

Social welfare institutions: private and public; needs assessment, resource allocation, procedures, city/state/federal/private policy review; highlights of current system demands and changes. Offered as PLAN 5316 and PAPP 5344; credit will be granted only once.

**PAPP 5317. ENVIRONMENTAL POLICY. 3 Hours.**

Focuses on the physical environmental dimensions of urbanization including such factors as pollution, waste disposal, and land use; stresses the role of economic, social, and political institutions as these affect environmental quality of the city. Offered as PLAN 5342 and PAPP 5317; credit will be granted only once.

**PAPP 5318. SOCIAL WELFARE POLICY. 3 Hours.**

Examines recent welfare reform measures (federal, state, and local levels), the political issues behind them, and their influence on urban life. A central topic will be the impact of a changing society on social welfare policy needs, including analyses of labor force participation and family structure.

**PAPP 5319. URBAN PROBLEMS. 3 Hours.**

Specific urban problems examined in depth, traced to their historical origins to see how they or similar problems have been dealt with in other times and places. Students will then propose possible solutions to the problems in their contemporary form. Offered as PLAN 5347 and PAPP 5319.

**PAPP 5320. PUBLIC AND NON-PROFIT ORGANIZATION THEORY. 3 Hours.**

Historical evolution of administrative theory including classical, sociological and social-psychological dimensions; decision-making theory; implications of public interest theory for public and non-profit management; basic concepts of organization development and impact on public administration paradigms; new public administration; and future of public and nonprofit urban organization. Also offered as CRCJ 5309 and POLS 5303; credit will be granted only once.

**PAPP 5321. URBAN MANAGEMENT. 3 Hours.**

Focuses through lectures, readings, and exercises on major administrative process: personnel and policy development and analysis; management styles and key contemporary management problems explored through presentations by prominent local practitioners.

**PAPP 5322. POLITICS AND POLICY IN PUBLIC AND NON-PROFIT MANAGEMENT. 3 Hours.**

Development of theory of bureaucracy; bureaucracy as social issue; ethics and morality in public and non-profit bureaucracy; mobilization of special interest support; power differentials in urban agencies; policy process in bureaucracy; new bureaucratic structures and processes for urban policy making.

**PAPP 5323. MANAGING CHANGE IN PUBLIC AND NON-PROFIT SERVICES. 3 Hours.**

Current theories and concepts of public and non-profit organizational change with particular emphasis on organization development and action research; theoretical roots of contemporary change literature traced through readings and discussion of classical organization theory, public administration including New Public Administration decision making, public interest, phenomenology, learning theory and general systems. Prerequisite: Basic organizational theory course or permission of instructor.

**PAPP 5324. URBAN PUBLIC FINANCE. 3 Hours.**

Local urban governments increasingly rely less and less on support from the state and federal governments. Many local governments rely heavily on a limited number of taxes and fees to finance services. This course explores the variety of revenue sources and fiscal problems of cities and local governments in metropolitan areas. This includes the topics of tax burden and tax equity. The second half of the course focuses on the unique challenges of financing the diversity of activities that cities in particular support, e.g. housing, transportation, economic and community development and human services. Offered as PAPP 5324 and PLAN 5329; credit will be granted only once.

**PAPP 5325. ADMINISTRATIVE LAW. 3 Hours.**

Examines scope and role of administrative regulation of and by governmental agencies; explores constitutional principles which limit administrative power and administrative law which governs classical areas of conflict between administrative agencies and their constituencies; rule-making, judicial review and informal regulatory processes of importance to public officials.

**PAPP 5326. PUBLIC BUDGETING. 3 Hours.**

This course introduces students to the principles and practices used by federal, state, and local governments to acquire and spend revenues within the context of American democracy, capitalism, federalism, and economics. The primary objective of this course is to provide students with the practical skills and theoretical knowledge to enable them to be effective participants in the budgeting process and critical consumers and producers of research relevant to public budgeting. Offered as PLAN 5328 and PAPP 5326. Credit will be granted only once.

**PAPP 5327. COMPARATIVE ADMINISTRATION AND POLICY. 3 Hours.**

Extensive, multidisciplinary exposure to concepts and models of administration in developed and modernizing countries; role of the military, bureaucracy and traditional elites in development; practices and concepts of strategies for effective change.

**PAPP 5328. SMALL CITY MANAGEMENT. 3 Hours.**

This course will focus on problems peculiar to small cities, including administrative law; personnel, planning; public works, public safety; human services; budget and finance; public relations and parks and recreation.

**PAPP 5329. FINANCIAL MANAGEMENT IN THE PUBLIC AND NON-PROFIT SERVICES. 3 Hours.**

Overview of the principles of finance as they apply to the public and non-profit services, financial reporting for state and local governments and non-profit organizations and evaluation.

**PAPP 5330. COMMUNITY AND NEIGHBORHOOD ORGANIZATION. 3 Hours.**

Structure and processes in the analysis and development of community and neighborhood organizations; special emphasis given to poverty and minority communities and neighborhoods.

**PAPP 5331. LAND USE PLANNING AND THE LAW. 3 Hours.**

Explores the law of land use in the context of the American legal, economic, and political systems. Examines leading court decisions and precedents for their background, content, and applicability to contemporary land use. Offered as PLAN 5316 and PAPP 5331. Credit will be granted only once.



**PAPP 5332. PUBLIC CAPITAL BUDGETING. 3 Hours.**

Examines governmental capital budgeting processes with a focus on understanding the significance of capital improvement planning, public facility investment, and project evaluation to sound infrastructure financing and regional economic growth. Governments purchase or construct long-lasting physical assets or facilities financed mostly through borrowing. This course aims to understand the rationale for public capital budgeting and debt instruments used to finance capital investment in the political context of public budgeting in America.

**PAPP 5333. GOVERNMENTAL AND NONPROFIT ACCOUNTING. 3 Hours.**

This course is designed as an introduction to governmental and nonprofit accounting. The course reviews major fund accounting principles, accounting for budgetary, revenue, and expenditure funds, accounting for general capital assets and long-term liabilities, accounting for fiduciary and proprietary funds, auditing practices, and financial reporting unique to government and non-profit organizations.

**PAPP 5334. MANAGEMENT OF ECONOMIC DEVELOPMENT. 3 Hours.**

This course focuses on the knowledge, organization, politics, issues, techniques and processes of local economic development. Emphasis is placed on contemporary issues and trends in the rich, dynamic laboratory of local economic development in Texas. Learning objectives include: 1) comprehension of basic techniques and issues such as strategic planning, leadership strategies, financial options and evaluation; 2) increased knowledge of the positive potential of thoughtful economic development for local environmental, infrastructure, and revenue challenges; and 3) enhanced professional development through individual and classroom exposure to successful practitioners.

**PAPP 5341. PROFESSIONAL REPORT WRITING. 3 Hours.**

The course aims to build professional writing skills. It reviews memo and report writing including grammatical construction, identifying and writing for a targeted audience, and writing in a clear, concise, and professional style. Also offered as PLAN 5335; credit will be granted for only one.

**PAPP 5342. INTERMEDIATE DATA ANALYSIS. 3 Hours.**

An intermediate level examination of statistical and research techniques appropriate to urban and social analysis. Presuming a basic understanding of descriptive and inferential statistics, the course covers multivariate regression, including error analysis and non-linear models, path analysis, ANOVA, logit and probit models, and techniques for data reduction (e.g., factor analysis). Offered as PAPP 5342 and PLAN 5317; credit will be granted only once. Prerequisite: PAPP 5302.

**PAPP 5343. APPLIED URBAN ANALYSIS. 3 Hours.**

Group and individual projects to develop research studies or strategies, data reports for local government, agency or citizen group; techniques appropriate to task utilized. P/F only.

**PAPP 5344. QUALITATIVE METHODS. 3 Hours.**

The study of qualitative research and analysis methods. Offered as PLAN 5346 and PAPP 5344; credit will be given only once.

**PAPP 5345. EVALUATION RESEARCH. 3 Hours.**

Methodological issues in evaluating public programs; identification of variables, indicators and analyses formats presented. Prerequisite: PAPP 5302.

**PAPP 5346. BIG DATA AND PUBLIC POLICY ANALYSIS. 3 Hours.**

An examination of the data competencies and quantitative techniques necessary for policy analysis, with a special emphasis on big data and policy analysis. Increasingly, the rise and aggregation of what is commonly referred to as "big data" has raised many questions about the potential of this data for informing public policy as well as the tools and techniques appropriate for analysis. This course focuses on questions as to what constitutes big data, what sources of big data have relevance for public policy analysis, and concerns related to generalizability, reliability and validity. The course presumes a basic understanding of the basic statistical and research techniques taught in PAPP 5302 and PAPP 5342 (or equivalents from other departments). It builds on this foundation to analyze the tools and techniques appropriate for big data analysis in the field of public policy. The purpose of the course is to prepare students to understand what constitutes big data and evaluate the potential and limitations of its use in policy analysis. Students will be responsible for analyzing a source of big data, evaluating its research potential, and communicating the results of the analysis in a professional manner.

**PAPP 5347. DEMOGRAPHIC METHODS. 3 Hours.**

Examination of sources of data-census, vital statistics, special surveys, reports, special studies; techniques of analysis with particular emphasis on growth and projection models, interpretation of findings as a major policy area in urban analysis.

**PAPP 5348. COST BENEFIT ANALYSIS. 3 Hours.**

Reviews theory of cost-benefit and cost-effective analyses; explores the research, measurement and methodological requirements for the assessments of costs and benefits. It is recommended that students have completed at least one graduate course in research and one graduate class in public finance.

**PAPP 5349. RESEARCH DESIGN IN PUBLIC POLICY. 3 Hours.**

Application of research issues, writing, and communication skills in public policy. Designed to assist students in preparing their research for master's thesis or project report. Also offered as PLAN 5380. Credit can only be granted once.

**PAPP 5350. INTRODUCTION TO PUBLIC ADMINISTRATION. 3 Hours.**

This is a graduate level introductory course designed to give students an understanding of public administration as a field of academic inquiry and professional practice within the context of American federalism, democratic values, institutional dynamics, and bureaucratic politics. In addition to contextually defining public administration, the course addresses government reform, intergovernmental relations, public ethics, organizational dynamics and behavior, personnel issues, budgeting, and e-governance.

**PAPP 5351. HUMAN RESOURCE MANAGEMENT IN GOVERNMENT AND NON-PROFITS. 3 Hours.**

The purpose of this course is to familiarize students with key functions of government and non-profit personnel systems, discuss various theoretical approaches and techniques, and understand the major legal requirements of public and non-profit personnel management. The course examines the structure, role, and evolution of the Civil Service, current personnel policies, and personnel management tasks such as examination, recruitment, position classification, and collective bargaining.

**PAPP 5352. CONFLICT RESOLUTION IN THE PUBLIC AND NONPROFIT MANAGEMENT. 3 Hours.**

Labor management at all levels of government and non-profits, ability to work together to solve problems. Emphasis on collective and interest based bargaining, mediation, labor management partnership. Simulation exercises teach dynamics of bargaining, negotiation, problem solving, and small group dynamics.

**PAPP 5353. REFORM AND INNOVATION IN URBAN PUBLIC AND NON-PROFIT MANAGEMENT. 3 Hours.**

Designed to acquaint students with urban governance and non-profit reform and innovation. Course will explore how reformed government differs from traditional bureaucracy by contrasting it with entrepreneurial government and other innovations. Examines some of the areas most in need of reform, including service delivery, organizational capacity, and fiscal decentralization.

**PAPP 5354. NONPROFIT MANAGEMENT AND SOCIAL ENTREPRENEURSHIP. 3 Hours.**

This course prepares students to be entrepreneurs, innovators and change leaders by using social entrepreneurship perspective to examine leadership and management practices of nonprofit organizations. Through hands-on experiential training, developing skills in needs assessment, and formulating interventions for social change, students develop a blueprint of a nonprofit organization that takes an innovative approach for sustainable solutions of social problems.

**PAPP 5355. NONPROFIT ORGANIZATIONS IN PUBLIC POLICY. 3 Hours.**

This course examines non-profits as community institutions with an outward focus: the political, economic, and inter-organizational environment, fund-raising and financial management, community relations and needs assessment, the role of the volunteers, boards and community leaders, marketing, and legal and government issues.

**PAPP 5356. ENTREPRENEURSHIP IN PUBLIC AND NON-PROFIT MANAGEMENT. 3 Hours.**

Public and non-profit entrepreneurship involves the use of public powers, and partnerships with individuals, firms and other organizations, to achieve public purposes. The focus will be on creative management techniques and methods employed in managing the public and non-profit sectors.

**PAPP 5357. STRATEGIC MGT AND PLANNING IN PUBLIC AND NON-PROFIT SERVICES. 3 Hours.**

Readings and case studies of strategic planning and management in the public and non-profit sectors; application of principles to an actual situation, involving stakeholder identification, environmental scanning, and formulation of mission statements, goals, and strategies. Offered as PLAN 5312 and PAPP 5357. Credit will be granted only once.

**PAPP 5358. ETHICS IN THE PUBLIC SERVICE. 3 Hours.**

This course examines public service theoretical ethics literature to provide a basis for each student to both reflect upon and expand their comprehension of the values and processes of ethical decision making. Beyond theoretical works, it addresses the application and evaluation of theory against the professional, workaday reality of case studies, ethical codes and other relevant materials. Three major learning objectives are: 1) achievement of a solid understanding of the dominant theoretical perspectives in the public service ethics literature; 2) competency in the development of guidelines and procedures that encourage ethical behavior, and 3) enhancement of the reach and resiliency of each member's personal commitment to public service ethics.

**PAPP 5359. ORGANIZATIONAL DIAGNOSIS. 3 Hours.**

This class deals with tools and techniques necessary to manage public organizations. The learning objectives include ability to conduct an organizational diagnostic; and familiarity with group procedures and facilitation techniques involved in organizational change.

**PAPP 5360. PUBLIC AND NON-PROFIT MANAGEMENT INTERNSHIP. 3 Hours.**

Designed to integrate work experience and coursework through a series of brief work-related assignments; presentations by local planning and management practitioners and class discussions and exercises. Enrollment is open to both pre-entry and in-career students. Formal internship placements with agency mentors will be arranged. P/F only.

**PAPP 5361. INTERNATIONAL ORGANIZATIONS. 3 Hours.**

The course focuses on the rise of governmental and nongovernmental organizations in geopolitics, international development, and environmental management. It analyzes their institutional histories, their organizational structures and cultures, and their role as institutional policy actors in the global diffusion of policy initiatives and managerial knowledge and practices.

**PAPP 5362. URBAN DIVERSITY. 3 Hours.**

Examines the growing spatial and social diversity of cities; how physical as well as socioeconomic urban structures have fostered race, class, and gender inequalities; how urban policies have addressed and can address these issues. Offered as PLAN 5362 and PAPP 5362.

**PAPP 5363. CIVIL RIGHTS AND URBAN MINORITIES. 3 Hours.**

Examines the changes in and growth of the civil rights of minorities in the United States from the close of the Civil War to the present. This is accomplished through the study of court decisions, legislation, and the civil rights movement in the 1950s and 1960s, as seen through the eyes of contemporary writers, including William Faulkner, Alice Walker, and Alex Haley.

**PAPP 5364. URBAN POLITICAL ECONOMY. 3 Hours.**

Examines the theoretical bases of economic paradigms and the different economic policies that logically flow from them. Comparison is made between the orthodox, or neoclassical, model of economics and alternative heterodox models, including comparing the growth and development of the urban system, land use patterns, and economic policy debates. Consideration will be given to how and why the neoclassical model remains the dominant model for economic policy in Western, capitalist countries.

**PAPP 5365. FOUNDATIONS OF ENVIRONMENTAL POLICY. 3 Hours.**

Explores how environmental controversy is rooted in conflict between a number of schools of environmental policy thought with divergent perspectives on issues such as how to define progress, how to balance the needs of economy and ecosystem, how to cope with environmental complexity, and what role science should play in environmental affairs. Also offered as PLAN 5343; credit will be granted only once.

**PAPP 5366. US IMMIGRATION POLICIES AND PLANNING FOR IMMIGRANTS. 3 Hours.**

A seminar course where weekly readings would include: perspectives on international migration theory; the evolution of US immigration policy and national security; theories and urban issues related to immigrant assimilation and incorporation; urban ethnic economies and ethnic enclaves; segregation and housing of immigrants; globalization and immigrant labor networks; governance issues with providing education and other public services to immigrants and their children; and social work issues regarding generational conflict in immigrant families.

**PAPP 5367. STRATEGIC PUBLIC AND NONPROFIT HUMAN RESOURCES MANAGEMENT. 3 Hours.**

This course is designed to acquaint students with the theory and practice of strategically developing, utilizing, and aligning human resources so that maximum contribution from each member of an organization is used toward the attainment of strategic long-range goals and objectives. Topics include HR strategy, diversity, leadership, selection, training and development, compensation, classification, performance appraisal, and future practices for public and non-profit organizations.

**PAPP 5368. PRACTICAL EMPLOYMENT FOR PUBLIC AND NONPROFIT MANAGERS. 3 Hours.**

The course examines the rights and obligations of employers and employees. It does this by examining the legal background pertinent to public and nonprofit management. Topics addressed include employee selection, promotion and discipline, anti-discrimination legislation, gender and family issues legislation, environmental, safety and health issues, whistleblower legislation, immigration law, worker's compensation, labor law, and drug and alcohol issues.

**PAPP 5390. TOPICS IN URBAN THEORY. 3 Hours.**

Different topics explored on an intensive basis, especially recent theoretical approaches. May be repeated for credit as topic changes.

**PAPP 5391. TOPICS IN URBAN POLICY. 3 Hours.**

Different topics and approaches in analysis of urban problems. May be repeated for credit as topic changes.

**PAPP 5392. TOPICS IN URBAN MANAGEMENT. 3 Hours.**

Selected topics on current management problems including small city management, community-neighborhood relations, citizen involvement programs and techniques, personal and professional effectiveness as a total person, intergovernmental strategies and styles, public-private sector collaboration and co-planning, privatization, and other alternatives to economic service delivery. May be repeated as topic changes.

**PAPP 5394. SPECIAL TOPICS IN URBAN RESEARCH. 3 Hours.**

Different topics each semester concentrate on a variety of methodological techniques and research strategies, such as demographic research and survey techniques. May be repeated for credit as topic changes.

**PAPP 5395. CONFERENCE COURSE IN URBAN AFFAIRS. 3 Hours.**

Reading and research in a specialized area of urban affairs under the direction of a member of the graduate faculty.

**PAPP 5396. PROJECT REPORT. 3 Hours.**

Student prepares report focusing on specific policy or professional issue, utilizing appropriate research techniques; subject area and design of project report with consent of instructor. Graded P/F/R only.

**PAPP 5397. RESEARCH REPORT. 3 Hours.**

Student prepares report comparable to a journal article focusing on research issue, utilizing appropriate theory and research techniques; subject area and design of research report with consent of instructor. Graded P/F/R only. Prerequisite: PAPP 5342.

**PAPP 5398. THESIS. 3 Hours.**

A thesis conforming to University and departmental requirements may be prepared by graduate students in urban affairs. Graded F, R.

**PAPP 5399. PUBLIC ADMINISTRATION CAPSTONE. 3 Hours.**

This integrative applied research course assesses the student's ability to analyze, synthesize, and formulate cogent recommendations to solve a real public sector problem. Students will write the capstone paper using concepts drawn from the MPA core curriculum, their chosen emphasis track, and the student's professional public work experience. Students are required to successfully defend their capstone paper before a Public Administration Forum consisting of CAPPA faculty, students, and other interested parties. Prerequisite: Completion of all other course work required for the MPA degree, including core courses and emphasis area courses, unless an exception is approved by the MPA advisor.

**PAPP 5698. THESIS. 6 Hours.**

A thesis conforming to University and departmental requirements may be prepared by graduate students in urban affairs. Graded P/F/R.

**PAPP 6301. RESEARCH FOUNDATIONS AND PH.D. WORKSHOP. 3 Hours.**

Explores the development and function of theoretical models and frameworks. Examines the major theories from the social sciences designed for framing urban planning or administration issues and public policy. Designed to assist doctoral students in preparing their dissertation research. Opportunities to present work in progress, share ideas, and interact with faculty. Also offered as PLAN 6301; credit will be granted only once. Prerequisite: PLAN 5346; and PLAN 5317 or PAPP 5342.

**PAPP 6305. ADVANCED THEORIES OF URBAN SOCIETY. 3 Hours.**

Advanced theoretical perspectives of the community and community organization are examined. Special emphasis given to theories from human ecology, organization and stratification, and social welfare.

**PAPP 6306. THE URBAN ECONOMY. 3 Hours.**

Study of theories that explain the structure, growth and change of urban economies.

**PAPP 6307. URBAN GEOGRAPHY. 3 Hours.**

Emphasizes real aspects associated with urban physical environments and social, behavioral, and financial processes that shape these environments.

**PAPP 6309. INTERGOVERNMENTAL RELATIONS IN THE ADMINISTRATION AND PUBLIC POLICY. 3 Hours.**

The course explores the constitutional, political and fiscal relationships among the federal, state and local levels of government. How the relationships impact the administration of urban public policy is of primary focus.

**PAPP 6310. MONETARY AND FISCAL POLICY: THE FEDERAL ROLE. 3 Hours.**

Examination of the role of the federal government in maintaining economic stability, ensuring full employment and controlling inflation; exploration of liberal interventionist, conservative and radical theories of state economic management to assess the various policy alternatives and the importance of interest groups.

**PAPP 6311. ADVANCED PUBLIC POLICY FORMATION AND ANALYSIS. 3 Hours.**

The course covers policy process, policy formulation and policy analysis, using multiple theoretical and analytical perspectives. The primary focus is on U.S. policy, with an emphasis on state and local policy issues. The course aims to provide students with advanced knowledge in the theory, process, and tools of policy analysis essential in critiquing and researching public policy. Students will also gain advanced skills in the development and presentation of policy analysis and recommendations.

**PAPP 6314. SEMINAR IN POLICY PROCESSES. 3 Hours.**

The course focuses on the political, economic, and sociological institutions in the policy process, including various theoretical approaches, and application of these multidisciplinary perspectives in the analysis of specific policy issues.

**PAPP 6315. PUBLIC ADMINISTRATION THEORY. 3 Hours.**

This course is designed to critically examine public administration theory through the lenses of various governance models that have been proposed beginning with Weber's "ideal"; bureaucratic model through Osborne and Gaebler's market model to Fox and Miller's postmodern discourse model. The course begins by examining each governance model's stated or implied assumptions (about man, government, state, etc.) Second, the course considers the political philosophy and conceptual pillars on which the models are theoretically founded. Finally, the course examines the ideas of what constitutes a state as it might be relevant to a particular model and public administration.

**PAPP 6316. SEMINAR IN PUBLIC ADMINISTRATION. 3 Hours.**

Final course in the public administration field, focuses on review and integration of the theories that explain the structure, growth and change of public administration.

**PAPP 6320. ADVANCED ORGANIZATION THEORY. 3 Hours.**

The purpose of this advanced seminar is to examine the role of public agencies as organs of the State. It focuses on federal, urban, and nonprofit organizations. Learning objectives include understanding of interpretive, critical, and postmodern critiques of State's institutions; and application of power, knowledge, and gender lenses to the analysis of organizational practices, culture, and policy actions. Prerequisite: PAPP 5320 or PAPP 5323.

**PAPP 6326. PUBLIC BUDGETING & FINANCE. 3 Hours.**

The primary objective of this seminar is to provide students with the theoretical underpinnings of budgeting and financial management in the public sector. Students will engage in in-depth discussions of public budgeting and financial management topics drawn from economics, decision-making models, urban politics, federalism, and others to be able to have a sound understanding of how fiscal decisions affect public administration and policy.

**PAPP 6340. RESEARCH DESIGN. 3 Hours.**

Advanced course especially for Ph.D. students; covers logic of research design and problems of structure. Emphasis on empirical and quantitative studies.

**PAPP 6342. INTERMEDIATE DATA ANALYSIS. 3 Hours.**

An intermediate level examination of statistical and research techniques appropriate to urban and social analysis. Presuming a basic understanding of descriptive and inferential statistics, the course covers multivariate regression, including error analysis and non-linear models, path analysis, Analysis of Variance (ANOVA), logit and probit models, and techniques for data reduction (e.g., factor analysis). Also offered as PAPP 5342, PLAN 5317, and PLAN 6317; credit will be granted only once. Prerequisite: PAPP 5302.

**PAPP 6344. QUALITATIVE METHODS. 3 Hours.**

The study of qualitative research and analysis methods. Offered as PAPP 6344 and PLAN 6347; credit will be given only once.

**PAPP 6346. ADVANCED DATA ANALYSIS IN URBAN AND PUBLIC AFFAIRS. 3 Hours.**

An introduction to selected advanced techniques related to planning analysis. Subjects include advanced applied regression analysis, multivariate logit analysis, and multinomial logistic regression. Applications of projection techniques, land use and transportation models, and methods of regional analysis. Offered as PLAN 6346 and PAPP 6346. Credit will be given only once.

**PAPP 6349. DECISION MAKING AND PUBLIC POLICY ANALYSIS. 3 Hours.**

This course explores the theoretical, practical, and topical connections between public policy and public administration through a decision-making lens. The objectives of the course are to enable students to identify, critique, and connect the theoretical and meta-theoretical assumptions of decision-making models to models of public policy analysis and public administration. Course objectives will be pursued through readings, seminar discussions, and research-based assignments that focus on the intersection between decision-making, public policy, and public administration.

**PAPP 6399. DISSERTATION. 3 Hours.**

Graded F/R only.

**PAPP 6699. DISSERTATION. 6 Hours.**

Graded F/R/P/W only.

**PAPP 6999. DISSERTATION. 9 Hours.**

Graded P/F/R.

**PAPP 7399. DOCTORAL DEGREE COMPLETION. 3 Hours.**

This course may be taken during the semester in which a student expects to complete all requirements for the doctoral degree and graduate. Enrolling in this course meets minimum enrollment requirements for graduation, for holding fellowships awarded by The Office of Graduate Studies and for full-time GTA or GRA positions. Students should verify that enrollment in this course meets other applicable enrollment requirements. To remain eligible in their final semester of study for grants, loans or other forms of financial aid administered by the Financial Aid Office must enroll in a minimum of 5 hours as required by the Office of Financial Aid. Other funding sources may also require more than 3-hours of enrollment. Additional hours may also be required to meet to requirements set by immigration law or by the policies of the student's degree program. Students should contact the Financial Aid Office, other sources of funding, Office of International Education and/or their graduate advisor to verify enrollment requirements before registering for this course. This course may only be taken twice. Students who do not complete all graduation requirements while enrolled in this course must enroll in a minimum of 6 dissertation hours (6699 or 6999) in their graduation term. Graded P/F/R.

## COURSES

**PCOM 2301. INTRODUCTION TO NONPROFITS AND PHILANTHROPY. 3 Hours.**

An overview of working in the nonprofit sector and exploring the issues and values surrounding philanthropy and not-for-profit organizations. Topics include history of philanthropy, theories of the nonprofit sector, law and governance, programming, mission, volunteer recruiting, and fundraising.

**PCOM 3301. FUNDRAISING AND DEVELOPMENT. 3 Hours.**

Examination of the fundraising practices and development role in nonprofits including the role of government support, earned revenue, private giving, and legal and ethical contexts of fundraising. Topics include the major areas of philanthropy in addition to the fundraising tools such as grant proposals, special events, planned giving, capital campaigns, and new technologies. Prerequisite: PCOM 2301.

**PCOM 3309. ORGANIZATIONAL COMMUNICATION. 3 Hours.**

Communication functions within formally structured social systems such as business, government, and education. Emphasis on conceptual schemes for conducting analysis of training programs in organizational communication. Credit will not be given for both COMS 3309 and PCOM 3309. Prerequisite: COMS 2304 with a grade of C or better (2.0/4.0), COMS 1301, and 3 hours of Math.

**PCOM 3310. NONPROFIT PROGRAM DESIGN AND GRANT WRITING. 3 Hours.**

Study of nonprofit program design and grant writing. Students will learn and work with nonprofit organizations to practice designing an effective nonprofit program with measurable outcomes, researching funding opportunities, crafting compelling grant proposals including realistic budgets and clear needs statements, and reporting program impact to funders. Prerequisite: PCOM 2301 or permission of the department.

**PCOM 3320. STRATEGIC SOCIAL MEDIA COMMUNICATION. 3 Hours.**

Developing strategy and content for social media, engaging in audience analysis, understanding the unique attributes of various platforms, and communicating ethically and effectively across those platforms. Credit will not be given for both PCOM 3320 and PREL 3320.

**PCOM 4301. NONPROFIT MANAGEMENT. 3 Hours.**

Leadership of nonprofits including staff, volunteers, marketing, advocacy, and board development. Topics include the creation of compelling programs and the use of storytelling to appeal to target audiences. Operational and financial aspects of nonprofit management, mission and governance of organizations, and strategic planning for effective management are also covered. Prerequisite: COMM 3315, PCOM 2301, PCOM 3301.

**PCOM 4315. PROFESSIONAL PRESENTATIONS. 3 Hours.**

The role of internal and external informative and persuasive presentations in organizations. Extensive readings and practice with an emphasis on research, development, organization, and critical evaluation of oral and visual presentations. Credit will not be given for both COMS 4315 and PCOM 4315. Prerequisite: 60 hours complete and a C or better in one of the following courses: COMS 1301, COMS 2302, COMS 2304, or COMS 2305.

**PCOM 4320. MANAGERIAL COMMUNICATION. 3 Hours.**

Analysis of the role of the business manager; readings in research and theory with emphasis on problem-solving and motivation. Credit will not be given for both COMS 4320 and PCOM 4320. Prerequisite: COMM 3315 and COMS 3309 with a grade of C or better (2.0/4.0), or permission of the department.



**PCOM 4391. CONFERENCE COURSE. 3 Hours.**

Topic assigned on an individual basis, covering individual research or study in the designated areas. May be repeated when topic changes. Prerequisite: 60 or more hours earned and permission of the department.

**PCOM 4393. SPECIAL TOPICS. 3 Hours.**

Special studies in philanthropy. Topic varies from semester to semester. May be repeated when topic changes for a maximum of six credit hours. Prerequisite: 60 or more hours earned and permission.

**PCOM 4395. DIRECTED INTERNSHIP IN NONPROFITS AND PHILANTHROPY. 3 Hours.**

Application of practices and theories within a professional philanthropic context. Students work with a host organization in their area of interest applying knowledge to practical situations. Individual conference to be arranged. Graded Pass/Fail. Prerequisite: COMM 3315, PCOM 2301, and PCOM 3301.

**COURSES****PHED 0113. PHYS EDUC. 1 Hour.****COURSES****PHIL 1301. FUNDAMENTALS OF REASONING. 3 Hours.**

This course is an introduction to critical thinking, which is a process of identifying, analyzing, evaluating, and constructing reasoning as found in texts, media, politics, and everyday personal interactions. Students will be introduced to what constitutes good reasoning through a range of topics including: formal logic; fallacious reasoning; cognitive biases; reasoning with probability, statistics, and numbers; and guarding against disinformation.

**PHIL 1304. CONTEMPORARY MORAL PROBLEMS. 3 Hours. (TCCN = PHIL 2306)**

Examination of ethical problems and theories which have a bearing on contemporary life. Texts may include both classical and contemporary ethical writings and deal with problems such as the conditions under which life may be taken (abortion, capital punishment, medical ethics), business ethics, social justice, and individual rights.

**PHIL 2300. INTRODUCTION TO PHILOSOPHY. 3 Hours. (TCCN = PHIL 1301)**

An examination of one or more basic problems of lasting interest to philosophers. Typical problems may include human nature and limits of knowledge. Formerly listed as PHIL 1300. Credit cannot be received for both PHIL 1300 and PHIL 2300.

**PHIL 2311. LOGIC. 3 Hours. (TCCN = PHIL 2303)**

The development of formal and symbolic systems (categorical, propositional, and predicate) for the analysis of arguments.

**PHIL 2313. PHILOSOPHY OF THE ARTS. 3 Hours.**

Problems in the philosophy of art and art criticism; the history of aesthetic theory.

**PHIL 2314. PERSPECTIVES ON SCIENCE AND MATHEMATICS. 3 Hours.**

Topics and episodes in the history of science and mathematics from a philosophical point of view. Students are brought to understand that science has a fascinating history, is underpinned by deep philosophical presuppositions, and depends upon special social and cultural factors for its continued growth and revision.

**PHIL 2315. TOPICS IN PHILOSOPHY. 3 Hours.**

In-depth treatment of philosophical topics or movements, such as Existentialism, Philosophy of Science Fiction, Brain and Mind, Asian Philosophy. May be repeated for credit as content changes.

**PHIL 2316. COMPUTATION, MIND, AND PARADOX. 3 Hours.**

A philosophical and historical introduction to the foundations of logic and mathematics, the psychology of reasoning, and the computational theory of mind. Topics may include: logic, set theory, axiom systems; number and infinity; fallacies of deductive and probabilistic reasoning; Bayesian epistemology; algorithms; artificial intelligence, computational theories of mind and brain.

**PHIL 3301. HISTORY OF PHILOSOPHY: ANCIENT PHILOSOPHY. 3 Hours.**

The beginning and the early developments of the western philosophic tradition. Ancient Greek philosophy, basically the Pre-Socratics, Socrates, Plato and Aristotle.

**PHIL 3302. HISTORY OF PHILOSOPHY: ROMAN AND MEDIEVAL PHILOSOPHY. 3 Hours.**

Post-Aristotelians (e.g., the later Stoics, the Epicureans, Neo-Platonists); philosophy of the early Church Fathers through Aquinas and later Scholastics.

**PHIL 3303. HISTORY OF PHILOSOPHY: RENAISSANCE AND EARLY MODERN EUROPEAN PHILOSOPHY. 3 Hours.**

The philosophical views of Galileo, Newton, Bacon, and Hobbes, the Continental Rationalists and British Empiricists, and a brief introduction to the philosophy of Immanuel Kant.

**PHIL 3304. HISTORY OF PHILOSOPHY: NINETEENTH AND EARLY TWENTIETH CENTURY PHILOSOPHY. 3 Hours.**

Major philosophers from Kant to the early 20th century.

**PHIL 3305. HISTORY OF PHILOSOPHY: CLASSICAL INDIAN & BUDDHIST PHILOSOPHY. 3 Hours.**

Introduces the Classical Indian philosophical tradition and the Buddhist philosophical tradition as they developed inside and outside of India. Covers the origins and history of the six "orthodox" schools of Classical Indian philosophy and the three "heterodox" schools-Buddhism, Jainism, and Carvaka materialism-and their contributions to epistemology, metaphysics, ethics, philosophy of mind, philosophy of language, and philosophy of religion. There are no prerequisites but at least one prior course in Philosophy or Religious Studies is recommended.

**PHIL 3307. SEMINAR IN RESEARCH METHODS AND PHILOSOPHICAL WRITING. 3 Hours.**

Examination of philosophical methodology; philosophical analysis, philosophical writing, discipline-specific bibliographic tools, etc. Students write a series of short papers on topics of interest. Prerequisite: PHIL 2311 and one other PHIL course.

**PHIL 3312. ETHICS. 3 Hours.**

Studies the fundamental concepts and problems of moral life through an in-depth examination of classical and contemporary philosophical accounts, such as utilitarianism, contractarianism, theories of natural rights, Kantian ethics, and virtue ethics. Previously offered as PHIL 2312; cannot be repeated for credit.

**PHIL 3315. EXISTENTIALISM. 3 Hours.**

Readings in existentialist philosophy and literature with a special emphasis on such themes as alienation, anxiety, the self, absurdity, value, freedom, and responsibility. Texts may include writings from Kierkegaard, Nietzsche, Heidegger, Sartre, Camus, de Beauvoir, Jaspers, and others.

**PHIL 3316. PHILOSOPHY OF RELIGION. 3 Hours.**

Problems that engage philosophy of religion (e.g., the existence of God, theodicy, religious language) and the way these problems have been treated by some outstanding Western thinkers.

**PHIL 3317. PHILOSOPHICAL LOGIC. 3 Hours.**

Begins with predicate calculus and includes such topics as definite descriptions, identity, modal logic, second-order logic, set theory, philosophy of logic and mathematics, and philosophical applications of logic. Prerequisite: PHIL 2311 or consent of the instructor.

**PHIL 3318. THE PHILOSOPHY OF SCIENCE AND TECHNOLOGY. 3 Hours.**

The method and goals of scientific scholars and inquiry. The distinction between formal and empirical sciences, laws and theories, measurement, the role of observation and experiment, and probability. Formerly listed as PHIL 4315. Credit cannot be received for both PHIL 4315 and PHIL 3318.

**PHIL 3319. BIOMEDICAL ETHICS. 3 Hours.**

Major ethical problems which arise in modern medicine and in medical/biological research (euthanasia, abortion, patient-physician relations, allocations of medical resources, genetic research, etc.).

**PHIL 3320. PHILOSOPHY OF LAW. 3 Hours.**

Examination of the institution of law, legal concepts, legal reasoning, and the legal process. Topics may include the nature of law; the moral limits of the criminal law; legal rights; liberty, justice, and equality; punishment; responsibility; the private law (property, contract, and tort); constitutional law; and feminist jurisprudence.

**PHIL 3321. PHILOSOPHY OF LANGUAGE. 3 Hours.**

Topics to be investigated include the nature of language and communication; the distinction between natural and artificial language; the traditional division of the field into syntax, semantics, and pragmatics; and such specialized subtopics as meaning, reference, truth, and speech acts. Completion of PHIL 2311 is recommended, but not required.

**PHIL 3322. DISABILITY ETHICS. 3 Hours.**

Explores the philosophical literature pertaining to disability and disabled experiences. Topics include defining disability, healthcare allocation, de-institutionalization, assisted dying and euthanasia, and the ethics of genetic and reproductive technologies. Offered as PHIL 3322 and DS 3322; credit will only be granted once.

**PHIL 3324. BUSINESS ETHICS. 3 Hours.**

Selected ethical issues in business, such as the nature and moral status of capitalism; corporate moral agency and responsibility; issues and challenges in the workplace (e.g., civil liberties, personnel policies, unionization, privacy, and safety); moral choices facing employees (e.g., loyalty, insider trading, and whistleblowing); job discrimination (e.g., affirmative action, comparable worth, and sexual harassment); consumer protection; environmental protection; and globalization.

**PHIL 3330. SOCIAL AND POLITICAL PHILOSOPHY. 3 Hours.**

Investigation of the basis (if any) of political obligation. Analysis of social and political concepts, such as equality, liberty, rights, and justice. Discussion of social and political theories, such as anarchism, contractarianism, Marxism, and conservatism.

**PHIL 3340. TOPICS IN APPLIED ETHICS. 3 Hours.**

Investigation of a single moral issue or a cluster of issues that arise in the context of a particular profession. Examples of the former are abortion, punishment, freedom of speech, the environment, and the moral status of animals. Examples of the latter are business ethics, legal ethics, engineering ethics, nursing ethics, and computer ethics. May be repeated for credit as content changes.

**PHIL 3341. TOPICS IN BIOETHICS. 3 Hours.**

Investigation of a single moral issue or a cluster of issues that arise in the context of the medical profession. Examples of possible topics are resource allocation, surrogate decision-making, the philosophy of mental illness, research ethics, reproductive ethics, and end of life care. May be repeated for credit as content changes. Prior completion of PHIL 3319 (Biomedical Ethics) is strongly recommended, but not required.

**PHIL 3350. TOPICS IN ANCIENT GREEK PHILOSOPHY. 3 Hours.**

An in-depth examination of a particular figure or topic in the field of ancient Greek philosophy. Works studied may include those of the Pre-Socratics, Plato, Aristotle, Hellenistic, and Neoplatonic philosophers.

**PHIL 3390. HONORS COLLOQUIUM. 3 Hours.**

An interdisciplinary course designed to meet the needs of advanced undergraduates in the Honors College.

**PHIL 4191. UNDERGRADUATE CONFERENCE COURSE. 1 Hour.**

Topics assigned on an individual basis covering research of individual students or study in designated areas. May be repeated for credit.

**PHIL 4192. CONFERENCE COURSE IN BIOETHICS. 1 Hour.**

This course is an independent study offering students an opportunity for in-depth study of a specific topic in bioethics. Requires permission of the department chair and the instructor.

**PHIL 4291. UNDERGRADUATE CONFERENCE COURSE. 2 Hours.**

Topics assigned on an individual basis covering research of individual students or study in designated areas. May be repeated for credit.

**PHIL 4292. CONFERENCE COURSE IN BIOETHICS. 2 Hours.**

This course is an independent study offering students an opportunity for in-depth study of a specific topic in bioethics. Requires permission of the department chair and the instructor.

**PHIL 4318. PHILOSOPHY AND LITERATURE. 3 Hours.**

The role of ideas in literature and an analysis of the actual contacts between philosophy and the dominant world views of the great writers of literature.

**PHIL 4380. PHENOMENOLOGY. 3 Hours.**

Phenomenology is a major philosophical movement based on the methodically controlled description of conscious experience, as uncovered at first introspectively. This course focuses on (1) the origin of the movement in common epistemological problems arising in philosophy, psychology, mathematics, and the natural sciences, (2) the development of the movement's method, and (3) a close study of some influential phenomenologists, including Husserl, Sartre, and Merleau-Ponty. Contemporary connections to the neuroscientific study of consciousness are also explored.

**PHIL 4383. PHILOSOPHY OF MIND. 3 Hours.**

Explores philosophical issues raised by the mind and its relation to the body. Topics may include consciousness, perception, artificial intelligence, animal minds, free will, the self, and the relationship between mind and matter.

**PHIL 4385. THEORY OF KNOWLEDGE. 3 Hours.**

Problems which arise from attempts to give an account of human knowledge. Skepticism, perception, induction, or the nature of truth. Note: Although there are no prerequisites for this course, students who have had no previous philosophy courses may find the material difficult.

**PHIL 4386. METAPHYSICS. 3 Hours.**

Problems which arise from attempts to give an account of reality and its manifestations. Possibility and necessity, causality, the nature of events, mind-body, and universals. Note: Although there are no prerequisites for this course, students who have had no previous philosophy courses may find the material difficult.

**PHIL 4387. TOPICS IN VALUE THEORY. 3 Hours.**

In-depth treatment of an issue or topic within value theory, which is broadly construed to include moral philosophy (and its subfields, such as moral epistemology and moral psychology), social philosophy, political philosophy, philosophy of law, aesthetics, philosophy of religion, and feminist philosophy. May be repeated for credit with permission of the department.

**PHIL 4388. TOPICS IN THE HISTORY OF PHILOSOPHY. 3 Hours.**

In-depth treatment of a single important philosophical writer, a related group of writers, or an extended tradition. May be repeated for credit with permission of the department.

**PHIL 4389. TOPICS IN PHILOSOPHY AND THE SOCIAL SCIENCES. 3 Hours.**

In-depth treatment of one or more of the social sciences from a philosophical perspective: may include the philosophy of history, social philosophy, political philosophy, philosophy of the social sciences, or any specific subject therein. Credit may not be granted for PHIL 4311 or PHIL 4317 (no longer offered) and PHIL 4389. May be repeated for credit with permission of the department.

**PHIL 4391. UNDERGRADUATE CONFERENCE COURSE. 3 Hours.**

Topics assigned on an individual basis covering research of individual students or study in designated areas. May be repeated for credit.

**PHIL 4392. CONFERENCE COURSE IN BIOETHICS. 3 Hours.**

This course is an independent study offering students an opportunity for in-depth study of a specific topic in bioethics. Requires permission of the department chair and the instructor.

**PHIL 4394. SENIOR THESIS. 3 Hours.**

During the senior year, the student completes a thesis under the direction of a faculty member in the major department. Required of all pre-professional track philosophy majors and of all philosophy majors who are members of the University Honors College.

**PHIL 5391. CONFERENCE COURSE IN PHILOSOPHY. 3 Hours.**

May be taken only with the permission of the instructor and Graduate Advisor.

**PHIL 5392. TOPICS IN THE HISTORY OF PHILOSOPHY. 3 Hours.**

Consideration in depth of the work of a single philosopher or a related philosophical school against the background of the development of philosophy. May be repeated for credit as the topic changes.

**PHIL 5393. PHILOSOPHICAL PERSPECTIVES ON THE HUMANITIES. 3 Hours.**

A philosophical inquiry into problems and issues of relevance in humanistic disciplines. May be repeated for credit as the topic changes.

**PHIL 6389. SEMINAR IN PHILOSOPHICAL ANALYSIS. 3 Hours.**

Seminar-style treatment of some major problem in contemporary philosophy. May be repeated for credit as the topic changes.

**PHIL 6394. TOPICS IN SYSTEMATIC PHILOSOPHY. 3 Hours.**

In-depth treatment of an issue or issues in metaphysics, epistemology, ethics, aesthetics or related subdisciplinary areas. May be repeated for credit as the topic changes.

**COURSES****PHYS 1181. PROBLEMS IN MECHANICS. 1 Hour.**

Primarily an independent study course involving problem-solving in general technical mechanics. The objective is to prepare the student whose background in physics is of a non-technical nature to do advanced study in curricula requiring technical physics. This course in combination with PHYS 1441 shall serve as an equivalent to PHYS 1443. Prerequisite: MATH 1426 and a grade of B or better in PHYS 1441. Department consent may be granted to take this course with Physics B AP score of 4 or 5.

**PHYS 1182. PROBLEMS IN ELECTRICITY AND MAGNETISM. 1 Hour.**

Primarily an independent study course involving problem-solving in general technical electricity and magnetism. The objective is to prepare the student whose background in physics is of a non-technical nature to do advanced study in curricula requiring technical physics. This course in combination with PHYS 1442 shall serve as an equivalent to PHYS 1444. Prerequisite: MATH 2425 and a grade of B or better in PHYS 1442. Department consent may be granted to take this course with Physics B AP score of 4 or 5.

**PHYS 1188. SPECIAL PROBLEMS IN GENERAL PHYSICS. 1 Hour.**

Primarily laboratory work and/or problem-solving in general technical physics. Prerequisite: PHYS 1441 or PHYS 1443 lecture credit equivalent or PHYS 1442 or PHYS 1444 lecture credit equivalent.

**PHYS 1288. SPECIAL PROBLEMS IN GENERAL PHYSICS. 2 Hours.**

Primarily laboratory work and/or problem-solving in general technical physics. Prerequisite: PHYS 1441 and PHYS 1442 lecture credit equivalent or PHYS 1443 and PHYS 1444 lecture credit equivalent.

**PHYS 1300. INTRODUCTION TO MUSICAL ACOUSTICS. 3 Hours.**

An introduction, for the music major, to the nature of periodic motion and its relation to music, characteristics of sound waves, sources of sound used in music, musical scales and temperament, mechanics of hearing, recording and reproduction of sound. May not be used to satisfy any of the requirements for a degree in physics.

**PHYS 1301. PHYSICS FOR NON SPECIALISTS I. 3 Hours. (TCCN = PHYS 1305)**

PHYS 1301 and 1302 constitute a one-year introductory course for liberal arts and business majors. How physics plays a role in everyday life; explanations of how things work. Helps develop analytical thinking. The first semester explains motion and forces and heat.

**PHYS 1302. PHYSICS FOR NON SPECIALISTS II. 3 Hours. (TCCN = PHYS 1307)**

Follows PHYS 1301 and explains sound, light, electricity and magnetism. Prerequisite: PHYS 1301 or permission from instructor.

**PHYS 1351. ENERGY AND ENVIRONMENT. 3 Hours.**

This course explores the fundamental laws of nature and natural processes related to energy production, transport, storage, and uses. The objective of this course is to provide students with an in-depth understanding of the Physics of Energy and its relation to the Earth Environment. The course is designed for non-science major students with two one-hour lectures (or one two-hour lecture) and one 2-hour laboratory per week.

**PHYS 1441. GENERAL COLLEGE PHYSICS I. 4 Hours. (TCCN = PHYS 1401)**

The first half of a one-year, non-calculus introductory physics course taken by pre-medical, pre-dental, biology and architectural majors and others. The study of mechanics, elasticity, fluids, heat and waves is supplemented by laboratory experiments. Familiarity with high school algebra and trigonometry is required.

**PHYS 1442. GENERAL COLLEGE PHYSICS II. 4 Hours. (TCCN = PHYS 1402)**

The second half of a one-year, non-calculus introductory physics course. Subject matter includes electricity and magnetism, light and optics, and modern physics. Prerequisite: PHYS 1441 or equivalent, or permission of instructor or student group.

**PHYS 1443. GENERAL TECHNICAL PHYSICS I. 4 Hours. (TCCN = PHYS 2425)**

The first half of a one-year technical course. Required for many science and engineering majors, exceeds premedical requirement. The study of physical phenomena in the fields of mechanics, heat, and waves. Concurrent enrollment in MATH 1426 (per prerequisite) is not recommended if no prior background in calculus. Prerequisite: MATH 1426 or consent of instructor.

**PHYS 1444. GENERAL TECHNICAL PHYSICS II. 4 Hours. (TCCN = PHYS 2426)**

The second half of a one-year technical course. The study of physical phenomena including electricity, magnetism, circuit theory, light, and optics. Prerequisites: PHYS 1443 or equivalent and MATH 2425 or concurrent enrollment.

**PHYS 2311. MATHEMATICAL METHODS OF PHYSICS. 3 Hours.**

Harmonic oscillators, waves, vector description of particles and fields, coordinate transformations, eigenvalue problems, and systems of linear equations. Prerequisites: PHYS 1444 or equivalent and MATH 2425.

**PHYS 2315. INTRODUCTORY ASTROPHYSICS. 3 Hours.**

This course introduces Science and Engineering majors to astrophysics. Subject matter includes the solar system, stellar properties and evolution, the Milky Way galaxy, normal and active galaxies, and cosmology. Prerequisite: PHYS 1444 or permission of the instructor.

**PHYS 2321. COMPUTATIONAL PHYSICS. 3 Hours.**

Development of computational techniques, including simulation, through applications to physical problems. A survey of topics including the multi-body problem, celestial mechanics, scattering, chaos, percolation, fractals, random processes, Fourier techniques in wave phenomena, Monte Carlo methods, and image reconstruction techniques. Prerequisite: PHYS 1444 or equivalent.

**PHYS 3183. MODERN PHYSICS LABORATORY. 1 Hour.**

Supplements the topics covered in PHYS 3313. Prerequisite: PHYS 3313 or concurrent enrollment.

**PHYS 3313. INTRODUCTION TO MODERN PHYSICS. 3 Hours.**

A brief introduction to the theories of quantum mechanics and statistical mechanics followed by a survey of atomic physics, conductors, semiconductors and modern electronic devices, nuclear and sub-nuclear physics. Prerequisites: PHYS 1444 or equivalent and MATH 2425.

**PHYS 3315. ASTROPHYSICS AND COSMOLOGY. 3 Hours.**

Diverse concepts in theoretical physics are applied to a wide range of astrophysical problems. Topics include stellar properties, spectra, evolution, radiation transport, nuclear reactions, degenerate matter, orbital mechanics, galactic dynamics, introductory general relativity and cosmology. Prerequisite: PHYS 3313 and MATH 3318 or MATH 3319.

**PHYS 3316. ASTROBIOLOGY I. 3 Hours.**

This is an interdisciplinary course between astrophysics, biology and geology. Topics include properties of life, origin and evolution of life on Earth, terrestrial geology and habitability, environmental forcings, extremophiles, mass extinctions, meteorites, searches for life in the solar system. Offered as BIOL 3316, GEOL 3316 and PHYS 3316; credit will be granted only once. Prerequisite: PHYS 1441 & PHYS 1442 or equivalent and PHYS 2315 or PHYS 3315, or permission from instructor. Prerequisites for Biology majors: PHYS 1441 & PHYS 1442 or equivalent.

**PHYS 3321. INTERMEDIATE ELECTRICITY AND MAGNETISM. 3 Hours.**

Vector algebra and vector calculus applied to electrostatics, magnetostatics, the study of dielectric materials, and boundary value problems. Prerequisite: PHYS 2311 and MATH 3318 or MATH 3319.

**PHYS 3341. INTRODUCTION TO BIOLOGICAL PHYSICS. 3 Hours.**

This course will cover four parts: Part I - History of Biological Physics and the general introduction of Cell biology; Part II - Physics of Biomaterials including polymer Physics; DNA & RNA; Protein Structures, Functions and Physics; Part III - Physics of life genetics including molecular motors, ATP functions, Photosynthesis and Physics of genetic regulations; and Part IV - Physics of biological detection including Physics of Radiation diagnosis; Optical Imaging; Magnetic Resonance Imaging and Ultrasound imaging. Prerequisite: PHYS 1442 or PHYS 1444 or equivalent.

**PHYS 3342. INTRODUCTION TO NANO-BIO PHYSICS. 3 Hours.**

The objective of this course is to provide students with an in-depth understanding of the physics of nanotechnology and its biological applications. The course is composed of two parts: nanoparticle physics and nano-bio physics. In the first part, the physics of nanotechnology will be introduced. The second part is the biological applications of nanotechnology, for which the focus will be on how to understand the physics of these applications. The understanding of the physical objectives for these applications will be helpful for the exploration of nano-biotechnology. Key advances from the recent literature will be reviewed and introduced to students as supplemental topics. Prerequisite: PHYS 1442 or PHYS 1444 or equivalent.

**PHYS 3358. ASTROBIOLOGY II. 3 Hours.**

This is an interdisciplinary course between astrophysics, biology and geology. Topics include basic properties of life, habitability of Earth, studies of possible life regarding Mars, Europa & Titan, space missions, exoplanets and exomoons, stellar habitable zones, multistellar systems, exoEarths, biomarkers, SETI, Fermi paradox, Drake equation, cosmology. Offered as BIOL 3358, GEOL 3358, and PHYS 3358; credit will be granted only once. Prerequisite: PHYS 1441 & PHYS 1442 or equivalent and PHYS 2315 or PHYS 3315, or permission from instructor. Prerequisites for Biology majors: PHYS 1441 & PHYS 1442 or equivalent. Note that Astrobiology I is strongly recommended to students to be taken prior to Astrobiology II, but is not a prerequisite.

**PHYS 3360. PHYSICS OF THE HUMAN BODY. 3 Hours.**

This course will explore the fundamental laws and natural processes related to the mechanics, fluid dynamics, optics, and biophysics of the human body. It is designed for kinesiology pre-health, biology and nursing students seeking to understand the foundations and biophysical principles of human life. Note that Kinesiology students seeking to apply to science based graduate programs are advised to take PHYS 1441 and PHYS 1442 so the prerequisite requirement of these courses will not preclude the students for whom PHYS 3360 is intended from taking the course. Prerequisite: PHYS 1441.

**PHYS 3366. SPECIAL TOPICS IN PRE-COLLEGE PHYSICAL SCIENCE INSTRUCTION. 3 Hours.**

A laboratory oriented curriculum for teaching physical science and/or physics is developed and experienced. The developed curriculum is particularly appropriate for pre-college instruction. May be repeated for credit as the subject matter changes, but not more than six hours credit may be accumulated. Prerequisite: junior standing, six hours of science, three hours of education, and consent of the instructor.

**PHYS 3445. OPTICS. 4 Hours.**

Fundamental principles of physical and geometric optics, absorption and scattering, Planck's quantum theory of radiation, diffraction, interference, light sources, and spectra. Prerequisites: PHYS 1444 or equivalent and MATH 2425.

**PHYS 3446. NUCLEAR AND PARTICLE PHYSICS. 4 Hours.**

The study of atomic nuclei and the fundamental constituents of matter. Topics include nuclear structure, radioactivity, nuclear reactions, fission, fusion, particles and their interactions, the standard model of particle physics, experimental methods, accelerators, and examples from current research topics. Prerequisite: PHYS 3313.



**PHYS 3455. ELECTRONICS. 4 Hours.**

A study of electronic components and quantum devices and their application to circuits and instrumentation. Prerequisites: PHYS 3313 and MATH 2425.

**PHYS 4081. UNDERGRADUATE RESEARCH IN PHYSICS. 0 Hours.**

Independent research conducted on a selected topic under the supervision of a member of the Physics faculty. This course may be repeated. This is a non-credit course so cannot be used to meet degree requirements. Prerequisite: Permission of instructor.

**PHYS 4117. INDIVIDUAL LEARNING BY SEMINAR. 1 Hour.**

Individual instruction on using the seminar as a model of learning current topics in physics. An individual report is required. Prerequisite: 18 hours of physics and senior standing.

**PHYS 4171. ADVANCED OPTICS LABORATORY. 1 Hour.**

Special laboratory projects in advanced optics. Prerequisite: PHYS 3445 or permission of the instructor.

**PHYS 4181. SPECIAL PROBLEMS. 1 Hour.**

Selected projects in research or teaching laboratories, which may be repeated in any order for a total credit not to exceed four hours, unless authorized by the undergraduate advisor. Prerequisite: Permission from instructor and Physics undergraduate advisor.

**PHYS 4185. ADVANCED ELECTRICITY AND MAGNETISM LABORATORY. 1 Hour.**

Supplements the topics covered in PHYS 3321 and PHYS 4324. Prerequisite: PHYS 4324 or concurrent enrollment.

**PHYS 4191. SPECIAL TOPICS IN PHYSICS. 1 Hour.**

Selected topics arranged on an individual basis, which may be repeated with permission from instructor and Physics undergraduate advisor. Prerequisite: as determined for topic or permission from instructor.

**PHYS 4271. ADVANCED OPTICS LAB. 2 Hours.**

Special laboratory projects in advanced optics. Prerequisite: PHYS 3445 or permission of the instructor.

**PHYS 4281. SPECIAL PROBLEMS. 2 Hours.**

Selected projects in research or teaching laboratories, which may be repeated in any order for a total credit not to exceed four hours, unless authorized by the undergraduate advisor. Prerequisite: permission from the instructor and the Physics undergraduate advisor.

**PHYS 4291. SPECIAL TOPICS. 2 Hours.**

Selected topics arranged on an individual basis, which may be repeated with permission from instructor and Physics undergraduate advisor. Prerequisite: as determined for topic or permission from instructor.

**PHYS 4315. THERMODYNAMICS AND STATISTICAL MECHANICS. 3 Hours.**

Topics in classical thermodynamics include the laws of thermodynamics, Gibbs' and Helmholtz's free energies, the Maxwell relations, heat capacities, entropy change calculations, phase and chemical changes. Statistical mechanics centers on the partition function and its applications, such as the entropy of an ideal gas, the Maxwell velocity distribution, the heat capacity of a solid, photon statistics, and blackbody radiation. Fermi-Dirac and Bose-Einstein statistics. Prerequisite: PHYS 3313 and MATH 2326 or permission of the instructor.

**PHYS 4319. ADVANCED MECHANICS. 3 Hours.**

Coupled oscillators, central forces, Lagrange's equations, Hamilton's canonical equations, the moment of inertia tensor, and the application of Euler's angles to rotational motion. Prerequisite: PHYS 2311, PHYS 3321, and MATH 3318 or MATH 3319, or permission of the instructor.

**PHYS 4324. ADVANCED ELECTRICITY AND MAGNETISM. 3 Hours.**

Electromagnetic phenomena based on Maxwell's equations and particle-field interactions. Prerequisite: PHYS 3321 or permission of the instructor.

**PHYS 4325. SOLID STATE PHYSICS. 3 Hours.**

Classification of crystalline solids and elastic and thermal properties, electric and magnetic properties, and electronic properties of solids. An introduction to current research problems. Prerequisite: PHYS 4315 or permission of the instructor.

**PHYS 4326. INTRODUCTION TO QUANTUM MECHANICS. 3 Hours.**

Schrodinger equation and implications, the free particle, the one-electron atom, the potential barrier, and perturbation theory. Prerequisite: PHYS 3313, MATH 3318 or MATH 3319, or permission of the instructor.

**PHYS 4327. INTRODUCTION TO QUANTUM MECHANICS II. 3 Hours.**

This is a continuation of Introduction to Quantum Mechanics (PHYS 4326). The topics that will be covered will include: time-independent perturbation theory for non-degenerate states, degenerate perturbation theory, atoms with one or two electrons and molecules, Fermi and Bose gases, time-dependent perturbation theory, scattering theory, and introduction to relativistic quantum mechanics. Prerequisite: PHYS 4326 or permission from instructor.

**PHYS 4343. RESEARCH METHODS - UTEACH. 3 Hours.**

The purpose of this course is to present UTeach students with the tools scientists use to solve scientific problems. These tools enable scientists to develop new knowledge and insights, the most important of which are eventually presented in textbooks and taught in more conventional science classes. These tools include: design of experiments to answer scientific questions; use of statistics to interpret experimental results and deal with sampling errors; mathematical modeling of scientific phenomena; finding and reading articles in the current scientific literature; applying scientific arguments in matters of social importance; writing scientific papers; reviewing scientific papers; oral presentation of scientific work; use of probes and computers to gather and analyze data; ethical treatment of human subjects; laboratory safety. Research Methods is primarily a laboratory course, and most of these topics are developed in connection with 4 independent inquiries UTeach students design and carry out. Written inquiries will be evaluated as examples of scientific writing. Prerequisite: C or better in SCIE 1201 or SCIE 1334 or concurrent enrollment; junior or senior standing.

**PHYS 4391. SPECIAL TOPICS. 3 Hours.**

Selected topics arranged on an individual basis, which may be repeated with permission from instructor and Physics undergraduate advisor.

Prerequisite: as determined for topic or permission from instructor.

**PHYS 4392. MEDICAL PHYSICS 1. 3 Hours.**

The study of the basic physics behind ionizing radiation therapy, radiation generation modalities, dose calculation, treatment planning, and modern radiation therapeutic techniques. Prerequisite: PHYS 1443, PHYS 1444, PHYS 2311 and MATH 3318 or MATH 3319.

**PHYS 4393. HONORS THESIS IN PHYSICS. 3 Hours.**

Required of all students in the University Honors College. During the senior year the honors physics major will perform a research project under the direction of a Physics Department faculty member.

**PHYS 5193. READINGS IN PHYSICS. 1 Hour.**

PHYS 5193 is structured to allow graduate students to delve into specific areas of physics that align with their research interests or academic goals. This course may be repeated. The course typically involves: Independent Reading: Students select and study advanced physics literature, including research papers, reviews, and textbooks, to gain a comprehensive understanding of a particular topic. Faculty Supervision: A faculty member guides the student through the reading material, providing insights, clarifying complex concepts, and ensuring academic rigor. Critical Analysis: Students are expected to critically analyze the material, identifying key arguments, methodologies, and conclusions. Synthesis and Reporting: The culmination of the course often involves the student synthesizing their findings into a written report or presentation, demonstrating their grasp of the subject matter.

**PHYS 5194. RESEARCH IN PHYSICS. 1 Hour.**

Conference course with laboratory. May be repeated for credit. In PHYS 5194, students collaborate with faculty advisors to identify research topics, develop methodologies, and conduct experiments or theoretical analyses. The course emphasizes the development of research skills, critical thinking, and scientific communication. Students are expected to contribute to ongoing research initiatives or initiate independent projects that align with their academic interests and career goals.

**PHYS 5294. RESEARCH IN PHYSICS. 2 Hours.**

Conference course with laboratory. May be repeated for credit. PHYS 5294 allows students to apply theoretical knowledge to practical research endeavors, fostering skills essential for a career in physics research. Students may work on experimental, theoretical, or computational projects, contributing to ongoing research initiatives or developing independent studies. The course emphasizes the development of research methodologies, critical analysis, and scientific communication.

**PHYS 5305. CHAOS AND NONLINEAR DYNAMICS. 3 Hours.**

Introduction to basic principles and concepts of chaos theory and their applications in diverse fields of research. Topics include chaotic and non-chaotic systems, stability analysis and attractors, bifurcation theory, routes to chaos and universality in chaos, iterated maps, Lyapunov exponents, fractal dimensions, multifractals, hamiltonian chaos, quantum chaos, controlling chaos, self-organized systems, and theory of complexity.

**PHYS 5306. CLASSICAL MECHANICS. 3 Hours.**

General principles of analytical mechanics, the kinematics of rigid bodies, canonical transformation, Hamilton-Jacobi theory. The course emphasizes analytical methods and provides a foundational understanding essential for various fields in physics and engineering.

**PHYS 5307. QUANTUM MECHANICS I. 3 Hours.**

PHYS 5307 provides a rigorous introduction to the principles and mathematical formulations of quantum mechanics. The course encompasses the following key topics: Matrix Formulation: Understanding quantum states and observables through linear algebra and operator theory. Theory of Radiation: Exploring the interaction between matter and electromagnetic radiation, including emission and absorption processes. Angular Momentum: Analyzing the quantization of angular momentum and its implications in atomic and molecular systems. Perturbation Methods: Applying approximation techniques to solve complex quantum systems that cannot be addressed exactly.

**PHYS 5308. QUANTUM MECHANICS II. 3 Hours.**

PHYS 5308 focuses on the following key topics: Approximate Methods: Exploration of techniques such as time-independent and time-dependent perturbation theory, and the variational method, which are essential for analyzing systems where exact solutions are unattainable. Symmetry and Unitary Groups: Study of the role of symmetry in quantum mechanics, including the application of group theory and unitary transformations to understand conservation laws and selection rules. Scattering Theory: Introduction to the principles of quantum scattering, including partial wave analysis and the Born approximation, which are fundamental in understanding interactions at the quantum level. Prerequisite: PHYS 5307.

**PHYS 5309. ELECTROMAGNETIC THEORY I. 3 Hours.**

PHYS 5309 covers the following key topics: Boundary Value Problems in Electrostatics: Techniques for solving problems involving electric fields in various configurations. Boundary Value Problems in Magnetostatics: Analysis of magnetic fields in static conditions and their boundary conditions. Maxwell's Equations: Comprehensive study of the fundamental equations governing electromagnetism, including their derivation and applications.

**PHYS 5310. STATISTICAL MECHANICS. 3 Hours.**

PHYS 5310 delves into the theoretical foundations of statistical mechanics, focusing on the statistical description of systems composed of a large number of particles. Key topics typically include: Ensemble Theory: Microcanonical, canonical, and grand canonical ensembles. Classical and Quantum Statistics: Maxwell-Boltzmann, Bose-Einstein, and Fermi-Dirac distributions. Partition Functions: Calculation and applications to thermodynamic quantities. Applications: Ideal gases, blackbody radiation, and phase transitions. This course also covers Fundamental principles of statistical mechanics, Liouville theorem, entropy, Fermi-Dirac distribution, Bose-Einstein distribution, Einstein condensation, density matrix, quantum statistical mechanics, kinetic methods, and transport theory.

**PHYS 5311. MATHEMATICAL METHODS IN PHYSICS I. 3 Hours.**

PHYS 5311 provides students with a comprehensive understanding of mathematical tools essential for advanced studies in physics. The course emphasizes both algebraic structures and analytical techniques, preparing students to tackle complex problems in various areas of physics. Material covered includes algebraic and analytical methods used in modern physics. Algebra: matrices, groups, and tensors, with application to quantum mechanics, the solid state, and special relativity. Analysis: vector calculus, ordinary and partial differential equations, with applications to electromagnetic and seismic wave propagation.

**PHYS 5312. MATHEMATICAL METHODS IN PHYSICS II. 3 Hours.**

Continuation of PHYS 5311 with a selection from the following topics. Algebra: matrix representations of the symmetric and point groups of solid state physics, matrix representations of the continuous groups  $O(3)$ ,  $SU(2)$ ,  $SU(3)$ ,  $SL(2,C)$ , general covariance. Analysis: further study of analytic functions, Cauchy's theorem, Green's function techniques, orthogonal functions, integral equations. Prerequisite: PHYS 5311.

**PHYS 5313. ELECTROMAGNETIC THEORY II. 3 Hours.**

PHYS 5313 emphasizes a modern tensorial approach to classical electrodynamics, covering the following key topics of classical electrodynamics such as: force on and field of a moving charge, derivation and application of 4-vector potential, Maxwell's equations in tensor form, field momentum and radiation. Prerequisite: PHYS 5309.

**PHYS 5314. ADVANCED OPTICS. 3 Hours.**

The curriculum of PHYS 5314 encompasses a range of advanced topics in optics, including: Electromagnetic Wave Equations: Study of the fundamental equations governing the behavior of electromagnetic waves. University Catalog - UT Arlington+1UTA CDN+1 Theory of Diffraction: Analysis of how waves bend around obstacles and openings, with applications to optical systems. Radiation Scattering and Dispersion: Examination of how light interacts with matter, including the spreading of light into its component colors. Coherence and Laser Optics: Exploration of the properties of coherent light sources, such as lasers, and their applications. Additional Advanced Topics: Discussion of current and emerging areas of interest in the field of optics.

**PHYS 5315. SOLID STATE I. 3 Hours.**

PHYS 5315 covers the following key topics: Crystal Structure: Examination of the geometric arrangement of atoms in solids, including unit cells, lattice types, and symmetry operations. Lattice Vibrations: Study of phonons and their role in the thermal and electrical properties of materials. Thermal Properties: Analysis of heat capacity, thermal expansion, and thermal conductivity in solids. Band Theory of Solids: Introduction to electronic band structures, including the formation of energy bands and their implications for electrical conductivity.

**PHYS 5316. SOLID STATE II. 3 Hours.**

Course focuses on the advanced physical properties of crystalline solids. It builds upon the foundational concepts introduced in PHYS 5315 (Solid State I), delving deeper into the electrical, magnetic, and optical phenomena that govern solid-state systems. PHYS 5316 explores the following key topics: Electrical Properties of Crystalline Solids: Study of charge transport mechanisms, conductivity, and the role of band structures in determining electrical behavior. University Catalog - UT Arlington+2University Catalog - UT Arlington+2Magnetic Properties: Examination of magnetic ordering, susceptibility, and the interaction of magnetic fields with solid materials. Magnetic Resonance: Introduction to techniques such as Nuclear Magnetic Resonance (NMR) and Electron Spin Resonance (ESR), and their applications in probing material properties. Optical Phenomena: Analysis of light-matter interactions, including absorption, reflection, and emission processes in solids. Prerequisite: PHYS 5315.

**PHYS 5317. STATISTICAL MECHANICS II. 3 Hours.**

PHYS 5317 explores a range of topics that are central to understanding critical phenomena and non-equilibrium systems. Key areas of study include: Fluctuations and Critical Phenomena: Examination of how small changes at the microscopic level can lead to significant macroscopic effects near critical points. The Ising Model: Study of this mathematical model to understand phase transitions and magnetic properties of materials. The Master Equation: Analysis of time evolution in systems with probabilistic transitions between states. Transport in Solids: Investigation of how particles, energy, and other physical quantities move through solid materials. Chaos: Exploration of deterministic systems that exhibit unpredictable behavior due to sensitivity to initial conditions. Prerequisite: PHYS 5310.

**PHYS 5319. MATHEMATICAL METHODS IN PHYSICS III. 3 Hours.**

PHYS 5319 covers a range of topics in numerical and computational methods, including: Numerical Differentiation and Integration: Techniques for approximating derivatives and integrals, crucial for analyzing physical systems. Interpolation and Extrapolation: Methods for estimating values within and beyond the range of known data points. Solving Differential and Integral Equations: Numerical approaches to tackle ordinary and partial differential equations, as well as integral equations commonly encountered in physics. Statistical Analysis: Application of statistical methods to interpret and analyze physical data. Scientific Computing Libraries: Utilization of specialized software libraries to facilitate complex computations. Artificial Intelligence Programming: Introduction to AI techniques relevant to physical problem-solving.

**PHYS 5320. QUANTUM MECHANICS III. 3 Hours.**

PHYS 5320 offers an in-depth study of: Quantum Theory of Radiation: Exploring the interaction between matter and electromagnetic radiation, including emission and absorption processes. Relativistic Quantum Equations: Studying equations that merge quantum mechanics with special relativity, such as the Dirac and Klein-Gordon equations. Elements of Quantum Field Theory: Introducing the framework that treats particles as excited states of underlying fields, fundamental in understanding particle physics. Symmetries and Gauge Theories: Analyzing how symmetries lead to conservation laws and exploring gauge theories that form the basis of fundamental interactions. Prerequisite: PHYS 5308 and PHYS 5312.

**PHYS 5325. INTRODUCTION TO ELEMENTARY PARTICLES I. 3 Hours.**

PHYS 5325 introduces students to the fundamental constituents of matter and the fundamental forces of nature. Key topics include: Overview of Particles and Forces: Understanding the basic building blocks of matter and the interactions between them. Particle Detectors and Accelerators: Exploring the tools and technologies used to detect and study elementary particles. Invariance Principles and Conservation Laws: Examining the symmetries and conservation laws that govern particle interactions. The Standard Model: Studying the theoretical framework that describes the electromagnetic, weak, and strong nuclear interactions. Electromagnetic, Weak, Strong, and Unified Interactions: Analyzing the fundamental forces and their unification.

**PHYS 5326. INTRODUCTION TO ELEMENTARY PARTICLE PHYSICS II. 3 Hours.**

PHYS 5326 focuses on advanced topics in particle physics, including: Systematics of the Quark Model: An in-depth exploration of quark classifications, their properties, and how they combine to form hadrons. Fundamental Interactions of Elementary Particles: A detailed study of the four fundamental forces-gravitational, electromagnetic, weak, and strong-and their roles in particle interactions. Spin and Relativistic Kinematics: Examination of particle spin, angular momentum, and the principles of relativistic motion as they apply to high-energy particles. Dirac Equation: Analysis of the Dirac equation's formulation and its significance in describing fermions and predicting antimatter. Standard Electroweak Model: Understanding the unification of electromagnetic and weak interactions within the Standard Model framework. Prerequisite: PHYS 5325.

**PHYS 5328. SURFACE PHYSICS. 3 Hours.**

PHYS 5328 delves into the following key areas: Experimental and Theoretical Methods: Techniques for analyzing solid surfaces, including various spectroscopy and microscopy methods. Geometric and Electronic Structures: Study of the arrangement of atoms and electronic states at the surfaces of metals and semiconductors. Reduced Dimensionality Systems: Investigation of surfaces as two-dimensional systems, which exhibit unique physical properties compared to their bulk counterparts. Adsorption Phenomena: Examination of how atoms and molecules adhere to surfaces, influencing surface chemistry and catalysis. Thin Film Growth: Understanding the processes involved in the formation of thin films, which are essential in various technological applications.

**PHYS 5330. PHYSICS OF SEMICONDUCTOR PROCESSING AND CHARACTERIZATION. 3 Hours.**

This course provides an in-depth exploration of the physical principles underlying semiconductor fabrication processes and the techniques used for material and device characterization. It is designed to equip students with both theoretical knowledge and practical skills relevant to the semiconductor industry and research. Selection from the following topics: physics of crystal growth, lattice defects, impurity diffusion, ion-implantation, thin film growth and plasma etching. Physics of characterization techniques utilizing resistivity, carrier mobility and lifetimes, electrons, x-rays, ions, Rutherford backscattering, neutron activation analysis, positron annihilation spectroscopy, deep-level transient spectroscopy.

**PHYS 5381. MECHANICS & HEAT FOR TEACHERS. 3 Hours.**

This course is intended for students who wish to achieve a higher level of knowledge and effectiveness in fundamental physics (not available for M.S. or Ph.D. credit in Physics). Topics include: Newton's Laws of Motion: Understanding the principles governing the motion of objects and their applications. Gravitation and Planetary Motion: Exploring the laws of universal gravitation and the mechanics of celestial bodies. Thermal and Statistical Physics: Examining the fundamental laws of thermodynamics and the statistical behaviors of systems. Oscillatory Motion, Waves, and Sound: Analyzing periodic motions, wave propagation, and acoustic phenomena.

**PHYS 5382. ELECTROMAGNETISM FOR TEACHERS. 3 Hours.**

This course is intended for students who wish to achieve a higher level of knowledge and effectiveness in fundamental physics (not available for M.S. or Ph.D. credit in Physics). Topics include: 1) Static charges, current flow, electric and magnetic fields; 2) simple DC/AC electrical circuits including examples from household circuit and practical electronic devices; 3) light and optics including examples such as cameras, microscopes and telescopes. Replaceable experiments will be demonstrated throughout the course.

**PHYS 5383. MODERN PHYSICS FOR TEACHERS. 3 Hours.**

This course is intended for students who wish to achieve a higher level of knowledge and effectiveness in fundamental physics (not available for M.S. or Ph.D. credit in Physics). Topics include: 1) Introduction to special relativity and quantum theory; 2) light and radiation; 3) applications to modern electrical devices; 4) nuclear and particle physics.

**PHYS 5385. PHYSICS LAB TECHNIQUES FOR TEACHERS. 3 Hours.**

This course is intended for students who wish to achieve a higher level of knowledge and effectiveness in fundamental physics (not available for M.S. or Ph.D. credit in Physics). Experiments demonstrating various topics are covered. Experiments include gravitational acceleration heat flow, harmonic motion, sound, electric magnetic fields, electric circuits, optic, x-rays and nuclear radiation.

**PHYS 5391. SPECIAL TOPICS IN PHYSICS. 3 Hours.**

Topics in physics, particularly from areas in which active research is being conducted, are assigned to individuals or small groups for intensive investigations. May be repeated for credit.

**PHYS 5392. MEDICAL PHYSICS 2. 3 Hours.**

This course is the second part of Medical Physics, which involves in depth learning of clinic medical imaging modalities, such as X-ray computed tomography (CT), magnetic resonance imaging (MRI), ultrasound, and nuclear medicine (gamma imaging, single photon emission computed tomography (SPECT) and positron emission tomography (PET)). Prerequisite: MATH 3318 or MATH 3319, PHYS 4392.

**PHYS 5393. READINGS IN PHYSICS. 3 Hours.**

Conference course. May be repeated for credit.

**PHYS 5394. RESEARCH IN PHYSICS. 3 Hours.**

Conference course with laboratory. May be repeated for credit.

**PHYS 5398. THESIS. 3 Hours.****PHYS 5694. RESEARCH IN PHYSICS. 6 Hours.**

Conference course with laboratory. May be repeated for credit.

**PHYS 5698. THESIS. 6 Hours.****PHYS 6301. METHODS OF APPLIED PHYSICS I--ELECTRONICS. 3 Hours.**

The analysis and design of electronic circuits for use in the laboratory. Transistors and integrated circuits in analog instrumentation. Digital logic. Information theory and signal processing.

**PHYS 6302. METHODS OF APPLIED PHYSICS II--COMPUTERS IN PHYSICS. 3 Hours.**

Applications of computers in physics. Acquisition and analysis of experimental data. Vector and parallel processing, image processing, simulation.

**PHYS 6303. METHODS OF APPLIED PHYSICS III--SPECTROSCOPY. 3 Hours.**

The principles (interactions, cross-sections, elastic and inelastic scattering, diffraction, coherence), the methodologies (sources, detectors, visualization), and applications (structure, dynamics, composition, excitations) of neutral and charged particle spectroscopies to condensed matter physics and materials science.

**PHYS 6304. APPLIED PHYSICS INTERNSHIP. 3 Hours.**

Applied physics and engineering research and training in industry or other science or engineering departments of U.T. Arlington or other institutions requiring applied physicists. Faculty supervision and submission of technical progress reports required.

**PHYS 6391. SELECTED TOPICS IN APPLIED PHYSICS. 3 Hours.**

Topics chosen from research areas in the Department of Physics or at one of the institutions or corporations participating in the traineeship program in applied physics; emphasis on industrial and engineering applications. May be repeated for credit.

**PHYS 6399. DISSERTATION. 3 Hours.****PHYS 6604. APPLIED PHYSICS INTERNSHIP. 6 Hours.**

Applied physics and engineering research and training in industry or other science or engineering departments of U.T. Arlington or other institutions requiring applied physicists. Faculty supervision and submission of technical progress reports required.

**PHYS 6699. DISSERTATION. 6 Hours.****PHYS 6904. APPLIED PHYSICS INTERNSHIP. 9 Hours.**

Applied physics and engineering research and training in industry or other science or engineering departments of U.T. Arlington or other institutions requiring applied physicists. Faculty supervision and submission of technical progress reports required.

**PHYS 6999. DISSERTATION. 9 Hours.****PHYS 7399. DOCTORAL DEGREE COMPLETION. 3 Hours.**

This course may be taken during the semester in which a student expects to complete all requirements for the doctoral degree and graduate. Enrolling in this course meets minimum enrollment requirements for graduation, for holding fellowships awarded by The Office of Graduate Studies and for full-time GTA or GRA positions. Students should verify that enrollment in this course meets other applicable enrollment requirements. To remain eligible in their final semester of study for grants, loans or other forms of financial aid administered by the Financial Aid Office must enroll in a minimum of 5 hours as required by the Office of Financial Aid. Other funding sources may also require more than 3-hours of enrollment. Additional hours may also be required to meet to requirements set by immigration law or by the policies of the student's degree program. Students should contact the Financial Aid Office, other sources of funding, Office of International Education and/or their graduate advisor to verify enrollment requirements before registering for this course. This course may only be taken twice. Students who do not complete all graduation requirements while enrolled in this course must enroll in a minimum of 6 dissertation hours (6699 or 6999) in their graduation term. Graded P/F/R.

## COURSES

**PLAN 1301. INTRODUCTION TO URBAN LIFE. 3 Hours.**

An examination of major urban problems, opportunities, and policy issues including crime, transportation, housing, education, welfare, and the environment with emphasis on racial, ethnic, and cultural diversity issues and alternative future possibilities; and an examination of the major political, social, and economic challenges facing contemporary urban planners and administrators - with emphasis on the interrelations among the national, state, and local governments.

**PLAN 3301. THE METROPLEX. 3 Hours.**

An in-depth orientation to urban dynamics, using as a case study the Dallas/Fort Worth metroplex - with its hundreds of cities, governmental units, neighborhoods, and business enterprises as well as its major concentrations of racial minorities and ethnic groups. Special attention is paid to the changing patterns of growth and demography occurring in the Dallas/Fort Worth metropolitan area and the impact of these on emerging social, political, and economic issues of this area. Emphasis also placed on career specializations and professional opportunities in the urban context.

**PLAN 4305. FOUNDATIONS OF ENVIRONMENTAL PROTECTION AND SUSTAINABILITY. 3 Hours.**

The organization, structure and practice of environmental protection at the federal, state and local levels of government. Course will develop a full understanding of how the goals of protecting human health and the environment are achieved through the implementation of environmental law, policy, practice, enforcement and collaboration among governmental entities, industry, environmental groups and the general public. Wide ranging use of case studies will be made and full engagement in new developments in the era of climate change will be achieved.



**PLAN 4310. PLANNING THE AMERICAN CITY. 3 Hours.**

Students in this course will develop an understanding of the role of the private and public sectors in the development and management of the American city. It will consider such topics as the organization of city government, demographic, economic, and physical conditions analysis, land use planning, the quality of the urban environment, urban redevelopment, urban design, and regional planning. An off-campus service learning component is a key required element of this course.

**PLAN 4320. SUSTAINABLE COMMUNITIES. 3 Hours.**

This course explores broad environmental and social issues in sustainable communities. Potential topics include urban water management, food and resources, wildlife conservation, native landscaping, waste management, green building, housing diversity, public transportation, and community participation. The course serves as a laboratory for working with governmental and non-governmental organizations in the DFW area and developing issue-based, action research projects to solve real-world problems in our communities. This hands-on course combines lectures, student-led discussions, site visits, and collaborative teamwork for service-learning projects.

**PLAN 4327. GREEN CITIES AND TRANSPORTATION. 3 Hours.**

Concepts of green cities and transportation, environmental and transportation challenges, and schools of thought on causes of environmental and transportation problems, with emphasis on planning practices and policies in relation to environmental and transportation issues and roles of planners in shaping urban landscape and infrastructure. Prerequisite: Junior standing. Department consent.

**PLAN 4356. INTRODUCTION TO GEOGRAPHIC INFORMATION SYSTEMS. 3 Hours.**

Introduction to GIS and the application of computer graphics systems in the storage, processing, and retrieval of geographic urban and regional information; case examples and related projects and issues of system management.

**PLAN 4357. INTERMEDIATE GEOGRAPHIC INFORMATION SYSTEMS. 3 Hours.**

Applications of GIS to typical urban and regional geographic information problems and projects. Prerequisite: PLAN 4356.

**PLAN 4391. INDEPENDENT STUDY. 3 Hours.**

Independent study guided by an instructor on a regular basis. May be repeated for credit. Prerequisite: permission of the instructor.

**PLAN 4394. COMMUNITY RESEARCH & APPLICATION. 3 Hours.**

Exposes students to research methods typically employed in planning and to their application to a community-based research project.

**PLAN 4395. STUDIES IN PLANNING. 3 Hours.**

Advanced studies in various subjects of city and regional planning. May be repeated for credit as topic varies. Prerequisite: Consent of the instructor.

**PLAN 5160. URBAN MANAGEMENT/PLANNING INTERNSHIP. 1 Hour.**

Intended to enhance readiness for professional work through exposure to planning practice in a one semester log internship (100 hrs in the spring or fall semester or 75 hrs in the summer). Integrates work experience and coursework through journaling and reflective practice. Requirements: (1) student secures an internship from a planning related employer and approval from the student's major professor prior to enrolling in the course; (2) the intern must provide performance evaluation by the job supervisor and the intern's evaluation of the internship experience. Enrollment open to students with no previous formal planning experience. Credit not available for previous internship or planning experience. P/F grade.

**PLAN 5191. CONFERENCE COURSE. 1 Hour.**

Special subjects and issues as arranged by individual students and faculty members. May be repeated for credit.

**PLAN 5193. MASTER'S COMPREHENSIVE EXAMINATION. 1 Hour.**

Directed study, consultation and comprehensive examination over coursework leading to thesis substitute for MCRP degree. Required of all thesis substitute students who were admitted to the MCRP program prior to Fall 2009 and who are not enrolled in thesis or other thesis substitute courses during semester in which they plan to graduate. Students beginning the MCRP program in Fall 2009 or after may not choose the Master's Comprehensive Examination as a thesis substitute option and may not enroll in this course.

**PLAN 5197. PROFESSIONAL REPORT. 1 Hour.**

Preparation of final professional report as a thesis substitute for MCRP degree. Required of all thesis substitute students not enrolled in PLAN 5193.

**PLAN 5297. PROFESSIONAL REPORT. 2 Hours.**

Preparation of final professional report as a thesis substitute for MCRP degree. Required of all thesis substitute students not enrolled in PLAN 5193.

**PLAN 5300. FOUNDATIONS OF URBAN THEORY. 3 Hours.**

Spatial development of human settlements, their life cycles, expansion, and decay. Covers key theories of social, spatial, and economic structures of cities, nineteenth century to present. Considers influences of urban form and development on class, race, gender, and community.

**PLAN 5303. PLANNING HISTORY, THEORY AND ETHICS. 3 Hours.**

Various theories of planning including rational comprehensive, communicative action, social learning, and radical planning. Sets theories within their historical contexts, and examines the social and political details of each era to show the development of diverse planning practices and theories of planning. Evaluates the values embodied in different theories and their relationship to practice and social justice, including planning ethics as contained in the AICP Code of Ethics and Professional Conduct.

**PLAN 5304. PLAN IMPLEMENTATION, ZONING, AND REGULATIONS. 3 Hours.**

Introduction to plan preparation and implementation. Topics include zoning, subdivision regulations, form-based codes, site planning, strategic planning, and comprehensive planning.

**PLAN 5305. LAND USE, MANAGEMENT AND DEVELOPMENT. 3 Hours.**

Assesses land use, management and development and considers new directions. Relates comprehensive planning, environmental management, and land use.

**PLAN 5306. URBAN REVITALIZATION. 3 Hours.**

Examines various urban revitalization projects from coordinated, large-scale ventures to grassroots and informal neighborhood initiatives. Emphasis on the history, logic, politics, and implementation of these projects as well as their physical, social, and economic outcomes.

**PLAN 5307. URBANIZATION IN THE DEVELOPING WORLD. 3 Hours.**

Explores the social, political and spatial dimensions of urbanization processes in developing countries. Covers urban, social, and cultural movements as well as development, processes of urban-rural migration, and globalization. The course will cover all developing regions of the world with an emphasis on Latin American countries.

**PLAN 5308. METROPOLITAN SUSTAINABILITY AND PLAN MAKING. 3 Hours.**

Provides the background for sustainability planning at the city and metropolitan levels including plan making (e.g., comprehensive plans, small area plans, functional plans, etc.). Explores the relationship of environmental sustainability to economic vitality and social equity including planning ethics.

**PLAN 5309. TRANSPORTATION/LAND USE MODELING AND POLICY ANALYSIS. 3 Hours.**

Overview of transportation/land use with specific transportation models and simulation methods; topics include economic theory of travel demand, land use models, UTPS framework for travel demand estimation, disaggregated travel demand models and abstract mode models.

**PLAN 5310. PLANNING, URBAN DEVELOPMENT AND STRUCTURE. 3 Hours.**

Overview of functional areas of planning (e.g., urban design, housing, transportation, etc.); fundamentals of urban structure and development of cities and regions including environmental, social, economic, and political factors and issues affecting urban settlements; global dimensions of planning.

**PLAN 5311. ELEMENTS OF URBAN DESIGN. 3 Hours.**

Study of contemporary urban form and environmental design, emphasizing visual-spatial qualities, social needs and economic linkages. Examination of processes, methods and techniques for solving urban design problems.

**PLAN 5312. STRATEGIC MGT AND PLANNING IN PUBLIC AND NON-PROFIT SERVICES. 3 Hours.**

Readings and case studies of strategic planning and management in the public and non-profit sectors; application of principles to an actual situation, involving stakeholder identification, environmental scanning, and formulation of mission statements, goals, and strategies. Offered as PLAN 5312 and PAPP 5357. Credit will be granted only once.

**PLAN 5313. URBAN GROWTH POLICIES. 3 Hours.**

Study of the political, societal and physical policies involved in urban growth management.

**PLAN 5315. TRANSPORTATION POLICIES, PROGRAMS AND HISTORY. 3 Hours.**

Transportation and related programs and policies in relation to city development and housing patterns. Interdependencies of land use, building development, and social change are explained as transportation-related.

**PLAN 5316. LAND USE PLANNING AND THE LAW. 3 Hours.**

Explores the law of land use in the context of the American legal, economic, and political systems. Examines leading court decisions and precedents for their background, content, and applicability to contemporary land use. Offered as PLAN 5316 and PAPP 5331. Credit will be granted only once.

**PLAN 5317. INTERMEDIATE DATA ANALYSIS. 3 Hours.**

An intermediate level examination of statistical and research techniques appropriate to urban and social analysis. Presuming a basic understanding of descriptive and inferential statistics, the course covers multivariate regression, including error analysis and non-linear models, path analysis, Analysis Of Variance (ANOVA), logit and probit models, and techniques for data reduction (e.g., factor analysis). Offered as PAPP 5342 and PLAN 5317; credit will be granted only once. Prerequisite: PAPP 5302.

**PLAN 5318. TECHNIQUES OF PLANNING ANALYSIS I. 3 Hours.**

Introduction to analytical techniques used in urban and regional planning. Topics include: census data and geography and introduction to GIS, demographic analysis, cost-benefit analysis, economic base analysis, gravity models, and displaying and communicating data analysis and results in graphic, written, and oral forms.

**PLAN 5319. AGENCIES OF PLANNING AND ADMINISTRATION. 3 Hours.**

Contemporary managerial functions involved in running public, private, or non-profit organizations: goal setting, planning, organizing, delegating and motivating others, personal productivity and motivation, time and stress management, controlling, and project management.

**PLAN 5320. DATABASE MANAGEMENT FOR URBAN PLANNING AND ADMINISTRATION. 3 Hours.**

Concepts and computer applications of data management. Topics include data sources, data models, database design, data query, data analysis, and database management techniques for urban planning, management and administration. Credit will be given only once.

**PLAN 5321. VISUAL BASIC AND GIS. 3 Hours.**

Provides an introduction to the techniques and applications of computer graphics and mapping for presenting socioeconomic information in graphic and spatial form.

**PLAN 5322. ECONOMIC DEVELOPMENT PLANNING AND POLICY. 3 Hours.**

Introductory seminar in subnational economic development programs in the U.S. Covers basics of location theory, economic planning, budgeting, incentives, public and private revenue sources, analysis methods such as central place and economic base, intergovernmental efforts, redevelopment, high tech, trade and/or tourism.

**PLAN 5323. HISTORIC PRESERVATION. 3 Hours.**

Covers elements of historic designation, rehabilitation, financial incentives, district regulations, and preservation impacts.

**PLAN 5324. COMMUNITY DEVELOPMENT. 3 Hours.**

Focuses on current problems of community development and neighborhood revitalization. Housing, community assets, the roles of community development corporations and social capital in cities, and community economic development will be analyzed. Federal, state, and local policies, with grassroots initiatives evaluated for effectiveness on promoting alternatives for community building and organizing. Also offered as URPA 5313; credit will be granted only once.

**PLAN 5325. PHYSICAL PLANNING AND URBAN DESIGN. 3 Hours.**

Introduction to basic concepts in urban design and physical planning. Provides an understanding of how built environments evolve, and how they can be creatively planned and designed so as to meet social and ecological goals. Special attention to principles and analyses related to the physical planning of neighborhoods and streets, as well as patterns of urban form and public places.

**PLAN 5326. CULTURAL PLANNING AND URBAN DEVELOPMENT. 3 Hours.**

This course examines 1) the composition of the creative economy in cities around the world, 2) arts, culture, and creative economy planning and policy efforts at the neighborhood, city, and regional levels, and 3) the social, spatial and political ramifications of these efforts and of the creative economy broadly.

**PLAN 5327. GREEN CITIES AND TRANSPORTATION. 3 Hours.**

Concepts of green cities and transportation, environmental and transportation challenges, and schools of thought on causes of environmental and transportation problems, with emphasis on planning practices and policies in relation to environmental and transportation issues and roles of planners in shaping urban landscape and infrastructure.

**PLAN 5328. PUBLIC BUDGETING. 3 Hours.**

This course introduces students to the principles and practices used by federal, state, and local governments to acquire and spend revenues within the context of American democracy, capitalism, federalism, and economics. The primary objective of this course is to provide students with the practical skills and theoretical knowledge to enable them to be effective participants in the budgeting process and critical consumers and producers of research relevant to public budgeting. Offered as PLAN 5328 and PAPP 5326. Credit will be granted only once.

**PLAN 5329. PUBLIC CAPITAL BUDGETING. 3 Hours.**

Examines governmental capital budgeting processes with a focus on understanding the significance of capital improvement planning, public facility investment, and project evaluation to sound infrastructure financing and regional economic growth. Governments purchase or construct long-lasting physical assets or facilities financed mostly through borrowing. This course aims to understand the rationale for public capital budgeting and debt instruments used to finance capital investment in the political context of public budgeting in America. Offered as PAPP 5332 and PLAN 5329; credit will be granted only once.

**PLAN 5330. TECHNIQUES OF PLANNING ANALYSIS II. 3 Hours.**

Introduction to research methods, both quantitative and qualitative and mixed methods. Relating planning problem identification and definition with appropriate method of data gathering and analysis. Analysis and interpretation of qualitative and quantitative data including interview and small group techniques, and basic statistical analysis. Communication of analysis results in graphic, written, and oral forms.

**PLAN 5331. GIS WORKSHOP. 3 Hours.**

Skills, practical experience, problem-solving methods and techniques in geographic information systems. Capstone course for GIS Certificate Program; substitutes for one Project Planning Course. Prerequisite: PLAN 5357.

**PLAN 5332. PROJECT STUDIO. 3 Hours.**

Studio course working on applied city and regional planning projects within the Dallas-Fort Worth area or elsewhere. Provides students with practical experience in collaborative teamwork and the application of skills, methods, and techniques in city and regional planning, including citizen participation, problem analysis, mapping, design, presentation, working with clients, and applied planning process. Should be taken in the second half of the student's program of study, with exceptions for those with applied planning experience. May be repeated as topic changes.

**PLAN 5333. GRAPHICS AND MULTIMEDIA COMMUNICATION IN PLANNING. 3 Hours.**

Builds skills in the use and application of contemporary graphic techniques that enable planners to visually communicate and display data, design concepts and ideas as solutions to planning problems. Training in the use of various graphic communication and multimedia software, including online web media and print media.

**PLAN 5335. PROFESSIONAL WRITING. 3 Hours.**

Builds student writing skills in professional communication of ideas and information. Includes review of basic writing skills, grammatical construction, report and memo writing based on current standardized formats; considering the role of audience, writing in a clear, concise and professional style; emphasizes revising writing assignments for effective communication. Also offered as PAPP 5341; credit will be granted for only one.

**PLAN 5340. GIS AND SUITABILITY ANALYSIS. 3 Hours.**

Acquaints students with theoretical and practical aspects of suitability analysis process or activity allocation on land use/environmental policies. Uses Geographic Information System (GIS) and computer models for overlaying map analysis, buffering, market demand and activity locations, etc. to incorporate environmental and ecological factors into the determination of land development potential including soils, slope, drainage, vegetation, and related factors.

**PLAN 5341. ENVIRONMENTAL REGULATIONS: LAWS AND PLANNING. 3 Hours.**

Federal, state, and local environmental regulations which have effect on the practice of city and regional planning. Specific articles, laws, and directives contrasted and compared to local city design and development controls. Subjects include CERCLA, RCRA, SARA, TSCA, OSH Act, among others.

**PLAN 5342. ENVIRONMENTAL POLICY. 3 Hours.**

Focuses on the physical environmental dimensions of urbanization including such factors as pollution, waste disposal, and land use; stresses the role of economic, social, and political institutions as these affect environmental quality of the city. Offered as PLAN 5342 and PAPP 5317; credit will be granted only once.

**PLAN 5343. FOUNDATIONS OF ENVIRONMENTAL POLICY. 3 Hours.**

Explores how environmental controversy is rooted in conflict between a number of schools of environmental policy thought with divergent perspectives on issues such as how to define progress, how to balance the needs of economy and ecosystem, how to cope with environmental complexity, and what role science should play in environment affairs. Also offered as URPA 5365; credit will be granted only once.

**PLAN 5344. HUMAN SERVICES PLANNING. 3 Hours.**

Social welfare institutions: private and public; needs assessment, resource allocation, procedures, city/state/federal/private policy review; highlights of current system demands and changes. Also offered as URPA 5316.

**PLAN 5345. PLANNING AND REAL ESTATE DEVELOPMENT. 3 Hours.**

The goals, strategies, methods, and achievements of major participants in the urban land and building markets are examined. Land owners, speculators, real estate brokers, developers, bankers, lawyers, non-profit builders, and government agencies are studied, as well as such business tools as: market and feasibility analysis, appraisal techniques, proforma analysis, and others.

**PLAN 5346. QUALITATIVE METHODS. 3 Hours.**

The study of qualitative research and analysis methods. Offered as PLAN 5346 and PAPP 5344; credit will be given only once.

**PLAN 5347. URBAN PROBLEMS. 3 Hours.**

Specific urban problems examined in depth, traced to their historical origins to see how they or similar problems have been dealt with in other times and places. Students will then propose possible solutions to the problems in their contemporary form. Offered as PLAN 5347 and PAPP 5319.

**PLAN 5350. ENVIRONMENTAL PLANNING. 3 Hours.**

Overview of environmental planning issues and problems, including basic ecological principles; development and effects of the chemical industry; policies on international issues; environmental justice and ethics; environmental economics, including externalities and public goods; sustainable development; overviews of planning for air quality, water quality, solid waste, pollution prevention, habitat conservation, etc.; and plan implementation, including enforcement, regulation and funding.

**PLAN 5351. TECHNIQUES OF ENVIRONMENTAL ASSESSMENT. 3 Hours.**

Analysis of impact assessment documents from a variety of projects; study of federal laws and regulations governing the process; state impact assessment laws and regulations; and procedures used in other nations. Students will prepare an environmental assessment for a real-world project. Overviews of environmental site assessment, MIS documents, and environmental auditing will also be given.

**PLAN 5352. ENVIRONMENT ASSESSMENT POLICY & PRACTICE. 3 Hours.**

Review and analysis of the development of the environmental assessment process with focus on expectations of how environmental assessment will be transformed in the era of climate change. Students evaluate the effects of new laws and regulations and the accelerated growth of environmental policy development at all levels of government, especially among urban areas. The course includes review of selected environmental assessment documents and project case studies.

**PLAN 5353. ENVIRONMENTAL LAW. 3 Hours.**

This seminar examines the role of environmental law within the political-institutional framework of the American system. Emphasis is on the legal-judicial aspects of environmental regulation. Analyzes the decision of U.S. courts as these affect and interpret environmental laws and regulations for their legality and constitutionality.

**PLAN 5354. HOUSING PLANNING, POLICY AND FINANCE. 3 Hours.**

Evaluation of the effect of state, local, and federal housing policy on the urban arena. Topics will be selected from federal subsidy programs, tax subsidies, operations of financial intermediaries, and related areas.

**PLAN 5356. INTRODUCTION TO GEOGRAPHIC INFORMATION SYSTEMS. 3 Hours.**

Introduction to GIS and the application of computer graphics systems in the storage, processing, and retrieval of geographic urban and regional information; case examples and related projects and issues of system management.

**PLAN 5357. INTERMEDIATE GEOGRAPHIC INFORMATION SYSTEMS. 3 Hours.**

Applications of GIS to typical urban and regional geographic information problems and projects. Prerequisite: PLAN 5356.

**PLAN 5358. INTELLIGENT TRANSPORTATION SYSTEMS (ITS) AND PLANNING. 3 Hours.**

Concepts, components, deployments, and implementations of ITS; methods for ITS evaluations; linkage between ITS and traditional transportation planning; and issues related to ITS planning and deployment.

**PLAN 5360. COMPUTER METHODS FOR TRANSPORTATION PLANNING. 3 Hours.**

Applications of computer software (for example, TransCad, Tranplan) in transportation planning modeling. Theories of residential location choice and travel behavior. Topics may include land-use and travel demand models, trip distribution models, mode choice models, and network equilibrium.

**PLAN 5361. PLANNING INTERNSHIP. 3 Hours.**

Intended to enhance readiness for professional work through exposure to planning practice in a one semester log internship (300 hrs in the spring or fall semester or 275 hrs in the summer). Integrates work experience and coursework through journaling and reflective practice. Requirements: (1) student secures an internship from a planning related employer and approval from the student's major professor prior to enrolling in the course; (2) the intern must provide performance evaluation by the job supervisor and the intern's evaluation of the internship experience. Enrollment open to students with no previous formal planning experience. Credit not available for previous internship or planning experience. P/F grade.

**PLAN 5362. URBAN DIVERSITY. 3 Hours.**

Examines the growing spatial and social diversity of cities; how physical as well as socioeconomic urban structures have fostered race, class, and gender inequalities; how urban policies have addressed and can address these issues. Offered as PLAN 5362 and PAPP 5362.

**PLAN 5363. LEADERSHIP AND COMMUNICATION SKILLS IN THE PLANNING PROCESS. 3 Hours.**

Governance and participation, comprehensive planning and the community planning process, participatory planning, and practical communication skills for planners and administrators: leadership and public meetings, participative decision making, interpersonal communications and conflict management, effective writing and presentations.

**PLAN 5364. ECONOMIC BASE AND INDUSTRIAL DEVELOPMENT POLICY. 3 Hours.**

Theories and methods of local and regional economic base analyses; techniques for inventorying strengths, weaknesses, opportunities and threats of local capital, labor and land resources; alternative policy responses to industrial development issues arising from economic base analysis.

**PLAN 5370. SUSTAINABLE COMMUNITIES. 3 Hours.**

This course explores broad environmental and social issues in sustainable communities. Potential topics include urban water management, food and resources, wildlife conservation, native landscaping, waste management, green building, housing diversity, public transportation, and community participation. The course serves as a laboratory for working with governmental and non-governmental organizations in the DFW area and developing issue-based, action research projects to solve real-world problems in our communities. This hands-on course combines lectures, student-led discussions, site visits, and collaborative teamwork for service-learning projects.

**PLAN 5380. RESEARCH QUESTIONS IN PLANNING. 3 Hours.**

Application of research issues, writing, and communication skills in planning. Designed to assist students in preparing their research for master's thesis or professional report.

**PLAN 5391. CONFERENCE COURSE. 3 Hours.**

Special subjects and issues as arranged by individual students and faculty members. May be repeated for credit.

**PLAN 5395. SPECIAL TOPICS IN PLANNING. 3 Hours.**

Selected topics in City and Regional Planning. May be repeated for credit.

**PLAN 5397. PROFESSIONAL REPORT. 3 Hours.**

Preparation of final professional report as a thesis substitute for MCRP degree. Required of all thesis substitute students not enrolled in PLAN 5193. Prerequisite: PLAN 5380.

**PLAN 5398. PLANNING THESIS. 3 Hours.**

Graded F/R.

**PLAN 5695. TOPICS IN PLANNING. 6 Hours.**

Studio, lecture or seminar course to explore and present special topics in city and regional planning. May be repeated for credit as topics change. Prerequisite: Permission of Graduate Advisor or Program Director.

**PLAN 5698. PLANNING THESIS. 6 Hours.**

Graded F/R.

**PLAN 5998. PLANNING THESIS. 9 Hours.**

Graded P/F/R.

**PLAN 6161. TEACHING INTERNSHIP. 1 Hour.**

Provides exposure to all aspects of course preparation and delivery including, course and syllabus design, student performance assessment, exam preparation, maintaining class records, and grading. Also, lecture and other forms of delivery of instruction. Interns co-teach with a faculty mentor, who provides feedback.

**PLAN 6300. ADVANCED URBAN THEORY. 3 Hours.**

Covers key theories of urbanization and socioeconomic relations. Emphasis is placed on the development of paradigms in urban theory, from classic texts to important shifts and debates in the late 20th-early 21st centuries. Considers principal theorists from urban disciplines of planning, geography, economics, sociology, and how they structure their arguments about urban form and social relations. Aimed at doctoral students, as well as advanced master's students, both from urban planning/urban affairs as well as from graduate programs outside School of Urban and Public Affairs.

**PLAN 6301. RESEARCH FOUNDATIONS AND Ph.D. WORKSHOP. 3 Hours.**

Examines fundamentals of research design for linking research questions to evidence, analysis, and research conclusions in urban planning, public administration, and public policy. Designed to assist doctoral students in preparing their research for dissertation. Opportunities to present work in progress, share ideas, and interact with faculty. Also offered as PAPP 6301; credit will be granted only once. Prerequisite: PLAN 5317 or PAPP 5342, PLAN 5346 or PAPP 5344 and PLAN 6346 or PAPP 6346.



**PLAN 6303. PLANNING HISTORY, THEORY AND ETHICS. 3 Hours.**

Various theories of planning including rational comprehensive, communicative action, social learning, and radical planning. Sets theories within their historical contexts, and examines the social and political details of each era to show the development of diverse planning practices and theories of planning. Evaluates the values embodied in different theories and their relationship to practice and social justice, including planning ethics.

**PLAN 6305. SEMINAR IN URBAN PLANNING PROCESSES. 3 Hours.**

Final course in urban planning field. Focus on the various political, economic, and social institutions and theoretical approaches in the planning process, and application of these multidisciplinary perspectives in the analysis of specific planning issues.

**PLAN 6306. URBAN REVITALIZATION. 3 Hours.**

Emphasizes the history, logic, politics, and implementation of urban revitalization projects as well as their physical, social, and economic outcomes. Examines various urban revitalization projects from coordinated, large-scale ventures to grassroots and informal neighborhood initiatives.

**PLAN 6307. URBAN GEOGRAPHY. 3 Hours.**

Emphasizes real aspects associated with urban physical environments and social, behavioral, and financial processes that shape these environments.

**PLAN 6308. METROPOLITAN SUSTAINABILITY AND PLAN MAKING. 3 Hours.**

Provides the background for sustainability planning at the city and metropolitan levels including plan making (e.g., comprehensive plans, small area plans, functional plans, etc.). Explores the relationship of environmental sustainability to economic vitality and social equity including planning ethics.

**PLAN 6309. TRANSPORTATION/LAND USE MODELING AND POLICY ANALYSIS. 3 Hours.**

Overview of transportation/land use with specific transportation models and simulation methods; topics include economic theory of travel demand, land use models, UTPS framework for travel demand estimation, disaggregated travel demand models and abstract mode models.

**PLAN 6310. PLANNING, URBAN DEVELOPMENT AND STRUCTURE. 3 Hours.**

Planning functional domains from transportation to comprehensive planning and fundamental theories explaining urban structure and development of cities and regions.

**PLAN 6311. SPATIAL THEORY AND POLICY: URBAN FORM AND STRUCTURE. 3 Hours.**

Examines factors shaping urban form. Includes economic and spatial structures of cities and their implications for planning and policy issues. Outlines location theory, urban growth, density and land price, land use and spatial pattern, multi-centering and sprawl, as well as new traditional and transit oriented developments (NTD & TOD) among others. Broadens understanding of different aspects of cities and urban areas (housing, employment and commercial centers). Reflects on the connections between emergent patterns of growth and evolving transportation network.

**PLAN 6313. URBAN GROWTH POLICIES. 3 Hours.**

Study of the political, societal and physical policies involved in urban growth management.

**PLAN 6315. LAND USE, MANAGEMENT AND DEVELOPMENT. 3 Hours.**

Fundamentals of real estate development and land use planning and its intersection with the planning process. Assesses land use, management and development and considers new directions.

**PLAN 6317. INTERMEDIATE DATA ANALYSIS. 3 Hours.**

Intermediate statistical and research techniques appropriate to Ph.D. level urban and social analysis. Presuming a basic understanding of descriptive and inferential statistics, the course covers multivariate regression, including error analysis and non-linear models, path analysis, Analysis of Variance (ANOVA), logit and probit models, and techniques for data reduction (e.g., factor analysis). Prerequisite: PAPP 5302.

**PLAN 6318. TECHNIQUES OF PLANNING ANALYSIS I. 3 Hours.**

Analytical techniques used in urban and regional planning. Topics include: census data and geography, introduction to GIS, demographic analysis, cost-benefit analysis, economic base analysis, gravity models, and displaying and communicating data analysis and results in graphic, written, and oral forms.

**PLAN 6321. ELEMENTS OF URBAN DESIGN. 3 Hours.**

Study of contemporary urban form and environmental design, emphasizing visual-spatial qualities, social needs and economic linkages. Examination of theories, processes, methods and techniques of urban design.

**PLAN 6322. ECONOMIC DEVELOPMENT PLANNING AND POLICY. 3 Hours.**

A seminar on subnational economic development programs in the U.S. Covers location theory, economic planning, budgeting, incentives, public and private revenue sources, analysis methods such as central place and economic base, intergovernmental efforts, redevelopment, high tech, trade and/or tourism.

**PLAN 6324. COMMUNITY DEVELOPMENT. 3 Hours.**

Focuses on current problems of community development and neighborhood revitalization. Housing, community assets, the roles of community development corporations and social capital in cities, and community economic development. Federal, state, and local policies vs. grassroots initiatives evaluated for effectiveness on promoting alternatives for community building and organizing. Ph.D. level critical assessment of the central theories and rationales driving community development.

**PLAN 6325. TRANSPORTATION POLICIES, PROGRAMS AND HISTORY. 3 Hours.**

Transportation and related programs and policies in relation to city development and housing patterns. Interdependencies of land use, building development, and social change are explained as transportation-related.

**PLAN 6326. PHYSICAL PLANNING AND URBAN DESIGN. 3 Hours.**

Concepts in urban design and physical planning. Provides an understanding of how built environments evolve, and how they can be creatively planned and designed so as to meet social and ecological goals. Special attention to principles and analyses related to the physical planning of neighborhoods and streets, as well as patterns of urban form and public places.

**PLAN 6327. GREEN CITIES AND TRANSPORTATION. 3 Hours.**

Schools of thought on causes of environmental and transportation problems and 'green cities' as potential solution with emphasis on the planning approaches and public policies tackling environmental and transportation issues. Critical assessment of the roles of planners in shaping the urban landscape and infrastructure.

**PLAN 6330. TECHNIQUES OF PLANNING ANALYSIS II. 3 Hours.**

Quantitative and qualitative and mixed methods research. Relating planning problem identification and definition with appropriate methods of data gathering and analysis. Analysis and interpretation of qualitative and quantitative data including interview and small group techniques, and basic statistical analysis. Communication of analysis results in graphic, written, and oral forms.

**PLAN 6331. GIS WORKSHOP. 3 Hours.**

Application of methods and techniques in geographic information systems to the analysis of spatial urban phenomena and spatial decision-making in regional planning and public policy. Research and project-based planning course. Prerequisite: PLAN 6357.

**PLAN 6340. GIS AND SUITABILITY ANALYSIS. 3 Hours.**

Presents theoretical and practical aspects of the suitability analysis process. Uses Geographic Information System (GIS) analysis and computer models for incorporating environmental and ecological factors in determining land development potential.

**PLAN 6345. PLANNING AND REAL ESTATE DEVELOPMENT. 3 Hours.**

The goals, strategies, methods, and achievements of major participants in the urban land and building markets are examined. Land owners, speculators, real estate brokers, developers, bankers, lawyers, non-profit builders, and government agencies are studied, as well as such business tools as: market and feasibility analysis, appraisal techniques, proforma analysis, and others.

**PLAN 6346. ADVANCED DATA ANALYSIS IN URBAN AND PUBLIC AFFAIRS. 3 Hours.**

An introduction to selected advanced techniques related to planning analysis. Subjects include advanced applied regression analysis, multivariate logit analysis, and multinomial logistic regression. Applications of projection techniques, land use and transportation models, and methods of regional analysis. Offered as PLAN 6346 and PAPP 6346. Credit will be given only once.

**PLAN 6347. QUALITATIVE METHODS. 3 Hours.**

The study of qualitative research and analysis methods. Offered as PAPP 6344 and PLAN 6347; credit will be given only once.

**PLAN 6350. ENVIRONMENTAL PLANNING. 3 Hours.**

Reviews environmental planning and its ecological principles; environmental effects of industrial development; policies on international issues; environmental justice and ethics; environmental economics, including externalities and public goods; sustainable development; overview of planning for air quality, water quality, solid waste, pollution prevention, habitat conservation, etc.; and issues of plan implementation, including enforcement, regulation and funding.

**PLAN 6357. INTERMEDIATE GEOGRAPHIC INFORMATION SYSTEMS. 3 Hours.**

GIS applications to typical urban and regional geographic information problems and projects. Prerequisite: PLAN 5356.

**PLAN 6358. INTELLIGENT TRANSPORTATION SYSTEMS (ITS) AND PLANNING. 3 Hours.**

Concepts, components, deployments, and implementations of ITS; methods for ITS evaluations; linkage between ITS and traditional transportation planning; and issues related to ITS planning and deployment.

**PLAN 6361. TEACHING INTERNSHIP. 3 Hours.**

Provides exposure to all aspects of course preparation and delivery including, course and syllabus design, student performance assessment, exam preparation, maintaining class records, and grading. Also, lecture and other forms of delivery of instruction. Interns co-teach with a faculty mentor, who provides feedback.

**PLAN 6399. DISSERTATION. 3 Hours.**

Graded R/F only.

**PLAN 6691. CONFERENCE COURSE. 6 Hours.**

Special subjects and issues as arranged by individual students and faculty members. May be repeated for credit.

**PLAN 6699. DISSERTATION. 6 Hours.**

Graded R/F/P/W only.

**PLAN 6999. DISSERTATION. 9 Hours.**

Graded P/F/R.

**PLAN 7399. DOCTORAL DEGREE COMPLETION. 3 Hours.**

This course may be taken during the semester in which a student expects to complete all requirements for the doctoral degree and graduate. Enrolling in this course meets minimum enrollment requirements for graduation, for holding fellowships awarded by The Office of Graduate Studies and for full-time GTA or GRA positions. Students should verify that enrollment in this course meets other applicable enrollment requirements. To remain eligible in their final semester of study for grants, loans or other forms of financial aid administered by the Financial Aid Office must enroll in a minimum of 5 hours as required by the Office of Financial Aid. Other funding sources may also require more than 3-hours of enrollment. Additional hours may also be required to meet to requirements set by immigration law or by the policies of the student's degree program. Students should contact the Financial Aid Office, other sources of funding, Office of International Education and/or their graduate advisor to verify enrollment requirements before registering for this course. This course may only be taken twice. Students who do not complete all graduation requirements while enrolled in this course must enroll in a minimum of 6 dissertation hours (6699 or 6999) in their graduation term. Graded P/F/R.

**COURSES****POLS 2311. GOVERNMENT OF THE UNITED STATES. 3 Hours. (TCCN = GOVT 2305)**

(GOVT 2305). The Constitution and government of the United States. The organization, procedures, and duties of the branches of the government, together with their accomplishments and defects.

**POLS 2312. STATE AND LOCAL GOVERNMENT. 3 Hours. (TCCN = GOVT 2306)**

(GOVT 2306). The principles and organization of American state, county, and municipal government, together with current problems and the Constitution and government of Texas.

**POLS 3301. INTRODUCTION TO GLOBAL ISSUES. 3 Hours.**

Comparative perspectives on a broad range of cultural, linguistic, economic, political, and social issues confronting a globalized world today. Designed to draw attention to the multifaceted connections among nation-states, nongovernmental organizations, diverse ethnic, cultural, and religious groups, and populations around the world. Course taught as POLS 3301 and GLOBAL 2301. Credit will be granted in only one department.

**POLS 3302. INTRODUCTION TO INTERNATIONAL RELATIONS. 3 Hours.**

Introduction to the interplay between states, international organizations, multinational corporations, and popular or militant movements within the international system and to their continued search for wealth, power, and security.

**POLS 3303. BUREAUCRATIC POLITICS. 3 Hours.**

Overview of social science research on bureaucratic organizations, including hierarchical power structures, collective action problems, organizational decline, pluralism, and the United States rulemaking process. Prerequisite: POLS 2311 and POLS 2312.

**POLS 3304. INTRODUCTION TO COMPARATIVE POLITICS. 3 Hours.**

Cross-national and cross-cultural comparisons of political systems. Institutional structure, political process, dynamics of change, and ideology. Prerequisite: POLS 2311 and POLS 2312.

**POLS 3305. GOVERNMENT IN URBAN AMERICA. 3 Hours.**

Problems associated with the growth, diversity, and complexity of urban areas and governmental solutions. Urban regimes, neighborhood governments, electoral politics, and intergovernmental relations. Useful for students interested in urban management.

**POLS 3306. LEGISLATIVE ORGANIZATION AND PROCEDURE. 3 Hours.**

Internal and external influences on the U.S. Congress: rules, norms, committees, seniority, political parties, presidents, media, constituents and interest groups. Prerequisite: POLS 2311 and POLS 2312.

**POLS 3307. COMPARATIVE STATE AND LOCAL POLITICS. 3 Hours.**

Comparison of state and local political institutions and policy choices in the United States. Useful for students interested in state and local government policy innovations.

**POLS 3309. HEALTH POLITICS, POLICY, AND ADVOCACY. 3 Hours.**

Explores health politics, policy, and advocacy in modern American politics in areas such as health care costs, the opioid epidemic, natural disasters, smoking and vaping, vaccines, and scooters. Considers how stakeholders such as patients, advocacy groups, hospitals, medical professionals, and insurance companies influence policy-making, and how health care policies shape patient care.

**POLS 3310. RESEARCH METHODS AND POLITICAL ANALYSIS. 3 Hours.**

The systematic investigation of political phenomena through theory building, appropriate research design, statistical inference, and hypothesis testing. Students will learn to analyze political data and use statistical packages to present and discern significant relationships between variables, fulfilling the computer competency requirement. Prerequisite: POLS 2311, POLS 2312, MATH 1301 or MATH 1302, and MATH 1308 or MATH 1309. Exceptions as approved by the Department.

**POLS 3311. PUBLIC OPINION. 3 Hours.**

Measurement of attitudes, public opinion and ideology, the learning and influencing of public opinion, and expression of public opinion in elections and mass political movements. The logic and practice of survey research. Prerequisite: POLS 2311 and POLS 2312.

**POLS 3312. INTRODUCTION TO PUBLIC POLICY ANALYSIS. 3 Hours.**

The American policymaking process from issue creation to program administration and evaluation. Policy models and methods of policy analysis. Oriented toward providing students with skills as a professional policy analyst. Prerequisite: POLS 2311 and POLS 2312.

**POLS 3313. MODERN CRITICS OF SOCIETY AND POLITICS. 3 Hours.**

Designed for both political science and other majors. Focus on writers like Banfield, Galbraith, Marcuse, Reich, Revel, Skinner, and Toffler. Prerequisite: POLS 2311 and POLS 2312.

**POLS 3315. VIOLENCE & REPRESSION IN THE AMERICAS. 3 Hours.**

Examination of extra-legal behavior in the Americas (particularly Latin America). Topics include human rights violations, repression, insurrection, terrorism, and revolution. Analysis of different causes and outcomes of such political participation. Prerequisite: POLS 2311 and POLS 2312.

**POLS 3317. MEXICAN POLITICS AND U.S.-MEXICO RELATIONS. 3 Hours.**

Current economic and political systems of Mexico and relevant issues in U.S.-Mexico relations. Trade, immigration, economic dependency, energy, contraband, and other topics. Offered as MAS 3317 and POLS 3317; credit will be given in only one department. Prerequisite: POLS 2311 and POLS 2312.

**POLS 3319. CAUSES OF WAR. 3 Hours.**

Introduces students to the causes of war including rationalist explanations, genetic and evolutionary impulses, psychological motivations, and group and structural incentives.

**POLS 3328. INTRODUCTION TO MIDDLE EAST POLITICS. 3 Hours.**

The historical developments that have led to the current political, social, economic, and security order of the Middle East, as well as the contemporary challenges facing the region and its inhabitants. Prerequisites: POLS 2311 and POLS 2312.

**POLS 3330. JUDICIAL POLITICS. 3 Hours.**

Examines the structure, function, and politics of the federal judiciary with an emphasis on the U.S. Supreme Court. Examines selection of judges, theories of judicial decision-making, external political influences on the courts, and impact of decisions. Especially recommended for pre-law majors. Prerequisite: POLS 2311 and POLS 2312.

**POLS 3331. CONTEMPORARY ISSUES IN CIVIL LIBERTIES. 3 Hours.**

Conflicts over civil liberties in American law focusing on classic and contemporary debates over race, gender, sexual identity, religion, and freedom of thought. Especially recommended for pre-law students. Prerequisite: POLS 2311 and POLS 2312.

**POLS 3333. JURISPRUDENCE AND CONSTITUTIONAL CONFLICT. 3 Hours.**

Competing theories of law, especially in American constitutional politics. Examines disagreements over the meaning and application of the U.S. Constitution focusing on debates over living constitutionalism versus originalism and the Supreme Court's recent controversial rulings on abortion, guns, race, and religion. Especially recommended for pre-law students. Prerequisite: POLS 2311 and POLS 2312.

**POLS 3336. STATE COURTS. 3 Hours.**

An examination of state judicial institutions emphasizing the role of processes in determining judicial behavior and the composition of state courts. Examines the role of law and courts, judicial system structures, and judicial policy-making in state government. Prerequisite: POLS 2311 and POLS 2312.

**POLS 3337. LAW AND LAWYERS IN POPULAR CULTURE AND REALITY. 3 Hours.**

Examines the role of law and lawyers in American society by contrasting popular culture views to ethical constraints imposed upon lawyers by the justice system and realities of how lawyers operate within that system. Prerequisite: POLS 2311, POLS 2312.

**POLS 3378. LATINO POLITICS. 3 Hours.**

An overview of Latino/Hispanic political behavior, identity, and power that analyzes the social, economic, and political issues impacting the Latino/Hispanic community in the United States. To be offered as POLS 3378 and MAS 3378. Credit will be granted only once.

**POLS 3379. LATINO POLITICAL THOUGHT. 3 Hours.**

An overview of the development of Latino/Hispanic political thought from Iberian and Latin American political culture and philosophy to contemporary North American Latino/Hispanic political ideology and political thought. To be offered as POLS 3379 and MAS 3379. Credit will be granted only once.

**POLS 3390. HONORS COLLOQUIUM. 3 Hours.**

An interdisciplinary course designed to meet the needs of advanced undergraduates in the honors program. Prerequisite: POLS 2311 and POLS 2312.

**POLS 4102. POLITICAL SCIENCE SERVICE LEARNING. 1 Hour.**

Students will engage in service learning placements to supplement political science course work with the goal of civic education and community involvement. Placements will be coordinated with the Center for Community Service Learning and students will be required to fulfill not only placement hours, but also additional reflection in writing in consultation with the faculty advisor. This course does not satisfy area distribution requirements. Prerequisite: POLS 2311 and POLS 2312.

**POLS 4103. POLITICAL SCIENCE AMBASSADORS. 1 Hour.**

This course is designed to provide Political Science majors with opportunities to develop leadership experience and communication and teamwork skills. POLS Ambassadors will assist the Department in its outreach efforts in the College, the University, and the broader community. Ambassadors will represent the Department in these communities and provide assistance to students enrolled in Political Science courses. Departmental consent required before enrollment. Prerequisite: POLS 2311 and POLS 2312, 3.0 GPA, must have completed one full semester at UTA.

**POLS 4300. POLITICS IN POPULAR CULTURE. 3 Hours.**

Use of film and video film, video television, novels, music, or other social media in the presentation of political ideas, opinions, and facts. Techniques, subject matter, and alternative forms of presentation. This course does not satisfy area distribution requirements.

**POLS 4301. ENTERTAINMENT AND MEDIA LAW. 3 Hours.**

Addresses fundamental issues in entertainment and media law such as copyright, first amendment protections, defamation, privacy rights, film and publishing contracts, idea protection, music rights, and rights of publicity. Focuses on developments of political and legal concern to those interested in an entertainment career.

**POLS 4303. PUBLIC ADMINISTRATION AND THE POLITICAL PROCESS. 3 Hours.**

The relationships of public administration at all levels with democratic institutions, including its interactions in the formulation and execution of public policies with the chief executive, the legislative and judicial branches, political parties, clientele groups, and the public at large. Prerequisite: POLS 2311 and POLS 2312.

**POLS 4310. ANALYZING AND VISUALIZING POLITICAL DATA. 3 Hours.**

Provides hands-on instruction on dissecting complex political trends and transforming raw data into compelling visual narratives with real-world datasets. Focuses on skills required to communicate findings effectively in a data-centric society. No prior data experience required. Prior or concurrent enrollment in POLS 3310 required. Prerequisite: previous or concurrent enrollment in POLS 3310.

**POLS 4311. INTERNATIONAL RELATIONS AND POLITICAL PSYCHOLOGY. 3 Hours.**

Examines psychological approaches to international politics. Topics may include personality and leadership traits, cognitive and emotional approaches, genetic characteristics and evolution, group decision-making, elite attitudes, public opinion, and social identity.

**POLS 4312. INTERNATIONAL ORGANIZATIONS. 3 Hours.**

This course introduces students to the institutions, decision-making, and activities of the world's leading multilateral organizations. Examples include the United Nations, NATO, the African Union, and the European Union. Students will focus on how organizations respond to contemporary global challenges such as civil wars, terrorism, human rights abuses, and economic crises. The course also teaches students how to apply theories of international relations to real-world policy problems.

**POLS 4315. DEMOCRACY IN THEORY AND PRACTICE. 3 Hours.**

Introduces students to the history and practice of democratic principles in public and private organizations and workplaces. Through discussions, case studies, and interactive projects, students will gain an understanding of how democracy shapes our political systems and workplaces. Prerequisite: POLS 2311 and POLS 2312.

**POLS 4316. WOMEN IN THE POLITICAL PROCESS. 3 Hours.**

This course introduces students to the unique experiences of women in the political process, the impact of these experiences on the political system, and theories of gender and politics. Offered as POLS 4316 and GWSS 4316; credit will be granted only once.

**POLS 4317. ETHNIC GROUP POLITICS IN THE UNITED STATES. 3 Hours.**

The influence of selected major ethnic groups with special attention given to organizational development, participation in political parties, leadership, ideology, immigration policy, current issues, and relations with the dominant culture and other ethnic groups. Offered as AAST 4317 and POLS 4317; credit will be granted in only one department. Prerequisite: POLS 2311 and POLS 2312.

**POLS 4318. POLITICS OF AFRICAN AMERICANS. 3 Hours.**

The influence of African-American politics on United States government and policies with special attention given to organizational development, participation in political parties, leadership, ideology, the Civil Rights movement, current issues, and relations with other ethnic groups. Offered as AAST 4318 and POLS 4318; credit will be granted in only one department. Prerequisite: POLS 2311 and POLS 2312.

**POLS 4319. POLITICS OF MEXICAN AMERICANS. 3 Hours.**

The influence of Mexican-American politics on United States government and policies with special attention given to organizational development, participation in political parties, leadership, ideology, the Chicano Movement, current issues, and relations with other ethnic groups. Offered as MAS 4319 and POLS 4319; credit will be given in only one department. Prerequisite: POLS 2311 and POLS 2312.

**POLS 4320. CIVIC ENGAGEMENT, CIVIL SOCIETY, AND COMMUNITY. 3 Hours.**

The study of civic engagement, leadership, and political participation. The relationship of community to public policy, political elites and disenfranchised groups. May employ service learning.

**POLS 4321. POLICY ENTREPRENEURSHIP. 3 Hours.**

Examines why some ideas become policy while others get stuck in the process. Explores major theories of the policy process and how thinking like an entrepreneur helps drive policy change. Focuses on how knowledge, skills, and confidence is necessary to tackle complex policy questions through an entrepreneurial mindset.

**POLS 4322. ISSUES IN POLITICAL THEORY. 3 Hours.**

Each time this course is offered it will focus on one particular issue central to the study of political theory for example, authority, justice, citizenship, methodology of the social sciences. May be repeated for credit when content varies. Prerequisite: POLS 2311 and POLS 2312.

**POLS 4323. FEMINIST POLITICAL THOUGHT. 3 Hours.**

Issues raised by the feminist critique of political theory; the exclusion of women from the political sphere until the 20th century; Marxist, liberal, and radical feminist political thought; alternative feminist conceptions of the political. Offered as POLS 4323 and GWSS 4323; credit will be granted only once. Prerequisite: POLS 2311 and POLS 2312.

**POLS 4326. ELECTION STRATEGY AND CAMPAIGN MANAGEMENT. 3 Hours.**

Strategies relating to elections and various aspects of managing campaigns, including the techniques of demographic survey, voting behavior analysis, opinion survey, issue research, and candidate research. Prerequisite: POLS 2311 and POLS 2312.



**POLS 4327. POLITICAL IDEAS OF THE ANCIENT WORLD. 3 Hours.**

Principal theorists and schools of political thought prior to 1500, with emphasis upon those making significant contributions to the political heritage of Western Europe. Prerequisite: POLS 2311 and POLS 2312.

**POLS 4328. MODERN POLITICAL IDEAS. 3 Hours.**

The development of political thought from Machiavelli to Marx. Emphasis on the Renaissance, Classical Liberalism, French Radicalism and Marxism. Prerequisite: POLS 2311 and POLS 2312.

**POLS 4329. CONTEMPORARY CONTROVERSIES IN POLITICAL THEORY. 3 Hours.**

Examination of twentieth-century approaches to political thought and central controversies in the field. Topics may include: liberal, conservative, and socialist theories; critical theory; communitarianism; postmodernism; feminism; and identity politics. Prerequisite: POLS 2311 and POLS 2312.

**POLS 4330. THE U.S. PRESIDENCY. 3 Hours.**

The U.S. Presidency, including sources of power, changes in the office over time, and the relationship between the individual and the institution. Prerequisite: POLS 2311 and POLS 2312.

**POLS 4331. U.S. CONSTITUTIONAL LAW: GOVERNMENT POWER. 3 Hours.**

U.S. Supreme Court decisions regarding the structure of government in the United States. Focus on Congress, the President, Federalism, and the relation of the judicial process to these topics. Recommended for pre-law majors. Prerequisite: POLS 2311 and POLS 2312.

**POLS 4332. U.S. CONSTITUTIONAL LAW: FUNDAMENTAL RIGHTS. 3 Hours.**

U.S. Supreme Court decision making involving the Bill of Rights and other fundamental rights. Especially recommended for pre-law majors. Prerequisite: POLS 2311 and POLS 2312.

**POLS 4333. PRESIDENTIAL LEADERSHIP IN DOMESTIC POLICY MAKING. 3 Hours.**

Explores the policy process from the perspective of the U.S. president, examining the president's influence through the policy stages. Prerequisite: POLS 2311 and POLS 2312.

**POLS 4336. CONTEMPORARY UNITED STATES FOREIGN POLICY. 3 Hours.**

Theories and analytical structure for understanding United States foreign policy. Policy examined from theoretical, structural, regional, and topical perspectives. Prerequisite: POLS 2311 and POLS 2312.

**POLS 4340. FEDERAL SOCIAL POLICY. 3 Hours.**

This course examines public policies, including Social Security, Medicare, Medicaid, and various public assistance programs that emerged from the federal government's attempts to create a "safety net" for American citizens beginning in the 1930s, and from attempts to confront poverty during the 1960s. This course also considers the importance of federal "tax expenditures" in prompting private actors to provide services, such as employer-sponsored health insurance. The course also examines attempts to alter, roll back, or expand the federal role in social policy over recent decades.

**POLS 4350. HEALTH POLITICS AND POLICY. 3 Hours.**

Debates over the role of government in providing access to health care have been a prominent feature of American politics for the past century. This course examines the politics of health care debates in America as well as major features of federal health policy. Prerequisite: POLS 2311 and POLS 2312.

**POLS 4359. CITIZENSHIP IN THE AMERICAS. 3 Hours.**

Evaluates contemporary citizenship through political and social action movements in the Americas with particular attention to Latin America.

**POLS 4360. THEORIES OF INTERNATIONAL RELATIONS. 3 Hours.**

Evaluates major theories, methodologies, and approaches to international relations in order to understand contemporary world affairs.

**POLS 4361. WAR, PEACE, AND POLITICS IN THE FORMER SOVIET UNION. 3 Hours.**

Since the breakup of the Soviet Union in December 1991, the 15 newly independent states have taken divergent paths, while Russia has attempted to restore its dominance over its former empire. This course examines the different paths taken by the former Soviet states and the historical and cultural forces that have driven the transitions, with a specific focus on Russia, Ukraine, Belarus, Moldova, and the South Caucasus. Taught in English. For Russian language credit, some research will be done in Russian. Offered as POLS 4361 and RUSS 4361; credit will be given in only one department. Prerequisite: POLS 2311 and POLS 2312.

**POLS 4362. RUSSIA AND THE POST-SOVIET STATES TODAY. 3 Hours.**

An interdisciplinary overview of Russia and Russian area studies. This course provides students with a broad understanding of Russia today through the lenses of its geography and demographics, forms of government, and the themes and tendencies that run throughout Russian history and culture, including their impact on neighboring post-Soviet states. Taught in English. RUSS 4362 students complete some assignments in Russian, while POLS 4362 students do all assignments in English. Offered as POLS 4362 and RUSS 4362; credit will be given in only one department. Prerequisite: For POLS: POLS 2311 and POLS 2312.

**POLS 4365. RUSSIAN FOREIGN POLICY. 3 Hours.**

The foreign policy of Russia with an emphasis on its historical, cultural, and political roots, and policymaking structures. Through lectures, seminars, meetings, and assignments, students will gain an understanding of the historical, cultural, and political sources of Russian foreign policy behavior, the actors that implement it, and the tactics deployed. Offered as POLS 4365 and RUSS 4365; credit will be given in only one department. Taught in English. For Russian language credit, some research will be done in Russian. Prerequisite: For POLS: POLS 2311 and POLS 2312.

**POLS 4369. THE ARAB-ISRAELI CONFLICT. 3 Hours.**

Explores the origins, development, and continuation of the Arab-Israeli and Israeli-Palestinian conflicts through personal stories, national narratives, public images, and popular discourses.

**POLS 4370. INTERNATIONAL RELATIONS OF THE MIDDLE EAST. 3 Hours.**

This course will focus on the international interactions among actors in the Middle East. Topics to be covered include: theoretical and conceptual approaches to understanding regional politics; main conflicts in the region; contemporary challenges and issues; and a survey examination of the foreign policies of select countries. Prerequisite: POLS 2311 and POLS 2312.

**POLS 4371. THE POLITICS AND FOREIGN POLICY OF ISRAEL. 3 Hours.**

This course will examine the domestic politics and foreign policies of Israel. The course will be divided into two sections. The first section will focus on the domestic institutions and politics of Israel, while the second section will focus on Israel's foreign policies and the impact of domestic politics on them. Topics to be covered include: the rise of Zionism; the pre-state period in Palestine; efforts at state-building and institutional development; domestic politics (including institutions, parties, electoral system); divisions in Israeli society; and determinants and examples of foreign policy. Prerequisite: POLS 2311 and POLS 2312.

**POLS 4372. VIOLENCE AND SCARCITY IN WORLD POLITICS. 3 Hours.**

This course explores patterns of violence and scarcity in world politics, particularly as they pertain to the emerging paradigm of human security. This approach calls into question conventional notions of national and international security by focusing on the security of people rather than states. It explores challenges to basic human needs and desires which undermine the ability to be safe, free, and secure -- such as infectious disease, genocide, environmental degradation, migration, and transnational crime. It also examines international responses to such problems.

**POLS 4373. POLITICS OF INTERNATIONAL LAW. 3 Hours.**

Examines the role of law in the international system including international treaties and agreements, states' compliance with international law, non-governmental actors, international courts. Topics include force, human rights, crimes against humanity, protection of the environment, and terrorism.

**POLS 4375. SCIENCE FICTION AND INTERNATIONAL RELATIONS. 3 Hours.**

Examines science fiction novels and films to explore themes in international relations such as political authority, nationalism, xenophobia, political violence, and gendered security.

**POLS 4389. THE POLITICS OF NATIONAL MEMORY. 3 Hours.**

An examination of power in Washington, focusing on what lies outside the Executive and Legislative branches. Students visit and study significant institutions and monuments in the city as windows into complex political and social issues. Enrollment is restricted to designated Archer Fellows.

**POLS 4390. POLICYMAKING IN WASHINGTON. 3 Hours.**

An analysis of the central role of Congress in shaping public policy. Emphasis on real-world policymaking. Students play the role of legislative assistants to members of Congress and produce analyses of the public policy issues. Enrollment is restricted to designated Archer Fellows. Prerequisite: POLS 2311 and POLS 2312.

**POLS 4392. SPECIAL TOPICS IN POLITICAL SCIENCE. 3 Hours.**

May be repeated for credit as topics change. Prerequisite: POLS 2311 and POLS 2312.

**POLS 4393. PREPARING FOR CAREERS IN POLITICAL SCIENCE. 3 Hours.**

Supervised employment in a government or government-related organization with the student performing duties related to the academic curricula of political science. Students are required to submit a term paper, case study, or an approved academic project related to the work performed. Work is generally graded pass/fail. A maximum of six semester hours of credit in Political Science Internship may be used to satisfy a political science elective requirement for graduation. Students must be classified as juniors or seniors, be political science majors or minors, and have a minimum 3.0 GPA in their major and overall. Majors must have completed 21 hours of political science; minors must have completed 12 hours of political science. Contact the Department for a complete description of requirements. Departmental consent required before enrollment. Prerequisite: POLS 2311 and POLS 2312.

**POLS 4394. HONORS THESIS/SENIOR PROJECT. 3 Hours.**

Required of all students in the University Honors College. During the senior year, the student must complete a thesis or a project under the direction of a faculty member in the major department. Prerequisite: POLS 2311 and POLS 2312.

**POLS 4395. CONFERENCE COURSE READINGS IN POLITICAL SCIENCE. 3 Hours.**

Designed for the advanced undergraduate student who is capable of independent study. An in-depth examination of one area of political science not necessarily covered in regular course work. May be repeated for credit when the subject matter varies, but only with permission of the department. Only two such courses will be counted on a student's degree plan. Prerequisites: permission of the undergraduate advisor; appropriate previous coursework; written consent of the instructor. Students must be Political Science majors or minors, have a minimum of 60 credit hours/junior status, have a 3.0 grade point average, and have completed at least 9 hours of Political Science.

**POLS 4396. RESEARCH PRACTICUM. 3 Hours.**

Supervised practicum with individual Political Science faculty in which students apply skills developed in coursework to Political Science research. This may include quantitative, qualitative, or mixed methods approaches. Departmental consent required. Prerequisite: POLS 2311, POLS 2312, and POLS 3310.

**POLS 4691. ARCHER PROGRAM INTERNSHIP. 6 Hours.**

One-semester work experience in Washington, DC carried out during the student's tenure of an Archer Fellowship. The internship is custom-designed with the assistance of the director of the Archer Program based on the student's academic and professional goals. Enrollment is restricted to designated Archer Fellows. Prerequisite: POLS 2311 and POLS 2312.

**POLS 5197. MASTER'S COMPREHENSIVE EXAMINATION. 1 Hour.**

Required of all non-thesis Master of Arts students in the semester of their graduation. Graded P/F/R.

**POLS 5300. AMERICAN GOVERNMENT AND POLITICS. 3 Hours.**

A survey of the major theories and subfields in the study of American politics. Readings comprise a representation of scholarship illustrating a variety of substantive and methodological approaches.

**POLS 5301. JUDICIAL POLITICS AND THE U.S. SUPREME COURT. 3 Hours.**

This course focuses on judicial decision-making and behavior. While the entire American court system will be considered, primary attention will be given to the U.S. Supreme Court and constitutional issues.

**POLS 5302. BUREAUCRATIC LEADERSHIP. 3 Hours.**

Recent literature in organizational theory, government restructuring, and policy management problems.

**POLS 5303. COMPARATIVE POLITICAL SYSTEMS. 3 Hours.**

Theories, concepts, and methods that dominate modern comparative political analysis. The state of the discipline and controversies in the comparative method are evaluated.

**POLS 5305. TOPICS IN POLITICAL THEORY. 3 Hours.**

This course will cover both historical and contemporary topics central to the discipline of political theory. It will consider the major figures in the field as well as themes such as citizenship, democracy, freedom, and authority. May be repeated for credit as the topic changes.

**POLS 5310. ANALYZING POLITICS: RESEARCH DESIGN AND METHODS. 3 Hours.**

This course introduces students to the practice of analyzing politics. It begins with a foundation in research design, covering topics such as how to develop testable hypotheses, measure concepts, and identify causal relationships. The course then takes a hands-on review of a range of tools used by political scientists—from basic data analysis and statistics, to experiments, elite interviews, content analysis, surveys, and the study of networks.

**POLS 5311. CAMPAIGNS AND ELECTIONS. 3 Hours.**

Describes important trends in modern campaigns and elections practices, focusing on contemporary American elections, including campaign finance, voter turnout, campaign advertising, and voter choices. Class presentations, a short research paper, and journal article readings.

**POLS 5312. MAKING PUBLIC POLICY. 3 Hours.**

This course examines how ideas, self-interest, and institutions weave together into the complex process of policymaking. Students will analyze influential policy theories, dissect real-world case studies, and engage in thought-provoking debates as they learn the theory, art, and science of the public policy process. This course will prepare students how to be discerning policy practitioners and scholars, and adept at deciphering the complexities of the policy landscape.

**POLS 5314. POLITICAL CAMPAIGNS: STRATEGY & MANAGEMENT. 3 Hours.**

This course provides an overview of the rules, realities, strategies, and outcomes of political campaigns. Through readings, in-class discussion, writing, and active volunteering on campaigns, students will get an overview of the theory and practice of campaigns and elections.

**POLS 5315. PUBLIC OPINION. 3 Hours.**

Describes the development of survey research and commonly-encountered problems in surveys. Focuses most heavily on the contemporary practice of public opinion research, particularly in the American setting. Class presentations, a short research paper, and journal article readings.

**POLS 5316. PUBLIC LEADERSHIP: RACE, ETHNICITY, & GENDER. 3 Hours.**

Study of leadership theories, skills and traits, with focus on the intersections of race, ethnicity, and gender on public leadership in the public arena.

**POLS 5317. RACE AND ETHNICITY IN AMERICAN POLITICS. 3 Hours.**

Explores the political behavior of racial and ethnic groups in the U.S. as well as the contemporary influence of race and ethnicity on American political institutions and public policy debates.

**POLS 5318. WOMEN IN THE POLITICAL PROCESS. 3 Hours.**

This course examines women and gender in the political process, exploring various theoretical and methodological approaches helpful in studying gender and politics.

**POLS 5319. CONGRESSIONAL BEHAVIOR. 3 Hours.**

This course addresses several major questions regarding the nature of Congress as an institution, the behaviors of its members, and the role Congress plays in shaping public policy and the general nature of a representative democracy. Students are expected to have the ability to comprehend readings that are heavily quantitative. Course requirements will include weekly writings, a research paper and exams.

**POLS 5320. THE AMERICAN PRESIDENCY. 3 Hours.**

An overview course on the U.S. Presidency, exploring the institution as well as its relationship to other branches and political actors.

**POLS 5321. THE PRESIDENCY AND DOMESTIC POLICY. 3 Hours.**

This course examines presidential and domestic policy making, exploring how the president makes policy, focusing on theories of presidential leadership, White House organization and presidential-congressional interactions.

**POLS 5323. STATE COURT SYSTEMS. 3 Hours.**

Examination of the major theories of judicial politics and public law applied to the state court level. Topics include attention to the institutional, strategic, and attitudinal perspectives of judicial behavior.

**POLS 5324. PUBLIC POLICY: ISSUES AND ANALYSIS. 3 Hours.**

This course examines the important role of analysis in the policy process. It provides an understanding of the major actors and institutions involved in policymaking, explores major theories of policy change, and equips students with the skills necessary to conduct effective public policy analysis.

**POLS 5325. STATE POLITICS. 3 Hours.**

This course surveys the substantial literature and research programs in the study of state politics and policy.

**POLS 5327. URBAN POLICYMAKING AND ADMINISTRATION. 3 Hours.**

Focus on the influence of economic, political, institutional, and organizational factors on urban policymaking and administration. A variety of regime and power structure models facilitate the analysis of urban policymaking.

**POLS 5328. PUBLIC POLICY AND MEXICAN AMERICAN COMMUNITIES. 3 Hours.**

Focus on the public policy process and the limited role Mexican Americans have had in national and state (TX) policymaking. Select topic areas are utilized to focus on state actors, issues, allocation of resources, and the power structure for analytical purposes.

**POLS 5329. PUBLIC BUDGETING. 3 Hours.**

The concepts, processes, and policy impacts of taxation and public budgeting. Introduction to current research techniques, budgetary issues, and the relevant political economy literature.

**POLS 5332. PARADIGMS AND PROBLEMS IN INTERNATIONAL RELATIONS. 3 Hours.**

This course surveys the major theoretical approaches in the field of International Relations. Students will learn to apply these paradigms to contemporary global issues such as conflict, trade, nuclear proliferation, terrorism, and protection of human rights.

**POLS 5333. IDENTITY AND POLITICS IN THE MIDDLE EAST. 3 Hours.**

Deeper examination of processes of state building and political development; state-society relations; Arabism; authoritarianism and democratization; oil and economic issues; Islamist politics; the role of transnational ideas.

**POLS 5334. VIOLENCE AND DEPRIVATION IN WORLD POLITICS. 3 Hours.**

Focuses on theoretical frameworks, empirical analysis, and policy relevance of myriad threats to individuals and communal groups. Examples include: human rights, failed states, violence, health issues, slavery and migration, environmental security.

**POLS 5335. LATIN AMERICAN POLITICS. 3 Hours.**

Designed to give students knowledge of the political development of Latin America by first examining general topics and then analyzing events in specific countries. Utilizes themes and concepts that are universal to all Latin American nations, but also stresses the different paths to political development that have been taken in each of these countries.

**POLS 5337. THE POLITICAL SYSTEM OF THE RUSSIAN FEDERATION. 3 Hours.**

This course emphasizes the analytical means by which researchers approach the Russian Federation in the post-Soviet period. Russia is considered from institutional, cultural, rationalist, and economic perspectives to develop a comprehensive orientation about the nature and scope of Russian politics.

**POLS 5338. AMERICAN FOREIGN POLICY. 3 Hours.**

Evaluation of some of the primary theories and models used in explaining American Foreign Policy. The course attempts to bridge the gaps that exist between theory and reality through approaches such as realism, neo-realism, deterrence, and others.

**POLS 5339. ISRAELI IDENTITY AND THE ARAB-ISRAELI CONFLICT. 3 Hours.**

This course will explore the deeper threads of Israeli identity, and how these impact Israeli policy toward the Arab-Israeli conflict. Topics to be covered include: diverse and clashing identities (e.g., Jewish, democratic, Middle Eastern, Israeli); how identity clashes have played out in politics; outlines of Israeli foreign policy; specific policies toward the Palestinians.

**POLS 5340. INTERNATIONAL SECURITY. 3 Hours.**

This course explores some of the major concepts in the theory and practice of international security, with a focus on military-related events, processes, and issue-areas.

**POLS 5341. COGNITION, EMOTION, AND EVOLUTION IN INTERNATIONAL RELATIONS. 3 Hours.**

This course focuses on psychological approaches to international relations and examines how these perspectives advance the study of world politics. Approaches to be studied include: behavioral traits, trust, risk, values, personality, leadership, group decision-making, emotions, and evolutionary dynamics. These will be applied to different policy areas, including U.S. foreign policy, the use of force, and international cooperation.

**POLS 5342. GLOBAL GOVERNANCE AND INTERNATIONAL INSTITUTIONS. 3 Hours.**

This course describes the institutions, decision-making and activities of the world's leading international organizations to establish an understanding of the role of international organizations in managing contemporary global problems.

**POLS 5343. INTERNATIONAL LAW. 3 Hours.**

This course examines international law, including how it is established and its impact on politics at the international and domestic levels. Topics include the creation and impact of international law in diverse fields such as security, human rights, the environment, and crime.

**POLS 5344. PUBLIC PERCEPTIONS OF LAW AND COURTS. 3 Hours.**

Examination of the theories and methodological practices used to determine how the public evaluates law and courts in the United States. Topics include perceptions of the Supreme Court and its policies, civil liberties, lower courts, and judges.

**POLS 5346. EDUCATION POLITICS & POLICY. 3 Hours.**

A comparative study of the education sector to analyze questions about power, lobbying, and political change.

**POLS 5347. POLITICS OF MEXICO. 3 Hours.**

Course will survey the political history of Mexico, and look at essential questions of revolution, authoritarianism, democratization, and democratic governance.

**POLS 5367. IMMIGRATION AND INTEGRATION IN GLOBAL POLITICS. 3 Hours.**

An overview of historical foundations and theories of international immigration, implications for Western democracies, and a comparison of immigration and immigration policies from around the world.

**POLS 5368. Health Politics and Policy. 3 Hours.**

Course will survey the political history of the health care debate in the United States as well as major features of federal health policy.

**POLS 5369. SOCIAL POLICY. 3 Hours.**

This course examines the role of the federal government relating to social policy as a central theme of contemporary American politics. Issues surrounding the federal government's attempt to create a social safety net and issues such as poverty will be confronted, as well as the central role of tax expenditures and attempts to roll back social policies.

**POLS 5380. TOPICS IN U.S. POLITICS. 3 Hours.**

This course will focus on the specific aspects of U.S. governing institutions, processes, and behavior. A single aspect of U.S. politics will be examined in a given semester. (May be repeated for credit when topics vary.).

**POLS 5381. TOPICS IN COMPARATIVE POLITICS. 3 Hours.**

This course will focus on the specific aspects of comparative politics. (May be repeated for credit when topics vary.).

**POLS 5382. TOPICS IN PUBLIC LAW AND JURISPRUDENCE. 3 Hours.**

The role of U.S. national and state courts in policy making, constitutional law, and the examination of the evolution and nature of law in the United States. (May be repeated for credit when topics vary.).

**POLS 5383. TOPICS IN PUBLIC ADMINISTRATION AND POLICY MAKING. 3 Hours.**

U.S. national policy making and program management, state and urban policy making and administration. (May be repeated for credit when topics vary.).

**POLS 5384. TOPICS IN INTERNATIONAL RELATIONS. 3 Hours.**

This course will focus on a specific issue-area of international relations and world politics. (May be repeated for credit when topics vary.).

**POLS 5391. CONFERENCE COURSE IN POLITICAL SCIENCE. 3 Hours.**

Research and reading in a specialized field under the direction of a member of the graduate faculty. Graded P/F/W.

**POLS 5392. INSIDE WASHINGTON: POLICYMAKING FROM THE GROUND UP. 3 Hours.**

This course provides students with an overview of the U.S. federal policymaking process and the various public/private stakeholders and institutions that participate in this process. Specifically, the course focuses on three key elements of federal policymaking: separation of powers and original constitutional intent, influencing federal policy, and creating effective advocacy strategies. Students will examine a sampling of the extensive literature on political theory/philosophy, political institutions, political behavior, public policy and public administration. Students will also meet regularly with practitioners, such as officials from Congress, the White House, executive branch agencies, think tanks, organized interest groups, media/communications, and lobbying firms.

**POLS 5393. ARCHER CENTER WASHINGTON INTERNSHIP. 3 Hours.**

This course consists of an internship in a governmental or non-governmental organization in Washington, D.C. The student is expected to work full-time (40 hours a week) at the internship, which may be paid or unpaid. Students are responsible for seeking and selecting their internships. The Archer Center does not guarantee any internship placements, but Archer Center faculty and staff will provide students with information about internship opportunities and advice about placements. The Archer Center faculty meet regularly with students to debrief and to integrate this practical training with other lessons in professional development.

**POLS 5394. ARCHER CENTER INDEPENDENT STUDY AND RESEARCH. 3 Hours.**

This course is tailored to each student's graduate program of study. An Archer Center faculty member will work independently with each student to develop a research project that is designed to advance the student's academic and research goals. The project will align with the requirements of the student's graduate degree.

**POLS 5398. THESIS. 3 Hours.**

Original research designed to augment existing studies of problems or topics related to one of the major fields of study.

**POLS 5698. THESIS. 6 Hours.**

Original research designed to augment existing studies of problems or topics related to one of the major fields of study. POLS 5398 graded R/F only; POLS 5698 graded P/F/R.

## COURSES

**PREL 2338. INTRODUCTION TO PUBLIC RELATIONS. 3 Hours. (TCCN = COMM 2330)**

Principles and methods of building goodwill and obtaining publicity; process of influencing public opinion; analysis of media; implementation of public relations programs.



**PREL 3313. CRISIS COMMUNICATION. 3 Hours.**

Examines effective and strategic communication practices throughout the stages of a crisis event. Special emphasis is placed on pre-crisis communication, crisis communication planning, media relations, spokesperson training, and ethical crisis responses. The course combines both hands-on and theoretical learning techniques. Prerequisite: 30 hours earned.

**PREL 3320. STRATEGIC SOCIAL MEDIA COMMUNICATION. 3 Hours.**

Developing strategy and content for social media, engaging in audience analysis, understanding the unique attributes of various platforms, and communicating ethically and effectively across those platforms. Credit will not be given for both PCOM 3320 and PREL 3320.

**PREL 3339. PUBLIC RELATIONS METHODS I. 3 Hours.**

The theory and practice of selecting the appropriate mass media channels to reach and influence specialized groups with introductory practice in public relations writing. Prerequisite: A grade of C or higher (2.0/4.0 scale) in the following courses: PREL 2338, COMM 2311, and either MATH 1308 or MATH 1309, and 60 or more hours earned.

**PREL 3340. PUBLIC RELATIONS METHODS II. 3 Hours.**

The theory and advanced practice of selecting the appropriate mass media channels to reach and influence specialized groups with strategic public relations writing. Prerequisite: PREL 3339 with a grade of C or higher (2.0/4.0 scale).

**PREL 4316. PUBLIC RELATIONS CAMPAIGNS. 3 Hours.**

The study of advanced public relations campaign strategies based on research techniques; campaign development, implementation and assessment. Prerequisite: PREL 3339 and PREL 3340 with a grade of C (2.0/4.0) or better. COMM 3315, COMM 3303, and ECON 2305, and completion or concurrent enrollment in PREL 4320.

**PREL 4320. PUBLIC RELATIONS MANAGEMENT CASE STUDIES. 3 Hours.**

The use of case studies to study public relations management decision-making in areas of operation, personnel, content, promotion, finance, and governmental regulations. Prerequisite: COMM 3315, A grade of C (2.0/4.0) or better in PREL 3340.

**PREL 4391. CONFERENCE COURSE. 3 Hours.**

Topic assigned on an individual basis, covering individual research or study in the designated areas. May be repeated when topic changes. Prerequisite: 60 or more hours earned and permission of the department.

**PREL 4393. SPECIAL TOPICS. 3 Hours.**

Special studies in public relations. Topic varies from semester to semester. May be repeated when topic changes for a maximum of six credit hours. Prerequisite: 60 or more hours earned, and permission of the department.

**PREL 4395. PROFESSIONAL INTERNSHIP. 3 Hours.**

Individual research in public relations while working with business and industry. Individual conference to be arranged. Prerequisite: 60 or more hours earned and permission of the department.

## COURSES

**PSYC 1315. INTRODUCTION TO PSYCHOLOGY. 3 Hours. (TCCN = PSYC 2301)**

The fundamental methods and content of scientific psychology. Concentration on the understanding of basic principles.

**PSYC 2300. STATISTICS IN PSYCHOLOGY. 3 Hours.**

This course covers descriptive and inferential statistics used in psychological research and assessment. It includes measurement, characteristics of distributions; measures of central tendency and variability; transformed scores; correlation and regression; probability theory; and hypotheses testing and inference. PSYC 2300 and PSYC 3300 can be taken concurrently. Prerequisite: PSYC 1315, and MATH 1301, MATH 1302, MATH 1315, or MATH 1402 (or equivalent).

**PSYC 2315. STUDENT SUCCESS IN PSYCHOLOGY. 3 Hours.**

This is a learning community course that will provide an environment for new students to build the knowledge, skills and abilities that will aid them academically, personally, and professionally. The course will help teach and develop students' critical thinking, problem-solving, and analytical skills to support successful academic achievement. The course will also focus on students' personal growth to support school-life balance challenges and future professional objectives. Required for psychology majors. Prerequisite: PSYC\_UNIV, PSYC\_\_INT, PSYCBA, or PSYCBS plan code.

**PSYC 2317. BASIC CONCEPTS IN HUMAN SEXUALITY. 3 Hours. (TCCN = PSYC 2306)**

The physiological, psychological, and sociological aspects of human sexuality. Offered as BIOL 2317, HEED 2317, PSYC 2317, and GWSS 2317. Credit will be granted for one of these courses only. Students seeking certification in Health Education must enroll in HEED 2317. Students seeking credit toward their science requirement must enroll in BIOL 2317. May not be used for biology grade point calculation or biology credit toward a BS degree in biology, microbiology, medical technology, psychology, or sociology.

**PSYC 3200. EXPERIENCING RESEARCH IN PSYCHOLOGY. 2 Hours.**

This is a practical, project-based course that focuses on laboratory and field experience in designing, conducting, and reporting psychology research. It includes all stages of the research process including the formulation of research hypotheses, review and evaluation of published literature, choice of research design and measurement variables, data collection and analysis, and presentation of results in oral and written reports. Prerequisite: PSYC 2300 and PSYC 3300.

**PSYC 3300. RESEARCH METHODS IN PSYCHOLOGY. 3 Hours.**

This course covers experimental designs and research methodologies commonly used in the field of psychology. It includes strategies for identifying meaningful hypothesis, conducting literature reviews, implementing research practices, and interpreting and evaluating statistical conclusions and empirical research findings. Challenges related to sociocultural factors will also be analyzed. PSYC 2300 and PSYC 3300 can be taken concurrently.

**PSYC 3301. PSYCHOLOGY OF HUMAN RELATIONS. 3 Hours.**

Workplace applications of topics including person perception, social influence, group processes and dynamics, interpersonal relations, teamwork, leadership, workplace discrimination, diversity, stress, and burnout.

**PSYC 3302. BUSINESS PSYCHOLOGY. 3 Hours.**

A survey of the fields of industrial and organizational psychology, focusing on the application of psychological theory to understanding and solving problems in the workplace. Topics include recruitment, employee selection and training, the effects of attitudes, motivation, group dynamics and leadership, job satisfaction, productivity and morale.

**PSYC 3303. DRUGS AND BEHAVIOR. 3 Hours.**

A survey of the psychoactive agents, their therapeutic uses, and social abuses. Alcohol, nicotine, caffeine, narcotics, hallucinogens, stimulants, and tranquilizers. Offered as BIOL 3303, HEED 3303, and PSYC 3303; credit will be granted only once. May not be used for biology grade point calculation or biology credit toward a B.S. degree in biology, microbiology, or medical technology. Students seeking certification in health education must enroll in HEED 3303.

**PSYC 3304. ANALYSIS & MANAGEMENT OF BEHAVIOR. 3 Hours.**

Behavioral control techniques for remediation and prevention of problem behaviors and for optimization of normal behaviors in real life settings. Contrasting therapeutic approaches, the ethics of behavior control, and the impact of behaviorism on society. Prerequisite: PSYC 1315 or permission of the instructor.

**PSYC 3305. PSYCHOLOGY OF EMPLOYEE TRAINING. 3 Hours.**

An introduction to theories, research, and techniques related to training needs analysis, program design and delivery, and training evaluation in organizational settings.

**PSYC 3306. PSYCHOLOGY OF CREATIVITY AND CREATIVE THINKING. 3 Hours.**

Research and theory relevant to the traits, attitudes, and abilities which are related to creative functioning with emphasis on the conceptual-cognitive components of creative formation and problem solving. Methods of stimulating creative behavior in individuals and in groups. Relevant research findings provide the substance of the course. Prerequisite: PSYC 1315.

**PSYC 3310. DEVELOPMENTAL PSYCHOLOGY. 3 Hours.**

Human development and growth from conception through old age, concerned with the physical, behavioral, and social aspects. Prerequisite: PSYC 1315.

**PSYC 3312. SOCIAL & PERSONALITY DEVELOPMENT. 3 Hours.**

A review of psychological theory and research on age trends and individuals differences in personality and social development. Topics include emotional development, aggression, identity and achievement, attachment, gender role development, and familial and extrafamilial influences on development. Prerequisite: PSYC 1315.

**PSYC 3313. CULTURAL STUDIES IN PSYCHOLOGY. 3 Hours.**

This course explores the critical concepts of culture, cultural identity, and ethnicity and examines their role in shaping human behavior and cognition. These issues will be approached from different psychological perspectives including clinical, developmental, social, health, and cognitive psychology. Students will learn to define, explain, and evaluate the influence that culture has on psychological processes and social interactions. Through the study of multicultural research, multimedia presentations, and class discussions, students will gain cultural awareness enabling them to critically assess research on multicultural topics. Prerequisite: PSYC 1315.

**PSYC 3314. PSYCHOLOGY OF PERSONALITY. 3 Hours.**

A broad survey of major theories, assessment methods, and representative research in the field of personality. The theoretical approaches considered include the psychoanalytic, neo-Freudian, trait, biological, humanistic, behavioral social/learning, and cognitive approaches. Prerequisite: PSYC 1315.

**PSYC 3315. SOCIAL PSYCHOLOGY. 3 Hours.**

The theories and research dealing with individual behavior in the social environment. Social influence processes, interpersonal attraction, group behavior, aggression, conformity, and attitude formation and change. Prerequisite: PSYC 1315.

**PSYC 3317. INTRODUCTION TO CLINICAL AND COUNSELING PSYCHOLOGY. 3 Hours.**

The student is introduced to psychodiagnostic procedures and the basic approaches of counseling and psychotherapy. Prerequisite: PSYC 1315.

**PSYC 3318. ABNORMAL PSYCHOLOGY. 3 Hours.**

Major forms of psychopathology. Classification, etiology, and treatment of major disorders. Prerequisite: PSYC 1315.

**PSYC 3319. PSYCHOLOGY OF ADOLESCENCE. 3 Hours.**

A topical study of adolescent behavioral and psychological development with emphasis on theory, methods of inquiry, and practical implications. Prerequisite: PSYC 1315.

**PSYC 3320. BEHAVIOR AND MOTIVATION. 3 Hours.**

Theory and research involving relation of motivation and emotion to learning theory, social behavior, personality, and development. Prerequisite: PSYC 1315.

**PSYC 3322. BRAIN AND BEHAVIOR. 3 Hours.**

An introduction to the anatomical structures and physiological processes that determine behavior. Topics include the acquisition and processing of sensory information, the neural control of movement, and the biological bases of complex behaviors (such as learning, memory, sex, language, and addiction), as well as the basic functioning of the nervous system. Offered as BIOL 3322 and PSYC 3322. Credit will be granted only once. BIOL 3322 prerequisite: BIOL 1441, BIOL 1442. PSYC 3322 prerequisite: BIOL 1441 or PSYC 1315.

**PSYC 3325. DATA SCIENCE IN PSYCHOLOGY. 3 Hours.**

This course is a survey of the benefits and challenges of data science in psychological research. The course includes discussions on advances in data collection and analysis, the applications and career opportunities within various psychology disciplines, and the best practices concerning ethics, privacy, security, and responsible conduct of research. Statistical concepts and techniques will be introduced using simple computing tools, such as Excel or code from programming languages, such as Python. Prerequisite: PSYC 2300 (or equivalent).

**PSYC 3326. ANIMAL BEHAVIOR. 3 Hours.**

A survey of research and theory comparing behavior at various phyletic levels. Offered as BIOL 3326 and PSYC 3326. Credit will be granted for only one of these courses. Prerequisite: BIOL 1441, BIOL 1442.

**PSYC 3334. COGNITIVE PROCESSES. 3 Hours.**

Current theory and research in cognitive processes such as memory, information processing, concept formation, and problem solving. Prerequisite: PSYC 1315.

**PSYC 3356. EVOLUTIONARY PSYCHOLOGY. 3 Hours.**

A consideration of how evolution has influenced social, cognitive and developmental processes in humans. Comparisons between humans and other species, and between different human cultures will be included. Topics such as mate selection, marriage and family practices, child rearing, social relations, language, thinking, neuropsychology, learning and related topics will be considered. Methods of gathering data and theory about evolutionary processes will be stressed. Prerequisite: PSYC 1315.

**PSYC 3357. CYBERPSYCHOLOGY BASIC CONCEPTS. 3 Hours.**

Cyberpsychology is a branch of psychology that studies the way people interact with technology and the impacts of technology on the way people feel, think, and behave both online and offline. This course provides a broad survey of the impacts of digital media (e.g., social media) on people's perception, learning, motivation, and decision making. Theories from neuroscience (e.g., large-scale networks), evolution (e.g., evolutionary mismatch), social (e.g., identity fusion), and health (e.g., anxiety) are incorporated for understanding the basic guiding principles of human behavior in the digital environment. Offered as PSYC 3357 and PSYC 5346.

**PSYC 3358. CYBERPSYCHOLOGY APPLICATIONS. 3 Hours.**

This is a project-based course that focuses on developing and testing digital interventions based on persuasion theories. Course topics include persuasion research, associative learning, consumer behavior, emotional and motivational strategies, social media, mental health, personality, social engineering, and political activism. This course is designed to introduce psychological vulnerabilities to technologically savvy students with hopes of aspiring them to invent technologies that improve the quality of life. Offered as PSYC 3358 and PSYC 5347.

**PSYC 3359. POLITICAL PSYCHOLOGY FOR THE INTERNET. 3 Hours.**

This course provides a comprehensive review of the psychology of political behavior on digital platforms. The course covers the foundational approaches to political psychology, including the evolutionary, personality, and developmental roots of political attitudes, to contemporary challenges to governance, including populism, hate speech, conspiracy beliefs, inequality, climate change, and terrorism. This course will focus on the application of psychological factors (affect, emotions, heuristics) that influence political behavior (voting, attitudes, beliefs) with emphasis on internet-mediated political strategies. Offered as PSYC 3359 and PSYC 5349.

**PSYC 3360. CAREERS IN PSYCHOLOGY. 3 Hours.**

This course explores the wide range of career opportunities available to psychology students. Through a combination of lectures, guest speakers, case studies, and practical assignments, students will gain insight into the diverse fields within psychology including clinical, counseling, industrial-organizational, cognitive, health, and neuroscience. The course will cover key topics such as graduate school options and preparations, career tracks and opportunities, and job search strategies. A key component will be on building career readiness through networking, resume development, and interview preparation for both academic and applied careers. Required for psychology majors. Prerequisite: Grade of "C" or better in PSYC 1315 and PSYC 2315. PSYC\_UNIV, PSYC\_\_INT, PSYCBA, and PSYCBS plan codes.

**PSYC 4081. VOLUNTEER RESEARCH IN PSYCHOLOGY. 0 Hours.**

Volunteer research hours (0 credit hours) Participation in a group research project on a selected topic as designated by the directing professor. Maybe repeated. Intended for advanced undergraduate majors. Prerequisite: Instructor permission; other prerequisites may be implemented at the discretion of each individual laboratory research mentor.

**PSYC 4161. READINGS IN PSYCHOLOGY. 1 Hour.**

Topics arranged on an individual basis. Performance may be assessed by oral exam, written test, or review paper as arranged. Prerequisite: permission of the instructor.

**PSYC 4181. RESEARCH IN PSYCHOLOGY. 1 Hour.**

Research problems arranged on an individual basis, to be conducted by the student, and written in publishable journal format. Prerequisite: permission of the instructor.

**PSYC 4191. UNDERGRADUATE TEACHING EXPERIENCE. 1 Hour.**

Teaching effectively requires mastering the content of your discipline, but also numerous other skills. This course will prepare undergraduate students to be challenging, inspiring, engaging teachers and/or communicators of psychological topics by providing hands-on experience as teaching assistants. Prerequisite: Students must complete Introduction to Psychology (PSYC 1315) and PSYC 4391 (Undergraduate Teaching Experience) before enrolling in this course. Students must have a minimum GPA of 3.5 and be a psychology major (other majors may be approved with instructor permission). Students must have earned a B or better in the class for which they will serve as a TA and instructor approval is required.

**PSYC 4261. READINGS IN PSYCHOLOGY. 2 Hours.**

Topics arranged on an individual basis. Performance may be assessed by oral exam, written test, or review paper as arranged. Prerequisite: permission of the instructor.

**PSYC 4281. RESEARCH IN PSYCHOLOGY. 2 Hours.**

Research problems arranged on an individual basis, to be conducted by the student, and written in publishable journal format. Prerequisite: permission of the instructor.

**PSYC 4291. UNDERGRADUATE TEACHING EXPERIENCE. 2 Hours.**

Teaching effectively requires mastering the content of your discipline, but also numerous other skills. This course will prepare undergraduate students to be challenging, inspiring, engaging teachers and/or communicators of psychological topics by providing hands-on experience as teaching assistants. Prerequisite: Students must complete Introduction to Psychology (PSYC 1315) and PSYC 4391 (Undergraduate Teaching Experience) before enrolling in this course. Students must have a minimum GPA of 3.5 and be a psychology major (other majors may be approved with instructor permission). Students must have earned a B or better in the class for which they will serve as a TA and instructor approval is required.

**PSYC 4301. PRINCIPLES OF NEUROSCIENCE. 3 Hours.**

An in depth understanding of the mechanisms underlying the function of the nervous system. Topics include cellular mechanisms of neural communication, neuroanatomy and neurophysiology of sensory, motor, and autonomic systems, cellular mechanisms of learning and memory, and neuropathological conditions that contribute to neurological disorders. Course offered as BIOL 4301 and PSYC 4301. Credit will be granted only once. Prerequisite: PSYC 3322 (BIOL 3322) or permission of instructor.

**PSYC 4309. NEUROPHARMACOLOGY. 3 Hours.**

A survey of how drugs affect the nervous system. General topics will include cellular and molecular foundations of neuropharmacology, receptors and modulation of neural signaling. The specific role of neurotransmitter systems (i.e. acetylcholine, dopamine, norepinephrine, serotonin, and opiate) will be explored. Offered as BIOL 4309 and PSYC 4309; credit will be granted only once. Prerequisite: one or more of the following courses or permission of instructor: BIOL 1441 or PSYC 3322/BIOL 3322 or BIOL 3301.

**PSYC 4315. HORMONES AND BEHAVIOR. 3 Hours.**

A study of the interaction between hormones and behavior. Specific topics covered include; examination of the hormonal influences on sex determination, reproductive behaviors, parental behavior, dominance and aggression, responses to stressful stimuli, homeostasis, and learning and memory. This course uses a comparative approach and draws examples of neuroendocrine function from throughout the animal kingdom including fish, birds, reptiles, and mammals (including humans). Offered as PSYC 4315 and BIOL 4315. Credit will be granted only once. Prerequisite: PSYC 3322/BIOL 3322 or BIOL 1441 or BIOL 3301.

**PSYC 4327. BEHAVIORAL GENETICS. 3 Hours.**

Genetic influences on behavioral phenotypes. Research strategies, quantitative methods, and pharmacogenetic approaches to the brain; sociality and altruism; the personality, emotionality and intelligence; psychopathology; chromosomal abnormalities; forensic implications of genetic counseling. Offered as BIOL 4327 and PSYC 4327; credit will be granted only once. Students seeking credit toward the science requirement must enroll in BIOL 4327. Prerequisite: PSYC 1315 or BIOL 1441.

**PSYC 4332. THEORIES OF HUMAN LEARNING AND MEMORY. 3 Hours.**

A comprehensive survey of theories and research concerning basic learning and memory processes and their application to a variety of areas, e.g., eyewitness memory, false memory syndrome, autobiographical memory, memory decline in aging. Theoretical and background perspectives include associative mechanism, information processing approaches, and neurophysiological bases for encoding, storage, and retrieval. Prerequisite: PSYC 1315, and Junior Standing.

**PSYC 4334. SENSATION AND PERCEPTION. 3 Hours.**

An introduction to the study of the human senses and higher order perceptual processes. Data gathered from psychophysical research and studies of the nervous system in both humans and other animals will be discussed. The course will review the mechanisms and principles of operation of vision, hearing, touch, taste and smell. Prerequisite: Grade of "C" or better in PSYC 3322 or BIOL 3322.

**PSYC 4335. COGNITIVE DEVELOPMENT. 3 Hours.**

Theories and phenomena concerning development of all aspects of human cognition across the life span. Prerequisite: C or better in PSYC 3300.

**PSYC 4338. COGNITIVE NEUROSCIENCE. 3 Hours.**

Theory and research on the relationship between the brain and human cognition. Normal functioning and comparisons between normal and disordered states (e.g., Alzheimer's disease, amnesia, localized brain injury, age changes). Prerequisite: PSYC 4332 or PSYC 4334.

**PSYC 4339. PSYCHOLOGY OF JUDGMENT AND CHOICE. 3 Hours.**

Research and theory on the errors of intuitive judgment and how formal decision methods improve choices. Prerequisite: C or better in PSYC 2300.

**PSYC 4357. HEALTH PSYCHOLOGY. 3 Hours.**

This course provides a broad introduction to health psychology and its interface with the medical world. The course provides a balanced presentation of the important issues in the field, as well as specific content topics that are especially relevant today to better understand health and illness. Offered as BIOL 4357, HEED 4357, and PSYC 4357. Students seeking science requirement credit must enroll in BIOL 4357; students seeking Certification in Health must enroll in HEED 4357. Prerequisite: PSYC 1315 or BIOL 1333 or BIOL 1441 or BIOL 2457; junior standing recommended.

**PSYC 4359. SELECTED TOPICS IN PSYCHOLOGY. 3 Hours.**

Topics pertinent to the field of psychology. Topic, format, and prerequisites to be determined by the instructor. May be repeated for credit as different topics are offered. Prerequisite: to be determined by the instructor.

**PSYC 4361. READINGS IN PSYCHOLOGY. 3 Hours.**

Topics arranged on an individual basis. Performance may be assessed by oral exam, written test, or review paper as arranged. Prerequisite: permission of the instructor.

**PSYC 4381. RESEARCH IN PSYCHOLOGY. 3 Hours.**

Research problems arranged on an individual basis, to be conducted by the student, and written in publishable journal format. Prerequisite: permission of the instructor.

**PSYC 4391. FOUNDATIONS OF UNDERGRADUATE TEACHING EXPERIENCE. 3 Hours.**

Teaching effectively requires mastering the content of your discipline, but also numerous other skills. This course will prepare undergraduate students to be challenging, inspiring, engaging teachers and/or communicators of psychological topics by covering important professional issues, including: planning a syllabus, structuring a lecture, navigating class discussions, communicating effectively with different types of classes, responding to student input, dealing with classroom incivilities, responding to student assignments, using technology, and responding to student work. This course will also assist students through the process of teaching as learning through addressing cognitive theories underlying the learning process. Prerequisite: Students must complete Introduction to Psychology (PSYC 1315) before enrolling in this course. Students must have a minimum GPA of 3.5 and be a psychology major (other majors may be approved with instructor permission). Students must have earned a B or better in the class for which they will serve as a TA and instructor approval is required.

**PSYC 4398. HONORS THESIS. 3 Hours.**

Students may take this course only at the invitation of the department. Consists of a research project of a type and level which would be publishable in one of the psychological journals. Particular emphasis is placed on independent work by the student. Prerequisite: departmental invitation.

**PSYC 4410. ADVANCED TOPICS IN DEVELOPMENTAL PSYCHOLOGY. 4 Hours.**

This course will cover current topics in Developmental Psychology using an interactive, participatory format that includes a lecture portion and a laboratory section. The course will focus on specific content topics that are especially relevant today to better understand and use advanced concepts in Developmental Psychology. Completion of the course is essential for students who are interested in pursuing a career in Developmental Psychology research. Prerequisites: C or better in PSYC 2300, PSYC 3200, PSYC 3300, and PSYC 3310.

**PSYC 4411. ADVANCED TOPICS IN PERSONALITY. 4 Hours.**

This course will cover current topics in Personality using an interactive, participatory format that includes a lecture portion and a laboratory section. The course will focus on specific content topics that are especially relevant today to better understand and use advanced concepts in Personality. Completion of the course is essential for students who are interested in pursuing a career in Personality research. Prerequisites: C or better in PSYC 2300, PSYC 3200, PSYC 3300, and PSYC 3314.

**PSYC 4412. ADVANCED TOPICS IN SOCIAL PSYCHOLOGY. 4 Hours.**

This course will cover current topics in Social Psychology using an interactive, participatory format that includes a lecture portion and a laboratory section. The course will focus on specific content topics that are especially relevant today to better understand and use advanced concepts in Social Psychology. Completion of the course is essential for students who are interested in pursuing a career in Social Psychology research. Prerequisites: C or better in PSYC 2300, PSYC 3200, PSYC 3300, and PSYC 3315.

**PSYC 4415. INTERNSHIP IN PSYCHOLOGY. 4 Hours.**

Provides the student with an opportunity to apply academic experience to practical situations by serving for a specified number of hours as participant-observer in an off-campus activity. The activity will be reflected in the title on the transcript. Internships must be arranged with an internship supervisor and/or faculty member in the semester prior to enrolling for this course. Prerequisite: C or better in PSYC 2300 and PSYC 3300, and a minimum 3.2 Psychology GPA.

**PSYC 4420. EXPERIMENTAL ANALYSIS OF BEHAVIOR. 4 Hours.**

A laboratory course examining basic principles of behavior control and analysis with single animals and automated testing apparatus. Emphasis is placed on individualized, self-paced instruction and creative experimentation. Prerequisite: C or better in either PSYC 3304 or PSYC 4310. C or better in PSYC 2300, PSYC 3200, PSYC 3300, and PSYC 3304.

**PSYC 4421. ADVANCED TOPICS IN NEUROSCIENCE. 4 Hours.**

This course will cover current topics in Neuroscience using an interactive, participatory format that includes a lecture portion and a laboratory section. The course will focus on specific content topics that are especially relevant today to better understand and use advanced concepts in Neuroscience. Completion of the course is essential for students who are interested in pursuing a career in Neuroscience research. Offered as BIOL 4421 or PSYC 4421. Credit will be granted only once. Junior standing recommended. Prerequisites: C or better in BIOL 3322 or PSYC 3322 required.



**PSYC 4430. ADVANCED TOPICS IN CLINICAL COUNSELING. 4 Hours.**

This course will cover current topics in Clinical and Counseling using an interactive, participatory format that includes a lecture portion and a laboratory section. The course will focus on specific content topics that are especially relevant today to better understand and use advanced concepts in Clinical and Counseling. Completion of the course is essential for students who are interested in pursuing a career in Clinical and Counseling research.

Prerequisite: PSYC 3317; PSYC 3318; C or better in PSYC 2300, PSYC 3200, and PSYC 3300.

**PSYC 4431. ADVANCED TOPICS IN COGNITIVE SCIENCE. 4 Hours.**

This course will cover current topics in Cognitive Psychology using an interactive, participatory format that includes a lecture portion and a laboratory section. The course will focus on specific content topics that are especially relevant today to better understand and use advanced concepts in Cognitive Psychology. Completion of the course is essential for students who are interested in pursuing a career in Cognitive Psychology research. May be repeated for credit as specific topics vary. Prerequisite: C or better in PSYC 2300, PSYC 3200, PSYC 3300, and PSYC 3334.

**PSYC 4432. ADVANCED TOPICS IN HEALTH. 4 Hours.**

This course will cover current topics in Health Psychology using an interactive, participatory format that includes a lecture portion and a laboratory section. The course will focus on specific content topics that are especially relevant today to better understand and use advanced concepts in Health Psychology. Completion of the course is essential for students who are interested in pursuing a career in Health Psychology research. May be repeated for credit as specific topics vary. Prerequisite: C or better in PSYC 2300, PSYC 3200, PSYC 3300, and PSYC 4357.

**PSYC 4433. ADVANCED TOPICS IN INDUSTRIAL/ORGANIZATIONAL PSYCHOLOGY. 4 Hours.**

Develop a thorough understanding of the fundamental concepts, methods, and principles associated with Industrial/Organizational Psychology and the scientific research process by reading, questioning, and thoroughly understanding empirical, peer-reviewed research in I/O Psychology as well as practical application through the development of tools used for analyzing jobs, measuring job performance, and predicting job candidates' success.

Prerequisite: A grade of "C" or better in PSYC 1315, PSYC 2300, PSYC 3300, PSYC 3200, PSYC 3302.

**PSYC 5110. PROFESSIONAL DEVELOPMENT. 1 Hour.**

The philosophy and methods of conducting a university class for undergraduates are examined. Specific tips and suggestions for managing course materials, lectures, audiovisual aids, grading, etc. will be presented. The role of the university instructor as a researcher as well as a teacher will be elaborated. Specific topics will include the ethics and regulation of research, service as a journal referee, corresponding with peers, participating in a research team, manuscript preparation, presentation at professional conferences, and submitting material for publication. Prerequisite: admission to the graduate program in psychology or permission of the instructor. Graded F, P. Prerequisite: Admission to the graduate program in psychology or permission of the instructor.

**PSYC 5127. INDUSTRIAL AND ORGANIZATIONAL INTERNSHIP. 1 Hour.**

This course is preparation for and supervision of internship activities in an organization or organizations in an area related to area of interest or training. No credit will be given for previous experience or activities. Course may be repeated for credit. Prerequisite: Consent of instructor.

**PSYC 5151. READINGS IN PSYCHOLOGY. 1 Hour.**

Independent readings under the supervision of an individual faculty member. Students wishing to conduct research should sign up for PSYC 5191, PSYC 5291, or PSYC 5391. May be repeated for credit with consent of the Graduate Advisor. Graded P/F/R. Prerequisite: consent of the instructor.

**PSYC 5191. RESEARCH IN PSYCHOLOGY. 1 Hour.**

Independent research under the supervision of an individual faculty member; may be repeated for credit with consent of Graduate Advisor. Graded P/F/R. Prerequisite: consent of the instructor.

**PSYC 5227. INDUSTRIAL AND ORGANIZATIONAL INTERNSHIP. 2 Hours.**

This course is preparation for and supervision of internship activities in an organization or organizations in an area related to area of interest or training. No credit will be given for previous experience or activities. Course may be repeated for credit. Prerequisite: Consent of instructor.

**PSYC 5251. READINGS IN PSYCHOLOGY. 2 Hours.**

Independent readings under the supervision of an individual faculty member. Students wishing to conduct research should sign up for PSYC 5191, PSYC 5291, or PSYC 5391. May be repeated for credit with consent of the Graduate Advisor. Graded P/F/R. Prerequisite: consent of the instructor.

**PSYC 5291. RESEARCH IN PSYCHOLOGY. 2 Hours.**

Independent research under the supervision of an individual faculty member; may be repeated for credit with consent of Graduate Advisor. Graded P/F/R. Prerequisite: consent of the instructor.

**PSYC 5307. RESEARCH METHODS. 3 Hours.**

This course considers basic and advanced aspects of methodology used in psychological research, including experimental design, methodologies that combine disciplinary approaches (e.g., biomedical, behavioral, and field and laboratory approaches).

**PSYC 5309. HEALTH PSYCHOLOGY. 3 Hours.**

A survey of current theory and research in health psychology, including basic research in health and behavior, biobehavioral contributions to illness and disability, and fundamental relationships among the brain, bodily function, and behavior that may affect health and well-being. It will also include clinical and translational topics including patient interventions in medically-ill populations, pain management, and disease prevention.

**PSYC 5310. DATA SCIENCE IN PSYCHOLOGY. 3 Hours.**

To live in the modern world is to leave digital data traces that provide insights into an individual's habits, choices, social networks, interests, and a range of personal identity markers (such as political views). The rapid growth of this data presents researchers with new avenues to evaluate and understand human cognition and human behavior, while simultaneously raising concerns of privacy, bias, and ethics. For researchers in psychology, "big data" also provides an additional methodological angle to complement existing research methodologies. This course surveys data science approaches to research, focusing on implications and opportunities in psychology. Topics include collecting, accessing, and analyzing data, as well as the tools and technologies commonly used in processing human-generated data. The course will also introduce construct creation where data is used to model and predict cognitive constructs and anticipate changes to those constructs. Additional emphasis will be on the skills needed by individual researchers as well as the broader implications of wearables and immersive environments (such as VR and AR) that capture psychophysiological data on the future of research in psychology.

**PSYC 5313. COGNITIVE PSYCHOLOGY. 3 Hours.**

Surveys current experimental and clinical research and theory relating the brain and cognition. Emphasizes selected areas i.e., perception, attention, memory, language, and thinking.

**PSYC 5321. PERSONALITY PSYCHOLOGY. 3 Hours.**

A survey of contemporary topics in personality psychology, including personality assessment, strategies for studying personality, temporal stability and cross-situational consistency in behavior, and personality influence on social behavior.

**PSYC 5322. SOCIAL PSYCHOLOGY. 3 Hours.**

A survey of contemporary topics in social psychology, including interpersonal attraction, altruism and aggression, attribution and social cognition, social influence, group dynamics, and social motivation.

**PSYC 5323. GROUP PROCESSES. 3 Hours.**

Survey of the major topics in group dynamics. Among the issues covered will be performance, motivation, goal setting, decision-making, creativity, social influence, memory, leadership, teamwork, and collective behavior.

**PSYC 5324. APPLIED RESEARCH DESIGN. 3 Hours.**

Basic aspects of organizational research methods will be covered including: research ethics, the scientific method, inductive and deductive reasoning, research questions, hypotheses, study designs, manipulation of variables, and various measures and methods used in organizational research. The history of Industrial and Organizational research will also be covered.

**PSYC 5325. ORGANIZATIONAL BEHAVIOR. 3 Hours.**

Survey of theory and research related to human behavior in organizations. Topics include job performance, motivation, job satisfaction, organizational commitment, work stress, organizational justice, leadership, groups and teams, and organizational theory.

**PSYC 5326. EMPLOYEE SELECTION. 3 Hours.**

Principles and techniques of employee selection, placement, and classification will be examined. Job analysis and competency modeling will be covered with a focus on the legal aspects of selection and promotion. The use of various methods and measures of job relevant individual differences will be examined within the context of predicting performance criteria.

**PSYC 5327. INDUSTRIAL AND ORGANIZATIONAL INTERNSHIP. 3 Hours.**

This course is preparation for and supervision of internship activities in an organization or organizations in an area related to area of interest or training. No credit will be given for previous experience or activities. Course may be repeated for credit. Prerequisite: consent of instructor.

**PSYC 5328. EMPLOYEE ATTITUDES AND BEHAVIORS. 3 Hours.**

Theory and research concerning the determinants, consequences, and measurement of job satisfaction and related constructs such as involvement, commitment and work motivation will be covered. Attitudes, opinions, and beliefs will be examined in relation to the behavioral intentions of individuals at work. Organizational interventions designed to improve and enhance employee motivation, attitudes and behaviors will be evaluated.

**PSYC 5329. PERFORMANCE MANAGEMENT SYSTEMS. 3 Hours.**

Principles and techniques of the performance appraisal and feedback process will be covered. Different sources of performance information will be evaluated. Mentoring and procedures for communicating performance evaluation information and improving job performance via development and training will be examined. Theories and techniques used to design, conduct, and evaluate training programs will be evaluated.

**PSYC 5330. ADVANCE EMPLOYEE TRAINING AND DEVELOPMENT. 3 Hours.**

Theoretical advancements, empirical research findings, and practical applications of psychological concepts related to employee training and development. This course focuses on the entirety of the employee training process, including topics and issues related to training needs analysis, program design and implementation, and the evaluation of training effectiveness.

**PSYC 5331. PERCEPTION AND ATTENTION. 3 Hours.**

Survey of methods and findings dealing with perception; emphasis will be upon behavioral rather than physiological considerations; particular topics include signal detection theory, form and pattern recognition, and attentional mechanisms.

**PSYC 5333. BEHAVIORAL NEUROSCIENCE. 3 Hours.**

A survey of biological and physical processes underlying behavior. Emphasis on neural, hormonal, and genetic determinants of behavior. Topics include regulatory behaviors, reward and nociceptive systems, differentiation and sociosexual behaviors, limbic and cortical functions.

**PSYC 5334. HUMAN PHYSIOLOGY. 3 Hours.**

This course will provide a comprehensive review of the human physiology that is categorized in 15 sections and 84 chapters. Some of them will be covered by different courses, such as Neuroscience, Immunology, and Endocrinology. Students are expected to learn how the human body works and what the underlying mechanisms that control the physiological responses are. In case of damage to these systems, what will happen to the body as a whole and what will be the impact on behaviors?.

**PSYC 5337. ANIMAL COGNITION AND BEHAVIOR. 3 Hours.**

A survey of theory and data on how animals learn and represent the world and the evolutionary processes that influence their individual and social behavior.

**PSYC 5341. DECISION MAKING. 3 Hours.**

Factors that influence categorical and numerical judgments, choices, and preference decisions. Comparison of human decision behavior with various quantitative theories.

**PSYC 5342. LEADERSHIP IN ORGANIZATIONS. 3 Hours.**

This course focuses on leadership theory and the applicability to modern organizations. Various approach to studying and understanding leadership, as well as the evolution of leadership theory over time will be discussion. Discussed approaches will include trait, situational, skill, contextual, style, cultural, and emerging theories of leadership. Additionally, this course will focus on designing effective leadership development programs.

**PSYC 5345. HUMAN LEARNING AND MEMORY. 3 Hours.**

Survey of current approaches to the study of human learning and memory.

**PSYC 5346. CYBERPSYCHOLOGY BASIC CONCEPTS. 3 Hours.**

Cyberpsychology is a branch of psychology that studies the way people interact with technology and the impacts of technology on the way people feel, think, and behave both online and offline. This course provides a broad survey of the impacts of digital media (e.g., social media) on people's perception, learning, motivation, and decision making. Theories from neuroscience (e.g., large-scale networks), evolution (e.g., evolutionary mismatch), social (e.g., identity fusion), and health (e.g., anxiety) are incorporated for understanding the basic guiding principles of human behavior in the digital environment. Offered as PSYC 3357 and PSYC 5346.

**PSYC 5347. CYBERPSYCHOLOGY APPLICATIONS. 3 Hours.**

This is a project-based course that focuses on developing and testing digital interventions based on persuasion theories. Course topics include persuasion research, associative learning, consumer behavior, emotional and motivational strategies, social media, mental health, personality, social engineering, and political activism. This course is designed to introduce psychological vulnerabilities to technologically savvy students with hopes of aspiring them to invent technologies that improve the quality of life. Offered as PSYC 3358 and PSYC 5347.

**PSYC 5349. POLITICAL PSYCHOLOGY FOR THE INTERNET. 3 Hours.**

This course provides a comprehensive review of the psychology of political behavior on digital platforms. The course covers the foundational approaches to political psychology, including the evolutionary, personality, and developmental roots of political attitudes, to contemporary challenges to governance, including populism, hate speech, conspiracy beliefs, inequality, climate change, and terrorism. This course will focus on the application of psychological factors (affect, emotions, heuristics) that influence political behavior (voting, attitudes, beliefs) with emphasis on internet-mediated political strategies. Offered as PSYC 3359 and PSYC 5349.

**PSYC 5351. READINGS IN PSYCHOLOGY. 3 Hours.**

Independent readings under the supervision of an individual faculty member. Students wishing to conduct research should sign up for PSYC 5191, PSYC 5291, or PSYC 5391. May be repeated for credit with consent of the Graduate Advisor. Graded P/F/R. Prerequisite: consent of the instructor.

**PSYC 5389. CONTEMPORARY PROBLEMS IN PSYCHOLOGY. 3 Hours.**

Topics vary. May be repeated for credit with consent of Graduate Advisor.

**PSYC 5391. RESEARCH IN PSYCHOLOGY. 3 Hours.**

Independent research under the supervision of an individual faculty member; may be repeated for credit with consent of Graduate Advisor. Graded P/F/R. Prerequisite: consent of the instructor.

**PSYC 5405. ADVANCED STATISTICS I. 4 Hours.**

Basic descriptive and inferential statistics used in psychological research.

**PSYC 5407. MULTIVARIATE DATA ANALYSIS. 4 Hours.**

Statistical aspects of complex experimental designs used in psychological research. Prerequisite: PSYC 5405.

**PSYC 5600. ADVANCED RESEARCH. 6 Hours.**

Supervised research. May be repeated for credit. Graded P/F/R. Prerequisite: permission of instructor.

**PSYC 5698. THESIS. 6 Hours.**

Graded P/F/R. Can only be taken up to 4 times. Prerequisite: 12 hours of advanced psychology and an approved thesis proposal.

**PSYC 6101. GRADUATE STUDENT SEMINAR. 1 Hour.**

Our primary focus in this seminar will be to discuss contemporary topics in science that are of interest to the area and discuss research in progress from different students and faculty in the area. Each week, a student (or faculty member) will give a talk on ongoing research they are conducting, a research proposal idea, practice conference presentation, an interesting paper that just came out, etc. The purpose is to get practice speaking and discussing research, while also receiving important feedback on research ideas from other students and faculty in the department. This is also a way to foster interdisciplinary collaborations within the department. This course will also be tied to the monthly Departmental Colloquium Series where we invite select speakers out to give a talk (including job talks), which could be proposed by the class, and then voted on by the colloquium committee members. The attendance is required. Reasonable conflict of schedule is acceptable, but not exceeding 20% of the time.

**PSYC 6191. RESEARCH IN PSYCHOLOGY. 1 Hour.**

Independent research under the supervision of an individual faculty member; may be repeated for credit with consent of Graduate Advisor. Graded P/F/R. Prerequisite: consent of the instructor.

**PSYC 6291. RESEARCH IN PSYCHOLOGY. 2 Hours.**

Independent research under the supervision of an individual faculty member; may be repeated for credit with consent of Graduate Advisor. Graded P/F/R. Prerequisite: consent of the instructor.

**PSYC 6300. SEMINAR IN PSYCHOLOGY. 3 Hours.**

Offered each semester. Topics vary. May be repeated for credit. Prerequisite: consent of instructor.

**PSYC 6318. SOCIAL AND PERSONALITY DEVELOPMENT. 3 Hours.**

Theory and research on social and emotional development with an emphasis on the interaction between individual needs and abilities and societal expectations and demands.

**PSYC 6320. NEUROPHARMACOLOGY. 3 Hours.**

Survey of the basis of behavioral pharmacology including mechanisms and theories of drug actions, techniques and strategies of research, common psychoactive drugs, and the uses of drugs in clinical practice.

**PSYC 6335. ANIMAL BEHAVIOR. 3 Hours.**

Phylogenetic approach to some basic problems in behavior, with special emphasis on unlearned behavior.

**PSYC 6336. COMPARATIVE PSYCHOLOGY. 3 Hours.**

Theory and data about all aspects of behavior stressing similarities and differences across species.

**PSYC 6338. NEURAL AND COGNITIVE MODELING. 3 Hours.**

Principles of neural network and dynamical systems modeling; application of these principles to the simulation of cognitive processes in both brains and machines; models of associative learning, pattern recognition and classification, and individual and group behavior. Prerequisite: consent of instructor.

**PSYC 6346. EVOLUTIONARY PSYCHOLOGY. 3 Hours.**

Evolutionary processes influence behavior and thinking of humans and nonhuman species. Sociosexual behavior, aggression, cognition, and information processing from an evolutionary perspective will be among the topics covered.

**PSYC 6347. ENVIRONMENTAL PSYCHOLOGY. 3 Hours.**

Survey of the current literature on the impact of various features of the physical environment on human behavior. Topics covered include crowding, privacy, territoriality, personal space, noise, the natural environment, residential, educational and work environments, urban and community design, and pollution and resource management. Designed to be of interest to graduate students in architecture, urban affairs, environmental science and engineering, geology, sociology, as well as those in psychology.

**PSYC 6349. PSYCHOMETRIC THEORY. 3 Hours.**

Introduction to test construction. Topics include reliability theory, test validation, and item analysis. Prerequisite: C or better in PSYC 5405 and PSYC 5407.

**PSYC 6391. RESEARCH IN PSYCHOLOGY. 3 Hours.**

Independent research under the supervision of an individual faculty member; may be repeated for credit with consent of Graduate Advisor. Graded P/F/R. Prerequisite: consent of the instructor.

**PSYC 6399. DISSERTATION. 3 Hours.**

Graded R/F. Prerequisite: approved dissertation proposal.

**PSYC 6699. DISSERTATION. 6 Hours.**

Graded R/F/P/W. Prerequisite: approved dissertation proposal.

**PSYC 6999. DISSERTATION. 9 Hours.**

Graded P/F/R. Prerequisite: approved dissertation proposal.

**PSYC 7399. DOCTORAL DEGREE COMPLETION. 3 Hours.**

This course may be taken during the semester in which a student expects to complete all requirements for the doctoral degree and graduate. Enrolling in this course meets minimum enrollment requirements for graduation, for holding fellowships awarded by The Office of Graduate Studies and for full-time GTA or GRA positions. Students should verify that enrollment in this course meets other applicable enrollment requirements. To remain eligible in their final semester of study for grants, loans or other forms of financial aid administered by the Financial Aid Office must enroll in a minimum of 5 hours as required by the Office of Financial Aid. Other funding sources may also require more than 3-hours of enrollment. Additional hours may also be required to meet to requirements set by immigration law or by the policies of the student's degree program. Students should contact the Financial Aid Office, other sources of funding, Office of International Education and/or their graduate advisor to verify enrollment requirements before registering for this course. This course may only be taken twice. Students who do not complete all graduation requirements while enrolled in this course must enroll in a minimum of 6 dissertation hours (6699 or 6999) in their graduation term. Graded P/F/R.

**COURSES****REAE 3325. REAL ESTATE FUNDAMENTALS. 3 Hours.**

A foundation for study and research in specialized areas such as real estate financing, real estate investment and counseling, real estate management, real estate development, and property appraising, as well as relevant social, legal, and policy issues. Formerly BUSA 3325; credit will be granted only once. Prerequisite: MATH 1315 or MATH 1316 or any other Calculus (or permission of instructor) and junior standing.

**REAE 4191. STUDIES IN REAL ESTATE. 1 Hour.**

Advanced studies, on an individual basis, in the various fields of real estate. Prerequisite: 90 credit hours and permission of instructor. May be repeated for credit with consent of department chair.

**REAE 4291. STUDIES IN REAL ESTATE. 2 Hours.**

Advanced studies, on an individual basis, in the various fields of real estate. Prerequisite: 90 credit hours and permission of instructor. May be repeated for credit with consent of department chair.

**REAE 4314. REAL ESTATE DEVELOPMENT. 3 Hours.**

The land conversion process including feasibility analysis, site selection, design, construction, and financial analysis. Land use controls, planning, and environmental constraints are also examined. Formerly REAE 4311; credit will be granted only once. Prerequisite: junior standing.

**REAE 4319. REAL ESTATE FINANCE. 3 Hours.**

Problems associated with real property financing. In-depth study of financial intermediaries who supply funds for real property investment. May be included as a part of the finance concentration. Formerly BUSA 4319; credit will be granted only once. Prerequisite: REAE 3325 (FINA 3313 may be substituted for non-real estate majors).

**REAE 4321. REAL ESTATE INVESTMENT. 3 Hours.**

The determination of financial feasibility for proposed real estate investments, the effect of income taxes and various financing patterns on the equity investment, and the criteria for proper decision making to maximize benefits for equity investors. Formerly REAE 4310; credit will be granted only once. Prerequisite: REAE 3325 (FINA 3313 may be substituted for non-real estate majors).

**REAE 4331. SEMINAR IN REAL ESTATE. 3 Hours.**

Readings and discussion of special topics in real estate. Prerequisite: Junior or senior standing and consent of instructor. May be repeated for credit with consent of department chair.

**REAE 4334. REAL ESTATE APPRAISAL. 3 Hours.**

Theory and methods of residential and income property appraisal. Market analysis, highest-and-best-use analysis, capitalization techniques, and market, cost, and income approaches to valuation and reconciliation of value indicators. Prerequisite: REAE 3325 (FINA 3313 may be substituted for non-real estate majors).

**REAE 4391. STUDIES IN REAL ESTATE. 3 Hours.**

Advanced studies, on an individual basis, in the various fields of real estate. Prerequisite: 90 credit hours and permission of instructor. May be repeated for credit with consent of department chair.

**REAE 4393. REAL ESTATE INTERNSHIP. 3 Hours.**

Practical training in real estate. Analysis of theory applied to real life situations. May be used as an advanced business elective only; graded on a pass/fail basis. No credit will be given for previous experience or activities. May not be repeated for credit. Prerequisite: Junior standing and consent of department internship advisor.

**REAE 5182. INDEPENDENT STUDIES IN REAL ESTATE. 1 Hour.**

Extensive analysis of a real estate topic. Prerequisite: departmental permission.

**REAE 5199. GRAD REAL ESTATE INTERNSHIP. 1 Hour.**

Practical training in real estate. Analysis of theory applied to real life situations. Course counts as an elective and has a pass/fail grade. No credit will be given for previous experience or activities. Prerequisite: Minimum nine graduate semester hours completed.

**REAE 5299. GRAD REAL ESTATE INTERNSHIP. 2 Hours.**

Practical training in real estate. Analysis of theory applied to real life situations. Course counts as an elective and has a pass/fail grade. No credit will be given for previous experience or activities. Prerequisite: Minimum nine graduate semester hours completed.



**REAE 5301. SUSTAINABLE ISSUES IN THE BUILT ENVIRONMENT. 3 Hours.**

A survey-based course that analyzes current and historical sustainability issues. The global and political nature of this evolving discipline is emphasized. Additionally, a macro view of the components currently embodied in the practice of sustainability will be examined and discussed.

**REAE 5302. SUSTAINABLE STRATEGIES IN THE BUILT ENVIRONMENT. 3 Hours.**

Business strategies that emphasize quantitative methods, asset allocation, socially responsible investing, and evaluation research.

**REAE 5303. SUSTAINABLE POLICIES IN THE BUILT ENVIRONMENT. 3 Hours.**

Governmental, regulatory, internal reporting, and policy development related to sustainability. Grant writing will also be explored.

**REAE 5304. SUSTAINABLE PROJECTS IN THE BUILT ENVIRONMENT. 3 Hours.**

A field-based study of buildings, developments, organizations, and companies that exemplify sustainable practices. Course will include elements of social networking and communication strategies.

**REAE 5311. REAL ESTATE ANALYSIS. 3 Hours.**

Survey of real estate finance, investment, valuation/market analysis, and urban development, including financial, physical, and social aspects of the real estate development process.

**REAE 5312. INTERNATIONAL PROPERTY MARKETS. 3 Hours.**

Property markets are characterized by significant institutional differences that affect the nature and performance of national markets. Analysis of socio-economic and cultural factors influencing the operation of international markets.

**REAE 5313. GIS & PROPERTY ANALYSIS. 3 Hours.**

The increasing availability of geographically referenced property data offers significant potential for real estate research and modeling. Covers fundamentals of Geographic Information Systems (GIS) (Concepts, principles, and functions) and essential skills for applying GIS to real estate industry problems.

**REAE 5314. SEMINAR IN REAL ESTATE DEVELOPMENT. 3 Hours.**

Topics relating to site selection, design, market analysis, financial feasibility, and management in the real estate development process.

**REAE 5315. REAL ESTATE TRENDS & ISSUES. 3 Hours.**

Analysis of specialized topics associated with emerging trends and issues in the real estate industry using current literature and case studies.

**REAE 5316. ADAPTIVE REUSE & REDEVELOPMENT OF COMMERCIAL INVESTMENT REAL ESTATE. 3 Hours.**

The tools and techniques associated with the market and financial feasibility analysis of adaptively reusing and redeveloping existing properties into economically viable commercial investment real estate.

**REAE 5317. REAL ESTATE CONSTRUCTION MANAGEMENT. 3 Hours.**

Topics relating to construction management for commercial investment real estate.

**REAE 5318. SUSTAINABLE DEVELOPMENT. 3 Hours.**

Sustainability perspectives about values, rights, property and what constitutes an optimum human environment; sustainability principles and case studies emphasizing on-the-ground, incentive-based commercial investment real estate development that balances economic growth with environmental quality. Projects will include those in urban areas as well as those in rural areas focusing on agricultural elements.

**REAE 5319. SEMINAR IN REAL ESTATE FINANCE. 3 Hours.**

Study of real property financing methods; analysis of cost of borrowing, sources of funds, and mortgage terms; emphasis on construction and permanent financing of commercial and industrial properties.

**REAE 5320. TEXAS REAL ESTATE STUDY TOUR. 3 Hours.**

A field-based study of Texas real estate markets, focusing on projects in Austin, San Antonio, Houston, and Dallas-Fort Worth.

**REAE 5321. SEMINAR IN REAL ESTATE INVESTMENT. 3 Hours.**

Introduction to analytical techniques, sources of financing, and other factors related to real estate investment. Stresses current developments and topics.

**REAE 5322. COMMERCIAL LEASE ANALYSIS. 3 Hours.**

Application of critical occupancy decisions such as comparative lease analysis, lease vs. purchase analysis, lease buyout analysis, and sale-leaseback analysis to optimize user space decisions.

**REAE 5323. REAL ESTATE PROJECT STUDIO. 3 Hours.**

Studio based course focused on a commercial real estate project.

**REAE 5324. REAL ESTATE ECONOMICS. 3 Hours.**

A review of the nature of urban areas and the development of the urban economics as an economic discipline. Emphasis will be on identifying location patterns in urban areas, policy issues, real estate and urban housing options, government issues in urban areas, and urban social problems. Students will utilize data analytics and projective techniques in developing projects based on current local urban real estate issues and opportunities.

**REAE 5327. ADVANCED REAL ESTATE MARKET ANALYSIS. 3 Hours.**

Study of advanced market analysis techniques and methods, including trend analysis and demand forecasting. Emphasis is on the application of these methods to commercial property markets.

**REAE 5334. SEMINAR IN REAL ESTATE APPRAISAL. 3 Hours.**

Market, cost, and income approaches with stress on income forecasting and capitalization.

**REAE 5337. REAL PROPERTY LAW. 3 Hours.**

Legal property theory underlying real estate transactions and relationships including estates and interests in land, conveyances, and mortgages.

**REAE 5350. QUANTITATIVE METHODS FOR REAL ESTATE. 3 Hours.**

Study of advanced statistical, modeling, and econometric techniques as applied to real estate markets. Emphasis on the integration of these techniques with traditional real estate analysis.

**REAE 5382. INDEPENDENT STUDIES IN REAL ESTATE. 3 Hours.**

Extensive analysis of a real estate topic. Prerequisite: departmental permission.

**REAE 5392. SELECTED TOPICS IN REAL ESTATE. 3 Hours.**

In-depth study of selected topics in real estate. May be repeated when topics vary. Prerequisite: REAE 5311.

**REAE 5398. THESIS. 3 Hours.**

Prerequisite: departmental permission.

**REAE 5399. GRAD REAL ESTATE INTERNSHIP. 3 Hours.**

Practical training in real estate. Analysis of theory applied to real life situations. Course counts as an elective and has a pass/fail grade. No credit will be given for previous experience or activities. Prerequisite: Minimum nine graduate semester hours completed.

**REAE 5698. THESIS. 6 Hours.**

Prerequisite: departmental permission.

**REAE 6390. SEMINAR IN SPECIAL TOPICS IN REAL ESTATE. 3 Hours.**

Doctoral level coverage of advanced topics in real estate. May be repeated for credit when topics vary. Prerequisite: REAE 5311.

**REAE 6392. RESEARCH IN REAL ESTATE. 3 Hours.**

Independent study of advanced topics in real estate under the direction of graduate faculty. May be repeated for credit when topics vary. Prerequisite: REAE 5311.

## COURSES

**REE 1301. INTRODUCTION TO RESOURCE & ENERGY ENGINEERING. 3 Hours.**

Provides a review and discussion of the history of energy usage, the relation between energy usage and quality of life, the societal impact of energy use, and the environmental constraints on energy usage. Emphasis is placed on the role that engineering disciplines play in solving energy problems. The full impact that the various energy alternatives have on economic and environmental issues will be reviewed in order to provide a rational basis for energy choices now and in the future. The course also provides foundational experience using units, 2D and 3D coordinate geometry, vector algebra and scientific problem solving in preparation for higher level courses. Prerequisite: C or better in MATH 1426 (or concurrent enrollment).

**REE 1306. THE CHEMISTRY OF FUELS. 3 Hours.**

The course deals with formation of natural resources as well as formation of alternative fuels. The chemical composition and physical and chemical properties of the principal fossil hydrocarbons (coal, petroleum, natural gas), and their refining, upgrading, and conversion chemistry will be explored. The chemistry of different types of fuel cells and the use of hydrogen as a fuel will be investigated, including advantages and disadvantages of alternative technologies. The lab component covers fuel production processes and analytical methods for assessing fuel properties. Prerequisite: C or better in CHEM 1465.

**REE 2301. THERMAL ENGINEERING. 3 Hours.**

Basic concepts and definitions, properties of pure substances, work and heat, first law of thermodynamics, second law of thermodynamics, entropy, and introduction to conductive, convective, and radiative transfer. Prerequisite: C or better in each of the following: CHEM 1465 (or concurrent enrollment) or CHEM 1441 and CHEM 1442 (or concurrent enrollment); MATH 2425 (or HONR-SC 2425) and PHYS 1444; or student group.

**REE 3301. PRINCIPLES OF ENERGY ENGINEERING. 3 Hours.**

Design of energy systems including generation, delivery, conversion and efficiency. Topics include efficiencies of both new and established energy generation and conversion methods; electricity generation by fossil fuels, nuclear, solar, wind and hydropower; and alternative energy technologies. Energy systems are evaluated quantitatively by modeling and by introducing the principles of fluid mechanics, thermodynamics and heat transfer. Prerequisite: C or better in both MAE 2323 and REE 2301 or equivalent.

**REE 3302. SUSTAINABLE ENERGY SYSTEMS. 3 Hours.**

This course presents the production and consumption of energy from a systems perspective. Sustainability is examined by studying global and regional environmental impacts, economics, energy efficiency, consumption patterns and energy policy. First, the physics of energy and energy accounting methods are introduced. Next, the current energy system that encompasses resource extraction, conversion processes and end-uses are covered. Responses to current challenges such as declining fossil fuels and climate change are then explored. Prerequisite: C or better in REE 2301 or equivalent.

**REE 3303. PETROLEUM & GAS ENGINEERING. 3 Hours.**

The course provides the student with a basic knowledge and understanding of the oil and gas engineering and industry, including its history, technical aspects, business model, and impact on society and the environment. The primary emphasis is on operations in exploration, production, transportation, refining, and marketing. At the end of the course, the student should be able to speak in a general way on all aspects of the industry and be familiar with common industry terminology. Prerequisite: C or better in both GEOL 3340 and REE 3301.

**REE 3304. ENERGY STORAGE TECHNOLOGIES. 3 Hours.**

Explores the various energy storage technologies, their working, and their practical applications. Focuses on the state-of-the-art review of current and most recent technologies. Offers students an opportunity to explore various innovations in the field of energy storage that can be helpful for fulfilling our current energy storage needs. Covers many different energy storage systems such as mechanical, chemical, electrochemical, thermal, and thermochemical. Prerequisite: REE 2301, EE 2440.

**REE 3310. DATA ANALYTICS AND VISUALIZATION FOR ENERGY SYSTEMS. 3 Hours.**

This course focuses on the applications of data science for energy systems operations and control. Fundamental elements of data storytelling are explored to analyze energy data. These elements include data curation, dataset cleaning and manipulation, and data visualization as a tool for identifying qualities necessary to answer questions. Students will learn to ask questions of data, to draw insights from data and use them to solve problems, and to create and present visualizations that effectively communicate data-driven findings and decisions. Prerequisite: C or better in both IE 3301 and REE 3301.

**REE 4301. ENERGY SYSTEMS MODELING. 3 Hours.**

Many of the most pressing energy challenges of our time transcend traditional disciplinary boundaries and necessitate the use of systems models to analyze possible solutions. This course will show how methodological approaches can be applied to construct such energy systems models. Particular emphasis will be devoted to models that combine concepts from engineering, economics, natural sciences, and policy. The featured models will showcase a broad range of methodological approaches, such as optimization, simulation, machine learning, decision analysis, stochastic processes, and dynamical systems. More generally, the course will train students to build mathematical models that represent complex real-world energy system problems. Topics include basics of energy systems engineering, concepts in probability and statistics, spatial representation (e.g. GIS), and more. Recommend background knowledge in data analytics. Prerequisite: C or better in IE 3301 and REE 3301.

**REE 4302. SMART GRID. 3 Hours.**

Fundamentals of smart electric power grid including definition, design criteria, and technology. Application of data collection, processing, and communications to the power grid. Seeks to motivate development of the smart grid, evaluating options for adding sensing, communications, computation, intelligence, control, and automation to various parts of the electric system. Topics include automation in existing power systems; generation; transmission; distribution; and smart grid definition. Prerequisite: Grade C or better in both EE 3317 and REE 3304.

**REE 4303. MANAGEMENT OF ENERGY PROJECTS. 3 Hours.**

This project course is intended to provide students with an industry-relevant experience. Students will apply their engineering knowledge and skills to solve problems in the production, processing, storage, distribution, and utilization of energy. A faculty member will follow the progress and serve as an advisor to the project. Each project must have a clearly defined problem or need; must show a solution methodology; and must be value-added to the sponsor. Prerequisite: Must be a senior in the REE Professional Program.

**REE 4305. ENERGY GOVERNANCE. 3 Hours.**

Introduces contemporary energy markets, government policies, and regulations. Explores energy as a strategic resource influenced by economics, market conditions and environmental constraints. Explores the relationship between nonrenewable and renewable energy sources and how different regions adapt and address local needs and concerns. Evaluates the impact of government policies on energy usage and alternative energy development efforts. Prerequisite: C or better in both IE 2308 and REE 3302.

**REE 4310. CAPSTONE DESIGN. 3 Hours.**

Students will apply knowledge gained in the program to an application oriented capstone project. Activities will demonstrate technical skills in energy system knowledge, identifying opportunities, analysis for quantifiable savings, engineering economics, report writing, and presentation. Prerequisite: Must be a senior in the REE Professional Program.

**REE 4390. SPECIAL TOPICS IN ENERGY ENGINEERING. 3 Hours.**

Special topics pertinent to the field of energy engineering. May be repeated, provided that topics are different. Prerequisite: Prior approval by the Program Director.

**COURSES****RELI 2312. ACTS AND THE LETTERS OF PAUL. 3 Hours.****COURSES****RUSS 1441. BEGINNING RUSSIAN I. 4 Hours. (TCCN = RUSS 1411)**

Multimedia immersion in the culture and language of Russian-speaking countries. Designed to enable students to understand and communicate effectively in Russian at the beginning level. No prerequisites.

**RUSS 1442. BEGINNING RUSSIAN II. 4 Hours. (TCCN = RUSS 1412)**

Continuation of beginning Russian. Prerequisite: RUSS 1441 with a grade of C or better.

**RUSS 1491. CONFERENCE COURSE. 4 Hours.**

Independent study; consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: Permission of the instructor.

**RUSS 2301. TOPICS IN RUSSIAN LITERATURE IN TRANSLATION. 3 Hours.**

Study of the works of major authors and intellectual trends of a given period or periods. May be repeated for credit as topics or periods vary. RUSS 2301 may be taken to fulfill the foreign language literature requirement. Prerequisite: ENGL 1301 and ENGL 1302.

**RUSS 2310. RUSSIAN CULTURE IN THE WORLD. 3 Hours.**

An overview of the cultures of the Russian-speaking world in a global context, examining cultural products such as food, art, music, popular culture, literature, and/or film. Taught in English. Offered as RUSS 2310 and HIST 2310; credit will be given in only one department.

**RUSS 2313. INTERMEDIATE RUSSIAN I. 3 Hours. (TCCN = RUSS 2311)**

Continued immersion in the culture and language of Russian-speaking countries. Application of strategies and technology in mastering listening, speaking, reading, and writing at the intermediate level. Prerequisite: RUSS 1442 with a grade of C or better.

**RUSS 2314. INTERMEDIATE RUSSIAN II. 3 Hours. (TCCN = RUSS 2312)**

Continuation of intermediate Russian. Prerequisite: RUSS 2313 with a grade of C or better.

**RUSS 2315. INTRODUCTION TO RUSSIAN LANGUAGE AND CULTURE. 3 Hours.**

A fully online course devoted to immersion in Russian culture through print and digital media as well as conversation and collaboration with native speakers of Russian. Students will gain broad exposure to social and historical contexts of Russian culture as well as reading ability of the Russian Cyrillic alphabet, and practice in basic reading, writing and speaking skills in Russian. No prerequisites. Prior knowledge of Russian is useful but not required. Credit will not be granted to native or heritage speakers of Russian.

**RUSS 2391. CONFERENCE COURSE. 3 Hours.**

Independent study; consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: Permission of the instructor.

**RUSS 3301. TOPICS IN RUSSIAN LITERATURE IN TRANSLATION. 3 Hours.**

Covers the works of major Russian authors during the period from the beginning of Russian literature until the 1917 Revolution, focusing on the interrelationship of various literary movements and philosophies. Students receiving credit in Russian will complete a research project using the Russian language. May be repeated for credit as topics and periods vary. Offered as ENGL 3301 and RUSS 3301; credit will be granted in only one department. Prerequisites: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**RUSS 3304. TOPICS IN RUSSIAN LANGUAGE STUDY. 3 Hours.**

Study of Modern Russian with a focus on pronunciation, word formation, and syntax. Students develop advanced listening, reading, speaking, and writing skills through cultural analysis. Cultural topics come from linguistics, literature, music, film, visual and performing arts, sports, and science. Repeatable for credit when the topic changes.

**RUSS 3305. TOPICS IN RUSSIAN POETRY. 3 Hours.**

Literary analysis of selected works of Russian poetry in the original Russian. Topics will come from different periods of Russian literary and cultural history. Students develop reading, writing, and language skills at an advanced level. Repeatable for credit when the topic changes.

**RUSS 3306. TOPICS IN SOVIET AND POST-SOVIET LITERATURE IN TRANSLATION. 3 Hours.**

Covers the works of major Soviet and post-Soviet authors from 1917 to the present against the background of unfolding social and political development in the USSR and post-USSR. Students receiving credit in Russian will complete a research project using the Russian language. May be repeated for credit as topics and periods vary. Offered as ENGL 3306 and RUSS 3306; credit will be granted in only one department. Prerequisites: English majors must have earned a C or better in ENGL 3350 and in one literature survey course (ENGL 3340, ENGL 3341, ENGL 3351, ENGL 3352, ENGL 3361, or ENGL 3362). Non-majors must have earned a C or better in 3 hours of sophomore literature (ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329).

**RUSS 3310. LOCALIZATION AND TRANSLATION I. 3 Hours.**

Introduction to cultural and linguistic issues in the translation of Russian language texts. Students will explore current technologies used in various real-world translation contexts and how to adapt texts, products, and services to the locale for which they are intended. May be repeated once. Prerequisite: RUSS 2314 with a grade of B or better.

**RUSS 3311. LOCALIZATION AND TRANSLATION II. 3 Hours.**

Continued study of cultural and linguistic issues in the translation of Russian and English language texts. Systematic development of advanced skills in localization and computer-aided translation and in using TMX/TBX (international standards for translation memory and terminology exchange) tools. Translation practice, individually and in translation teams, with increasingly longer and more specialized texts. Prepares localization and translation specialists for real-world careers in the language-services industry. May not be repeated for credit. Prerequisite: RUSS 3310 with a grade of B or better.

**RUSS 3314. POLITICAL SYSTEMS OF EASTERN AND CENTRAL EUROPE. 3 Hours.**

POLS 3314 or RUSS 3314. Examination of the political institutions and processes of the former communist systems of Eastern Europe and the Baltics, as well as selected Central European states. Credit will be given in only one department. Students receiving credit in Russian will complete projects using the Russian language.

**RUSS 3333. CONVERSATION AND TOPICS IN RUSSIAN CULTURE. 3 Hours.**

Intermediate practice in spoken Russian using print and media resources on a range of cultural topics. Students actively master the discourse of the source media through dialogue, debate, and short presentations in Russian. May be repeated as topic varies. Prerequisite: RUSS 1442 with a grade of C or better.

**RUSS 3334. RUSSIAN COMPOSITION AND GRAMMAR. 3 Hours.**

Introduction to the analysis of texts with emphasis on reading comprehension, grammar, writing skills and compositional techniques. Prerequisite: RUSS 1442 with a grade of C or better.

**RUSS 3343. RUSSIAN PHONETICS. 3 Hours.**

Introduction to the articulatory phonetics of Russian. Of special interest to students who wish to improve their pronunciation, comprehension, and oral expression. Prerequisite: RUSS 1442 with a grade of C or better.

**RUSS 3345. INTRODUCTION TO COMPUTER-ASSISTED TRANSLATION. 3 Hours.**

Introduction to computer-assisted translation (CAT), machine translation (MT), translation memory (TM) and terminology management tools in modern translation and localization workflows. Prepares students for real-world careers in the language services industry. Exclusively for students pursuing a minor in Localization and Translation-Russian. RUSS 4334 or RUSS 3310 is strongly recommended before RUSS 3345.

**RUSS 3391. CONFERENCE COURSE. 3 Hours.**

Independent study; consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: Permission.

**RUSS 3393. RUSSIAN INTERNSHIP. 3 Hours.**

A combination of field-related experience in the business or service sector with an academic component. Coursework may include journal writing, outside readings, reflection papers, and formal presentations. Prerequisite: Permission of the instructor.

**RUSS 4301. SELECTED AUTHORS AND TOPICS. 3 Hours.**

Detailed reading and analysis of selected Russian writers such as Alexander Pushkin, Nikolai Gogol, Fyodor Dostoevsky, Leo Tolstoy, Ivan Turgenev and Anton Chekhov. Their works are compared in the light of urgent social, political, literary and philosophical questions of their day. May be repeated as topic varies. No prerequisites. May also be offered as ENGL 3300; credit will be granted in only one department. Students taking the course as RUSS 4301 read some texts in the original. Taught in English.

**RUSS 4302. RUSSIAN AND SOVIET CINEMA. 3 Hours.**

A survey of Russian and Soviet cinema from their beginnings to the present. Special attention is paid to film theory and formal analysis, the ideological uses of film art, and cinema as a medium of cultural dissent and witness to social change. No prerequisites. May also be offered as ENGL 3300; credit will be granted in only one department. Taught in English.

**RUSS 4303. PROPAGANDA AND IDEOLOGY IN SOVIET ART AND LITERATURE. 3 Hours.**

An examination of the purpose, value and influence of the arts in revolutionary Russia with the aid of diverse source documents and artistic media. Focus is on the symbols, stories, rituals and ideologies that defined the Russian experience of 'building socialism' in the early decades of the Soviet Union. No prerequisites. May also be offered as ENGL 3306; credit will be granted in only one department. Students taking the course as RUSS 4303 read some texts in the original. Taught in English.

**RUSS 4304. BANNED AND CENSORED WORKS OF RUSSIAN LITERATURE. 3 Hours.**

An examination of selected works of Russian literature that were censored, banned or otherwise prohibited, from tsarist Russia through the Soviet period. The role of censorship in Russian cultural life, and the great works of literature that flourished in spite of it. No prerequisites. May also be offered as ENGL 4337; credit will be granted in only one department. Students taking the course as RUSS 4304 read some texts in the original. Taught in English.

**RUSS 4334. THE CULTURE OF BUSINESS. 3 Hours.**

The relationship of culture, language, and meaning to issues affecting business and e-commerce in the Russian-speaking world, with emphasis on intercultural communication in an international business environment. Web-based media segments about international business in Russia, Europe, and North America are used as an aid in the acquisition of pertinent cultural knowledge, as well as vocabulary and other linguistic knowledge. Prerequisite: RUSS 2314 with a grade of B or better.

**RUSS 4335. BUSINESS RUSSIAN. 3 Hours.**

Students learn to function in business environments, with emphasis on the skills needed for conducting e-commerce. Web-based media segments from Russia, Europe, and North America are used to reinforce vocabulary and other linguistic knowledge. Prerequisite: RUSS 4334 with a grade of B or better.

**RUSS 4338. TOPICS IN INTERCULTURAL COMMUNICATION AND COLLABORATION. 3 Hours.**

This course is devoted to intercultural communication and collaboration. Through telecollaboration with native speakers of Russian, students will gain active practice in listening comprehension and spoken and written Russian. Active learning tasks employing multimedia in collaboration with language partners will contribute to a broadening of knowledge in the social and historical contexts of Russian culture and media, increased ability to express ideas in everyday contexts in spoken and written Russian, and advancement of strategies for autonomous learning. May be repeated for credit as topic changes. Prerequisite: RUSS 1442 with a grade of C or better.

**RUSS 4342. TOPICS IN SIMULTANEOUS INTERPRETING: THEORY AND PRACTICE. 3 Hours.**

This fully online course focuses on the theory and practice of simultaneous interpreting through active translation and interpreting tasks. Through telecollaboration with native speakers of Russian, students will gain active practice in listening comprehension and spoken and written Russian. A major focus is on translation and simultaneous interpreting in a variety of professional contexts including health and legal settings, politics and media, and business negotiations. Active learning projects will involve role-play, simultaneous interpreting tasks, and creating audio/visual presentations. Prerequisite: RUSS 2314 or equivalent.



**RUSS 4361. WAR, PEACE, AND POLITICS IN THE FORMER SOVIET UNION. 3 Hours.**

Since the breakup of the Soviet Union in December 1991, the 15 newly independent states have taken divergent paths, while Russia has attempted to restore its dominance over its former empire. This course examines the different paths taken by the former Soviet states and the historical and cultural forces that have driven the transitions, with a specific focus on Russia, Ukraine, Belarus, Moldova, and the South Caucasus. Taught in English. For Russian language credit, some research will be done in Russian. Offered as POLS 4361 and RUSS 4361; credit will be given in only one department. Prerequisite: POLS 2311 and POLS 2312.

**RUSS 4362. RUSSIA AND THE POST-SOVIET STATES TODAY. 3 Hours.**

An interdisciplinary overview of Russia and Russian area studies. This course provides students with a broad understanding of Russia today through the lenses of its geography and demographics, forms of government, and the themes and tendencies that run throughout Russian history and culture, including their impact on neighboring post-Soviet states. Taught in English. RUSS 4362 students complete some assignments in Russian, while POLS 4362 students do all assignments in English. Offered as POLS 4362 and RUSS 4362; credit will be given in only one department. Prerequisite: For POLS: POLS 2311 and POLS 2312.

**RUSS 4365. RUSSIAN FOREIGN POLICY. 3 Hours.**

The foreign policy of Russia with an emphasis on its historical, cultural, and political roots, and policymaking structures. Through lectures, seminars, meetings, and assignments, students will gain an understanding of the historical, cultural, and political sources of Russian foreign policy behavior, the actors that implement it, and the tactics deployed. Offered as POLS 4365 and RUSS 4365; credit will be given in only one department. Taught in English. For Russian language credit, some research will be done in Russian. Prerequisite: For POLS: POLS 2311 and POLS 2312.

**RUSS 4391. CONFERENCE COURSE. 3 Hours.**

Independent study in the preparation of a paper or a translation on a research topic; consultation with instructor on a regular basis. May be repeated for credit.

**RUSS 4393. RUSSIAN INTERNSHIP. 3 Hours.**

This course is a combination of field-related experience in the business or service sector with an academic component. Coursework may include journal writing in Russian, outside readings, and formal presentations. Prerequisite: Two RUSS 3000 level courses and permission of the instructor.

**RUSS 4394. HONORS THESIS/SENIOR PROJECT. 3 Hours.**

Required of all students in the University Honors College. During the senior year, the student must complete a thesis or a project under the direction of a faculty member in the major department. May not be repeated for credit.

## COURSES

**SALES 3344. SELLING FINANCIAL SERVICES AND PRODUCTS. 3 Hours.**

This course examines the fundamental concepts and hands-on techniques for selling financial services and products, with a special emphasis on applying these sales strategies specifically within the banking industry. It focuses on financial offerings unique to the banking industry and skills needed to sell these offerings to current clients and potential customers of commercial banks. Prerequisite: FINA 3313.

## COURSES

**SCED 5351. PHYSICAL SCIENCE - PROPERTIES AND CHANGES IN MATTER. 3 Hours.**

This course provides an in depth study of the properties and changes in matter and how to teach these concepts to students in grades K-12 science. Students study matter by engaging in inquiry and field/laboratory investigations using scientific processes, critical thinking, and problem solving. The course will help students learn to teach these physical science concepts to K-12 students using inquiry models.

**SCED 5352. PHYSICAL SCIENCE - FORCE & ENERGY. 3 Hours.**

In this course, students gain scientific knowledge about characteristics and interactions among matter, force, and energy with interdisciplinary and everyday life connections. Topics experienced through laboratory/field based investigations include: gravity, work, friction, acceleration, volume, length, distance, light, forms of energy, electricity, heat, and simple machines. The course will help students learn to teach these physical science concepts to K-12 students using inquiry models.

**SCED 5353. EARTH SCIENCE - STRUCTURES, MOVEMENT, & CHANGES IN EARTH & SPACE. 3 Hours.**

Through laboratory investigations, students gain knowledge of the various constructive and destructive forces that shape and alter the Earth's surfaces such as plate tectonics, volcanoes, earthquakes, erosion, weathering and deposition, as well as conservation of resources. The course will include studies of rock identification, and the rock cycle, as well as geologic time and the fossil record. The course includes study of earth, moon and planetary characteristics and motions. The course will enable students to teach these earth science concepts to K-12 students using inquiry models.

**SCED 5354. EARTH SCIENCE - WATER PROPERTIES, DISTRIBUTION, THE WATER CYCLE, & WEATHER. 3 Hours.**

Students gain understanding of the importance of water including the topics of cohesion, adhesion, surface tension, and capillary action. Water distribution on Earth is analyzed using maps and charts, with connections to geographic and climatic characteristics of the various regions. Water, as a major factor in weather, along with other meteorological variables such as air pressure, humidity, dew point, and cloud formation will be studied and weather patterns will be tracked over time using technology and maps. The course will provide students with the knowledge and skills required to teach these earth science concepts to K-12 students using inquiry models.

**SCED 5355. LIFE SCIENCE - UNITY & DIVERSITY OF LIFE & LIFE PROCESSES. 3 Hours.**

This course will explore living organisms and classification of organisms. The course will focus on the unity of life including the cell and cell components and the life functions, as well as the diversity of life including a look at pathogenic agents including bacteria and viruses. The course will analyze the structure and function of DNA and genetics. The course will include comparative anatomy and physiology studies of organisms. Students will learn how to teach these life science concepts to K-12 students using inquiry models.

**SCED 5356. LIFE SCIENCE - CYCLES IN NATURE, ADAPTATIONS, AND ENVIRONMENTAL SCIENCE. 3 Hours.**

This course analyzes life, biochemical, and geochemical cycles within the natural world and how they impact ecological systems and environment. Students conduct laboratory and field investigations to examine and recognize various plant and animal adaptations. Science topics include camouflage, mimicry, body coverings, mouthparts, habitats. Math-science integrations include estimations, relationships, graphing, and number sense. Inquiry models will be used to help students learn to teach these life science concepts to K-12 students.

**COURSES****SCIE 1201. STEP 1: INQUIRY APPROACHES TO TEACHING. 2 Hours.**

STEP 1 allows students to explore teaching as a career. Following an introduction to the theory and practice behind excellent inquiry-based science and mathematics instruction, students observe two and teach three lessons in elementary classrooms to obtain firsthand experience in planning and implementation. A grade of C or better is required for this course to apply towards a UTeach degree.

**SCIE 1202. STEP 2: INQUIRY-BASED LESSON DESIGN. 2 Hours.**

In STEP 2, students continue developing the lesson planning skills learned in STEP 1 as they become familiar with exemplary middle school science curricula. After observing a lesson being taught in a local school district classroom, students work alone or in pairs to plan and teach three inquiry-based lessons to sixth, seventh, or eighth graders. Prerequisite: C or better in SCIE 1101 or SCIE 1201.

**SCIE 1334. STEP 1 & 2 COMBO: INQUIRY APPROACHES TO TEACHING & LESSON DESIGN. 3 Hours.**

STEP 1 & 2 Combo allows students to explore teaching as a career. Following an introduction to the theory and practice behind excellent inquiry-based science and mathematics instruction, students observe two lessons being taught in a local school district. Students will then work alone or in pairs to plan and teach four inquiry-based lessons to elementary and middle school students. This course is for students completing the UTeach program in two years or less. A grade of C or better is required for this course to apply towards a UTeach degree.

**SCIE 1350. INTRODUCTION TO DATA SCIENCE. 3 Hours.**

A survey of contemporary approaches to data-driven discovery. This course will be the required entry point for students majoring in Data Science and is designed to be accessible to all others interested in the modern data revolution. The course includes discussions of ethical principles involving privacy, data security, and broader societal implications.

**SCIE 2301. FOUNDATIONS OF SCIENCE. 3 Hours.**

An integrated presentation of the methodology and fundamental concepts in the physical, biological and behavioral sciences with special emphasis on their social, cultural and historical context. Topics will be organized around a selected theme, such as origins, the environment or science and society. The primary goal is to prepare students to participate in modern society. This course does not require previous background in the sciences.

**SCIE 2392. SPECIAL TOPICS IN SCIENCE. 3 Hours.**

Topics as selected by the instructor. May be repeated for credit as the topic varies. Prerequisite: permission of the department.

**SCIE 3100. MEDICAL LABORATORY SCIENCE FIELD EXPERIENCE. 1 Hour.**

Restricted to medical technology majors. Students participate in a twelve to sixteen month off-campus education and clinical training program. May be repeated for credit. Prerequisite: Completion of all organized coursework for the Bachelor of Science in Medical Technology degree and consent of department.

**SCIE 3200. MEDICAL LABORATORY SCIENCE FIELD EXPERIENCE. 2 Hours.**

Restricted to medical technology majors. Students participate in a twelve to sixteen month off-campus education and clinical training program. May be repeated for credit. Prerequisite: Completion of all organized coursework for the Bachelor of Science in Medical Technology degree and consent of department.

**SCIE 3300. MEDICAL LABORATORY SCIENCE FIELD EXPERIENCE. 3 Hours.**

Restricted to medical technology majors. Students participate in a twelve to sixteen month off-campus education and clinical training program. May be repeated for credit. Prerequisite: Completion of all organized coursework for the Bachelor of Science in Medical Technology degree and consent of department.

**SCIE 3301. PHYSICAL SCIENCE - PHYSICS. 3 Hours.**

This integrated study of physics and chemistry includes force and motion, waves, thermodynamics energy transformations, and quantum physics. This course is designed to meet the needs of students seeking to become elementary or middle school science teachers.

**SCIE 3302. PHYSICAL SCIENCE - CHEMISTRY. 3 Hours.**

This physical science includes atomic structure, chemical bonding, the periodic table, nomenclature, kinetic theory, gas laws, chemical equations, and solutions. This course is designed to meet the needs of students seeking to become elementary or middle school science teachers.

**SCIE 3303. GEOLOGY, METEOROLOGY, AND OCEANOGRAPHY. 3 Hours.**

This integrated study of the earth emphasizes interactions among plate tectonics, the atmosphere, the oceans, the biosphere, and human activity. Topics include formation, composition, and shaping of the earth, including plate tectonics, the rock cycle, natural energy resources, characteristics of oceans, characteristics of the atmosphere, climate, and weather. This course is designed to meet the needs of students seeking to become elementary or middle school science teachers.

**SCIE 3304. ASTRONOMY. 3 Hours.**

Topics include the evolution of the universe, properties of light and the life cycle of stars, galaxies, and apparent motions and characteristics of the solar system. This course is designed to meet the needs of students seeking to become elementary or middle school science teachers.

**SCIE 3305. ENVIRONMENTAL SYSTEMS. 3 Hours.**

Topics include interrelationships among biotic and abiotic factors within habitats, ecosystems, and biomes and the energy flow through environmental systems. This course is designed to meet the needs of students seeking to become elementary or middle school science teachers.

**SCIE 3348. PRE-MEDICAL PRECEPTORSHIP. 3 Hours.**

The purpose of this course is to allow students to gain knowledge and field experience in the science and healthcare industry while earning college credit. Students will discuss current healthcare topics through primary literature research, personal experiences, and observation activities. UTA partners with local healthcare entities to facilitate this program. Students must apply for the program and be cleared for registration during the semester prior to enrollment.

**SCIE 3400. MEDICAL LABORATORY SCIENCE FIELD EXPERIENCE. 4 Hours.**

Restricted to medical technology majors. Students participate in a twelve to sixteen month off-campus education and clinical training program. May be repeated for credit. Prerequisite: Completion of all organized coursework for the Bachelor of Science in Medical Technology degree and consent of department.

**SCIE 4101. SPECIAL TOPICS IN COMPOSITE SCIENCE. 1 Hour.**

This special seminar will focus on contemporary issues on integrated science topics, including reflections on science teaching experiences and contemporary critical issues in science education. Prerequisite: permission of instructor.

**SCIE 4107. CAPSTONE TEACHING EXPERIENCE SEMINAR. 1 Hour.**

Restricted to students in the UTeach Arlington program. Discussions include capstone teaching experiences, contemporary critical issues in education, and preparation for the state certification exams. Prerequisite: C or better in SCIE 4333; concurrent enrollment in SCIE 4607; in good standing with UTeach program.

**SCIE 4192. SELECTED TOPICS IN SCIENCE. 1 Hour.**

(Variable credit 1-3 hours as arranged). Topics in science not treated in the regular curriculum. Topic, format, and prerequisites to be determined by the instructor. May be repeated for credit as different topics are offered.

**SCIE 4292. SELECTED TOPICS IN SCIENCE. 2 Hours.**

Topics in science not treated in the regular curriculum. Topic, format, and prerequisites to be determined by the instructor. May be repeated for credit as different topics are offered.

**SCIE 4301. ISSUES IN AMERICAN HEALTHCARE. 3 Hours.**

Survey of current issues in American healthcare to include medical ethics, holistic medicine, nutrition, wellness, and the economics of healthcare. This course is the capstone course required for a College of Science interdisciplinary minor in Health Studies. This course is only open to students completing a minor in Health Studies within the College of Science.

**SCIE 4302. TEACHING AND LEARNING: SCIENTIFIC INQUIRY. 3 Hours.**

Scientific inquiry refers to the diverse ways in which scientists study the natural world and propose explanations based on the evidence derived from their work. This course explores inquiry as it refers to the activities of students in which they develop knowledge and understanding of scientific ideas, as well as an understanding of how scientists study the natural world.

**SCIE 4303. CLINICAL MEDICINE AND THE HUMAN EXPERIENCE. 3 Hours.**

This will be a medical survey course describing the human experience through the lens of different medical specialties and patient perspective rather than current medical therapies. Example: in our cardiology discussion will examine the patient's perspective on having a heart attack rather than the medications for treatment.

**SCIE 4304. DIAGNOSIS OF HUMAN DISEASE. 3 Hours.**

This clinical medicine course will examine a variety of diagnostic tools, such as laboratory, radiologic, and scanning techniques used to screen, diagnose, and monitor a wide variety of health and disease states.

**SCIE 4325. WOMEN IN SCIENCE. 3 Hours.**

Explores the role of women in science. Emphasis on gender and science, the history of women in science, gender equity in the classroom, strategies for the retention of women scientists, the current culture/climate for women in science, and contemporary women in science. Offered as EDUC 4325, SCIE 4325, and GWSS 4325. Credit will be granted only once.

**SCIE 4331. KNOWING AND LEARNING IN STEM. 3 Hours.**

Psychological foundations of learning; problem solving in mathematics and science education utilizing technology; principles of expertise and novice understanding of subject matter; implications of high-stakes testing; and foundations of formative and summative assessment. A grade of C or better is required for this course to apply towards a UTeach degree. Prerequisite: C or better in SCIE 1201 or SCIE 1334 or concurrent enrollment in either.

**SCIE 4332. CLASSROOM INTERACTIONS. 3 Hours.**

Principles of delivering effective instruction in various formats (lecture, lab activity, collaborative settings); examination of gender, class, race, and culture in mathematics and science education; overview of policy related to mathematics and science education. Includes approximately 6 hours of field experience at the high school level. A grade of C or better is required for this course to apply towards a UTeach degree. Prerequisite: C or better in SCIE 1202 or SCIE 1334; C or better in SCIE 4331 or concurrent enrollment.

**SCIE 4333. MULTIPLE TEACHING PRACTICES. 3 Hours.**

Multiple research-based teaching practices including foundations of project-based, case-based, and problem-based learning environments; principles of project-based curriculum development in mathematics and science education; classroom management and organization of inquiry-based, problem-based/project-based learning classrooms. Includes approximately 10 hours of field experience at the high school level. A grade of C or better is required for this course to apply towards a UTeach degree. Prerequisite: C or better in SCIE 4332.

**SCIE 4392. SELECTED TOPICS IN SCIENCE. 3 Hours.**

Topics in science not treated in the regular curriculum. Topic, format, and prerequisites to be determined by the instructor. May be repeated for credit as different topics are offered.

**SCIE 4607. CAPSTONE TEACHING EXPERIENCE FOR STEM SECONDARY GRADES. 6 Hours.**

Closely supervised field experience in a cooperating school. Experience includes carrying out the duties of a secondary teacher. Consent of the UTeach Arlington advisor is required. Prerequisite: C or better in SCIE 4333; concurrent enrollment in SCIE 4107; in good standing with UTeach program.

**SCIE 5192. SELECTED TOPICS IN SCIENCE. 1 Hour.**

Topics in science not treated in the regular curriculum. Topic, format, and prerequisites to be determined by the instructor. May be repeated for credit as different topics are offered.

**SCIE 5292. SELECTED TOPICS IN SCIENCE. 2 Hours.**

Topics in science not treated in the regular curriculum. Topic, format, and prerequisites to be determined by the instructor. May be repeated for credit as different topics are offered.

**SCIE 5301. CONTEMPORARY SCIENCE. 3 Hours.**

This class will review modern topical areas in contemporary science from a broadly multidisciplinary view. Readings from popular and scientific journals will be combined with lectures from different disciplines, to review the newest science innovations. Materials presented will familiarize students with current research, major breakthroughs in various fields, and the foundational science behind the discoveries. Topics covered should enrich K-12 science curricula and help teachers to address student questions about breaking science news. This class is intended for M.A. in Science majors, and may not be taken for credit for the M.S. or Ph.D. degrees in the College of Science.

**SCIE 5302. CAPSTONE SCIENCE SEMINAR. 3 Hours.**

The Capstone Science Seminar is an intensive research and discussion class that will focus on new studies in science education and practice. Students in the M.A. in Science program should take this class in the last semester of study. This class will include a research project relevant to science education, and formal presentation of the research. This class is intended for M.A. in Science majors, and may not be taken for credit for the M.S. or Ph.D. degrees in the College of Science.

**SCIE 5303. TEACHING AND LEARNING: SCIENTIFIC INQUIRY. 3 Hours.**

Scientific inquiry refers to the diverse ways in which scientists study the natural world and propose explanations based on the evidence derived from their work. This course explores inquiry as it refers to the activities of students in which they develop knowledge and understanding of scientific ideas, as well as an understanding of how scientists study the natural world.

**SCIE 5304. SPECIAL TOPICS IN SCIENCE I. 3 Hours.**

Seminar on significant research in science. Topics are selected with the assistance of the instructor and may include both pure and applied science.

**SCIE 5305. SPECIAL TOPICS IN SCIENCE II. 3 Hours.**

Seminar on significant research in science. Topics are selected with the assistance of the instructor may include both pure and applied science.

**SCIE 5307. INTEGRATED PHYSICS AND CHEMISTRY: CHEMISTRY. 3 Hours.**

This integrated study of physics and chemistry fundamental chemical principles including atomic structure, chemical bonding, the periodic table, nomenclature, kinetic theory, gas laws, chemical equations, and solutions.

**SCIE 5308. INTEGRATED PHYSICS AND CHEMISTRY: PHYSICS. 3 Hours.**

This integrated study of physics and chemistry includes force and motion, waves and thermodynamics, energy transformations, quantum physics, and atomic structure.

**SCIE 5321. MECHANICS, HEAT, & WAVE MOTION. 3 Hours.**

This course is intended for students who wish to achieve a higher level of knowledge and effectiveness in the teaching of fundamental physics. Topics include: 1) Newton's laws of motion, gravitation, and planetary motion; 2) the basic laws of thermal and statistical physics; 3) oscillatory motion including wave and sound. Replicable experiments will be demonstrated throughout the course. This class is intended for M.A. in Interdisciplinary Science majors, and may not be taken for credit for M.S. or Ph.D. degrees in the College of Science. Prerequisite: Trigonometry.

**SCIE 5322. ELECTRICITY, MAGNETISM, CIRCUITS, & OPTICS. 3 Hours.**

This course is intended for students who wish to achieve a higher level of knowledge and effectiveness in the teaching of fundamental physics. Topics include: 1) Static charges, current flows, electric and magnetic fields; 2) simple DC/AC electrical circuits including examples from household circuit and practical electronic devices; 3) light and optics including examples such as camera, microscopes and telescopes. Replicable experiments will be demonstrated throughout the course. This class is intended for M.A. in Interdisciplinary Science majors, and may not be taken for credit for M.S. or Ph.D. degrees in the College of Science. Prerequisite: SCIE 5321.

**SCIE 5323. MODERN PHYSICS. 3 Hours.**

This course is intended for students who wish to achieve a higher level of knowledge and effectiveness in the teaching of fundamental physics. Topics include: 1) introduction to special relativity and quantum theory; 2) light and radiation; 3) applications to modern electronic devices; 4) nuclear particle physics. This class is intended for M.A. in Interdisciplinary Science majors, and may not be taken for credit for M.S. or Ph.D. degrees in the College of Science. Prerequisite: SCIE 5321, SCIE 5322.

**SCIE 5329. LABORATORY TECHNIQUES IN PHYSICS. 3 Hours.**

This course is intended for students who wish to achieve a higher level of knowledge and effectiveness in the teaching of fundamental physics. Experiments demonstrating various topics are covered. Experiments include gravitational acceleration, heat flow, harmonic motion, sound, electric, magnetic fields, electric circuits, optics, x-rays and nuclear radiation. This class is intended for M.A. in Interdisciplinary Science majors and may not be taken for credit for M.S. or Ph.D. degrees in the College of Science. Prerequisite: SCIE 5321, SCIE 5322.

**SCIE 5330. EARTH SYSTEMS, PART I. 3 Hours.**

A review of Earth materials and their chemistry. Earth structure and geologic time, followed by a detailed discussion of the plate tectonic system, the hydrologic system, and their interaction in weathering and erosion, sedimentation, and landscape development. Laboratory demonstrations will include identification of earth materials, estimating plate motions, location of earthquake epicenters, flood frequency, and groundwater discharge. These classes are intended for M.A. in Interdisciplinary Science majors and may not be taken for credit for the M.S. or Ph.D. degrees in Geology or any other College of Science discipline.

**SCIE 5331. EARTH SYSTEMS, PART II. 3 Hours.**

A detailed discussion of the atmosphere system, oceanic systems, biologic systems, and their history. A summary discussion of the interaction of Earth Systems for an understanding of processes that have formed and continue to form the Planet Earth. Laboratory demonstrations will include weather forecasting, ocean currents, sea level change, and fossil identification. This class is intended for M.A. in Interdisciplinary Science majors, and may not be taken for credit for the M.S. or Ph.D. degrees in Geology or any other College of Science discipline. Prerequisite: SCIE 5330 and admission into the M.A. in Interdisciplinary Science program.

**SCIE 5332. EARTH RESOURCES & THE ENVIRONMENT. 3 Hours.**

A detailed discussion of resources that support life: atmosphere, water, soil, minerals and materials, and energy; the use of those resources and the effect on the environment and global change; and the relation between population, resource distribution and availability, and environmental pollution. These classes are intended for M.A. in Interdisciplinary Science majors, and may not be taken for credit for the M.S. or Ph.D. degrees in Geology or any other College of Science discipline. Prerequisite: SCIE 5330, SCIE 5331, and admission into the M.A. in Interdisciplinary Science Program.

**SCIE 5335. LABORATORY METHODS & TECHNIQUES. 3 Hours.**

Methods and techniques used to identify minerals, rocks and fossils; maps and mapping of geological data; recognition of landslides; flood frequency and erosion processes of river and streams; location of earthquakes. These classes are intended for M.A. in Interdisciplinary Science majors, and may not be taken for credit for the M.S. or Ph.D. degrees in Geology or any other College of Science discipline. Prerequisite: SCIE 5330, SCIE 5331 and admission into the M.A. in Interdisciplinary Science Program.

**SCIE 5355. PRINCIPLES OF CHEMISTRY. 3 Hours.**

The fundamentals of atomic structure, chemical bonding, the periodic table, nomenclature, gas laws, chemical equations, and solutions. The course will be supplemented with laboratory demonstrations devoted to chemical problem-solving, library and Internet resources, chemical ethics, etc. This course is intended for M.A. in Interdisciplinary Science majors, and may not be taken for credit for the M.S. or Ph.D. degrees in Chemistry or any other College of Science discipline.

**SCIE 5356. PRINCIPLES OF CHEMISTRY II. 3 Hours.**

Study of advanced atomic structure and bonding concepts, acid-base theory, kinetics and equilibria, thermodynamics, electrochemistry, and the chemistry of some elements. The course will be supplemented with laboratory demonstrations devoted to chemical problem solving, library and internet resources, chemical ethics etc. This course is intended for M.A. in Interdisciplinary Science majors, and may not be taken for credit for M.S. or Ph.D. degrees in Chemistry or any other College of Science discipline. Prerequisite: SCIE 5355.

**SCIE 5357. INTRODUCTORY ORGANIC & BIOCHEMISTRY. 3 Hours.**

Survey of organic and biochemistry with emphasis on application to the human body. Organic functional groups and nomenclature, organic reactions, carbohydrates, lipids, proteins, enzymes, metabolism, and nucleic acids. This course is intended for M.A. in Interdisciplinary Science majors, and may not be taken for credit for M.S. or Ph.D. degrees in Chemistry or any other College of Science discipline. Prerequisite: SCIE 5355, SCIE 5356.

**SCIE 5358. LABORATORY PROBLEMS IN CHEMISTRY. 3 Hours.**

Experiments related to fundamental principles covered in SCIE 5355 (formerly CHEM) and SCIE 5356. Volumetric and gravimetric determinations and qualitative analysis. This course is intended for M.A. in Interdisciplinary Science majors, and may not be taken for credit for the M.S. or Ph.D. degrees in Chemistry or any other College of Science discipline. Prerequisite: SCIE 5355, SCIE 5356.



**SCIE 5371. CELL AND MOLECULAR BIOLOGY. 3 Hours.**

The course focuses on the chemical and molecular basis of life, including metabolism, cell structure and function and genetics. This class is intended for M.A. in Science majors, and may not be taken for credit for the M.S. or Ph.D. degrees in Biology or any other College of Science discipline.

**SCIE 5372. STRUCTURE & FUNCTION OF ORGANISMS. 3 Hours.**

The study of structure and function of plants and animals. Topics to be covered include structure at the level of the cell, tissue, organ and individual, growth, transport/circulation/gas exchange, nutrition, reproduction, development, endocrinology, and animal neural regulation. This class is intended for M.A. in Interdisciplinary Science majors, and may not be taken for credit for the M.S. or Ph.D. degrees in Biology or any other College of Science discipline. Prerequisite: SCIE 5371.

**SCIE 5373. EVOLUTION, ECOLOGY, AND BIODIVERSITY. 3 Hours.**

Reviews three significant aspects of organismal biology and presents current hypotheses concerning the origin and diversification of life on Earth. The ecological and behavioral interactions between organisms and their biotic/abiotic environments are considered from an evolutionary perspective. This class is intended for M.A. in Interdisciplinary Science majors, and may not be taken for credit for the M.S. or Ph.D. degrees in Biology or any other College of Science discipline. Prerequisite: SCIE 5371, SCIE 5372.

**SCIE 5374. LABORATORY PROBLEMS IN BIOLOGY. 3 Hours.**

Laboratory experiments related to fundamental principles covered in SCIE 5371 (formerly BIOL) and SCIE 5372. This course will utilize labs designed by Master Biology Teachers. These will be supplemented by labs published by the National Association of Biology Teachers, and various biology publishers. This class is intended for M.A. in Interdisciplinary Science majors, and may not be taken for credit for the M.S. or Ph.D. degrees in Biology or any other College of Science discipline. Prerequisite: SCIE 5371, SCIE 5372.

**SCIE 5380. MENTORED RESEARCH. 3 Hours.**

Research under the direction of a College of Science faculty member. No more than six credit hours of SCIE 5380 may be taken for a letter grade. Prerequisite: written permission of the instructor.

**SCIE 5392. SELECTED TOPICS IN SCIENCE. 3 Hours.**

Topics in science not treated in the regular curriculum. Topic, format, and prerequisites to be determined by the instructor. May be repeated for credit as different topics are offered.

## COURSES

**SOCI 1200. PERSONAL AND PROFESSIONAL SUCCESS IN THE SOCIAL SCIENCES. 2 Hours.**

A first year experience course for new students and new transfer students interested in a career in the social sciences. Provides the necessary foundation for success in a college environment while balancing personal and/or work obligations. Orients students to life on campus, demonstrates how to leverage campus resources to achieve career and academic goals, and emphasizes engagement outside the classroom through collaborative and co-curricular opportunities. Fulfills the University requirement for either UNIV 1101 or UNIV 1131. Offered as SOCI 1200 and ANTH 1200; credit will be granted only once.

**SOCI 1310. INTRODUCTION TO POPULAR CULTURE. 3 Hours.**

This course will introduce students to the role of popular culture in American society. It examines culture as a process through which people make symbolic meaning out of the world. Since everyone has access to popular culture, it constructs the way that people think about the world around them. The course will explore the creation, production, dissemination, reception and consumption of popular culture.

**SOCI 1311. INTRODUCTION TO SOCIOLOGY. 3 Hours. (TCCN = SOCI 1301)**

(SOCI 1301). A scientific approach to the analysis and explanation of culture, personality, and social organization. The social processes and mechanisms of interaction involved in the natural process of cultural development, dissemination, assimilation, and the institutions of the group. This course satisfies the University of Texas at Arlington core curriculum requirement in Social and Behavioral Sciences.

**SOCI 2312. SOCIAL PROBLEMS. 3 Hours. (TCCN = SOCI 1306)**

A survey of contemporary social problems in the United States. Emphasis is on applying different theoretical perspectives and systematic procedures to understand social problems as public issues rather than personal problems. This course satisfies the University of Texas at Arlington core curriculum requirement in Social and Behavioral Sciences.

**SOCI 3312. JUVENILE DELINQUENCY. 3 Hours.**

The delinquent as a person and delinquency as a social problem, theories of delinquency, and methods of correctional treatment and preventive programs.

**SOCI 3313. CRIMINOLOGY. 3 Hours.**

Crime-related social issues. Defining and measuring crime, surveying major theoretical explanations of criminal behavior, and society's formal responses to crime and criminals.

**SOCI 3314. THE LATINA EXPERIENCE. 3 Hours.**

Examines the social, cultural and economic experiences of Latin American women in the United States, with particular emphasis on Mexican-origin women. The course surveys the historical and contemporary experiences of Latinas in the United States with respect to family dynamics, religion, education, politics, health and illness, the labor market, mass media, and the arts. Offered as MAS 3314, SOCI 3314, SOCW 3314, GWSS 3314, and AAST 3321. Credit will be granted in only one department.

**SOCI 3315. SOCIAL PSYCHOLOGY OF CRIME. 3 Hours.**

Selected concepts in social psychology applied to issues in crime and justice, such as the actions of victims, criminals, and criminal justice professionals. Topics include aggression, social perception, cognitions, conformity, obedience, and deviance.

**SOCI 3316. LATINO HEALTH ISSUES. 3 Hours.**

A cross-cultural examination of issues in Latino health and relevant health practices in the United States through the lenses of social sciences. Themes include the Latino Threat Narrative, acculturation histories and health care status of major Latino ethnic enclaves in the U.S. Listed as SOCI 3316, MAS 3316 and ANTH 3316; may receive credit for either SOCI 3316, MAS 3316, or ANTH 3316.

**SOCI 3317. INDIVIDUAL AND SOCIETY. 3 Hours.**

How society influences individual thought, feeling, and behavior. Includes interpersonal perception, attitudes, norms, roles, conformity, and such social issues as aggression, helping behavior, prejudice, and interpersonal attraction.

**SOCI 3318. SELF AND SOCIAL IDENTITY. 3 Hours.**

The social self. Topics include factors in the development, organization, evaluation and presentation of self in everyday life and processes by which social categories and roles influence self concept.

**SOCI 3319. SMALL GROUPS. 3 Hours.**

The process and structures of small-scale interaction systems, including an analysis of the process of leadership, the exercise of influence, the effect of groups on individuals and of individuals on groups, the relation and function of the small group as a part of a larger whole, and the process of group formation, development, and disintegration.

**SOCI 3320. DEVIANCE: SOCIAL AND PERSONAL. 3 Hours.**

Theoretical perspectives on societal definitions of behavior as deviant or disorganized. Selected studies, representative of current problems, examined critically in terms of the structural-cultural conditions of contemporary society.

**SOCI 3321. SOCIALIZATION AND SOCIAL CONTROL. 3 Hours.**

The relationship between social structure and the individual. The influence of social factors on cognitive development, personality formation, and the behavior of individuals throughout the lifecycle. The effect of socialization on conformity and deviance. Prerequisite: sophomore standing or permission of the instructor.

**SOCI 3322. RACE, LATINOS, AND THE AMERICAN NARRATIVE. 3 Hours.**

Adopts race and ethnicity as a central platform to examine how sociocultural and structural processes intersect to shape an American narrative of Latinos in the United States. Assesses topics like ethnic capital, socioeconomic mobility, and the digital age to broaden a sociological understanding of Latino group progress in relation to widening inequality gaps. Offered as SOCI 3322 and MAS 3322; credit will be granted in only one department.

**SOCI 3323. COLLECTIVE BEHAVIOR. 3 Hours.**

Provides an overview of the elementary forms of collective behavior including riots, panics, fads, fashion, cults and crazes. Explanatory theories and specific instances of the different forms of collective behavior are examined. Prerequisite: SOCI 1311.

**SOCI 3324. SOCIAL MOVEMENTS. 3 Hours.**

Focuses on twentieth and twenty-first century social movements, including the U.S. civil rights movement, the student and anti-war movements of the 1960s, the women's movement, the environmental movement, and anti-globalization movements. Status politics movements, such as pro-choice/pro-life and gay rights movements, are also explored. Compares these movements with their counterparts in other countries and identifies the reasons for their successes and failures.

**SOCI 3327. INTERCULTURAL INTERACTION. 3 Hours.**

Patterns and variations in interactions involving people from different cultures and subcultures. Intercultural interaction, both within multicultural societies and between persons from different societies.

**SOCI 3328. MARITAL AND SEXUAL LIFESTYLES. 3 Hours.**

Contemporary American lifestyles selected from: singles, traditional marriage, homosexuals, single-parent families, open marriage, non-marital sexuality, cohabitation, dual-career marriage, childless couples, egalitarian marriage, families in later life. Offered as DIVR 3328, SOCI 3328 and GWSS 3328; credit will be granted only once.

**SOCI 3331. SOCIOLOGY OF THE FAMILY. 3 Hours.**

The family's role in American society and in other cultures past, present, and future. Family research methods, comparative family systems, child development/parenting, culture and personality, minority families, social class variation in families, work and family. Offered as SOCI 3331 and GWSS 3331; credit will be granted only once. Prerequisite: sophomore standing or permission of the instructor.

**SOCI 3332. SOCIOLOGY OF REPRODUCTION. 3 Hours.**

Investigates historical and contemporary cultural customs, social institutions, and personal experiences related to reproduction. Topics may include assisted reproduction, pregnancy loss, living "child-free," sperm/egg donation, and surrogacy. Examines how changing economic conditions, technologies, and social norms shape the meaning of children, childbirth education, infertility, and the experience of birth for both men and women.

**SOCI 3334. SOCIOLOGY OF GENDER. 3 Hours.**

Examination of theoretical and empirical approaches to understanding the formation of gender. Assesses individual and structural dimensions of gender in various social institutions including work, education, and families. Offered as SOCI 3334 and GWSS 3334; credit will be granted only once.

**SOCI 3336. SOCIAL INEQUALITY. 3 Hours.**

Examines the processes, characteristics, and consequences of social inequality in society. Topics include the social class structure, status groups, and elite power structure as they influence people's life chances. Offered as AAST 3336 and SOCI 3336; credit will be granted in only one department.

**SOCI 3337. RACIAL & ETHNIC GROUPS IN US. 3 Hours.**

Compares the immigration, acculturation, and adjustment processes of various racial/ethnic groups in the U.S. Examines historical and contemporary discrimination in relation to the social conditions of racial/ethnic minority groups in the U. S. Topics include classical and contemporary theory; individualistic, cultural, and structural arguments about social arrangements; and conflict among majority and minority groups. Offered as AAST 3337, MAS 3337, and SOCI 3337; credit will be granted in only one department. Credit will not be granted for both SOCI 3337 and SOCI 4310 or for MAS 3337 and MAS 4310.

**SOCI 3338. CONTEMPORARY BLACK EXPERIENCE. 3 Hours.**

An overview of recent research concerning the African American experience in the post-civil rights era. Topics include explanations for racial differences across spheres of society such as income, education, and occupation; the debate over race versus social class; the persistence of racial discrimination; and emerging disputes within the black community regarding "what it means to be black." Offered as AAST 3338 and SOCI 3338; credit will be granted in only one department.

**SOCI 3339. RACE, SPORT AND MEDIA. 3 Hours.**

The media, including television, film, print, audio, and online outlets, influence how we view the world. This course analyzes overt, subtle and subliminal messages about culture, race, ethnicity, and sport as presented to us through various forms of the media. Through examinations of media portrayals of race, both past and present, students will analyze media artifacts, identify recurring themes, and examine research focused on the societal effects of stereotypical media portrayals. Offered as AAST 3339 and SOCI 3339; credit will be granted in only one department.

**SOCI 3340. SOCIOLOGY OF EDUCATION. 3 Hours.**

This course examines the sociocultural processes involved in the production of academic inequalities. It assesses how families shape students' opportunity structures and explores how factors like teacher influences, neighborhood environments, peer groups, and cultural resources shape students' educational trajectories. The course emphasizes college and university settings to further understandings of the disparate academic experiences of marginalized student groups. Prerequisite: sophomore standing or permission of the instructor.

**SOCI 3341. SOCIOLOGY OF SPORT. 3 Hours.**

Sociological examination of the institution of sport in U.S. society. By examining selected topics such as sport and socialization, sport and politics, sport and education, the Olympics, race and sport, violence in sport, women in sport, and the business of sport, this course will address the social significance of sport and its function as a major social institution.

**SOCI 3342. SOCIOLOGY OF THE HUMAN BODY. 3 Hours.**

Drawing from the social sciences, cultural and gender studies, and exercise physiology, this course in body sociology addresses several contemporary issues relating to diet, nutrition and exercise. Specific topics include eating disorders, factory farming, and "body industries" involving weight-loss diets, gyms, fashion, and cosmetic and bariatric surgery. The medical model of bodies is also examined. Also listed as KINE 3342; credit will not be granted for both.

**SOCI 3343. RELIGION IN MODERN AMERICA. 3 Hours.**

This course provides an overview of the scientific study of religion from a sociological perspective. The focus is on theories, research and trends relevant to religion in the contemporary United States. Topics include, but are not limited to, religious traditions, practices, and beliefs; declining religious participation; and religion and social change. The relationship between religion, politics, race relations, sex and gender will also be examined. Offered as SOCI 3343 and AAST 3342; credit will be granted in only one department.

**SOCI 3345. SOCIOLOGY OF THE 1960S. 3 Hours.**

This course presents a sociological analysis of the sixties, stressing the connection between grassroots mobilization and large structures of power, war, race and gender. The legacy of the sixties is examined through stories told by and about activists of the period. Parallels between the sixties and the present are identified. Movements covered may include civil rights, black power, anti-war and women's rights. Offered as AAST 3344 and SOCI 3345; credit will be granted in only one department.

**SOCI 3346. U.S. INTO THE TWENTY-FIRST CENTURY. 3 Hours.**

Selected problems, prospects, and dilemmas examined in the context of contemporary perspectives in sociology as the United States enters the new millennium as a global actor.

**SOCI 3347. ENVIRONMENT AND SOCIETY. 3 Hours.**

Explores the causes, consequences, and potential resolutions of environmental issues as they relate to human society. Topics include the social roots of environmental problems, inequalities in the distribution of environmental risks and harms, and new directions in sustainable development.

**SOCI 3348. SOCIAL ASPECTS OF RISK. 3 Hours.**

An examination of the social aspects of risk in everyday life. The course covers the relationship between risk and thrill-seeking behavior, risk assessment and the management of risk by technical experts, risk perceptions among the general public, and how technology and culture change the nature and meaning of risk over time.

**SOCI 3351. WORK, OCCUPATIONS, AND CAREER DEVELOPMENT. 3 Hours.**

Combines applied information on career development with a sociological perspective on work and occupations. Career development topics may include academic majors and career options, networking, career mentorship and sponsorship, job searches, resume writing, and interviewing. Other topics may include the historical development of work, occupational structures (professional, managerial, service, and blue-collar occupations), inequalities, work satisfaction, work-life balance, and the future of work.

**SOCI 3352. APPLIED STATISTICS FOR SOCIAL RESEARCH. 3 Hours.**

Learn to describe patterns in data, analyze relationships between variables, and make predictions by generating tables, graphs, and statistics. Students will use statistical software to answer research questions in the social sciences. Major sections of the course include descriptive statistics (central tendency and variability), inferential statistics (hypothesis testing and estimation), and multivariate analysis (regression).

**SOCI 3353. SOCIAL CLIMATE OF CITIES. 3 Hours.**

A comparative study of urban communities and metropolitan areas in terms of their distinctive social life and culture. Topics touching on power and urban politics, race and ethnic relations, poverty, and leisure and lifestyles will be examined in terms of their contribution to the unique social climate of cities. Offered as AAST 3353 and SOCI 3353; credit will be granted in only one department.

**SOCI 3355. APPS AND TOOLS FOR SOCIAL RESEARCH. 3 Hours.**

A hands-on course in which students learn to use the apps and tools commonly used in qualitative and quantitative social research to collect, manage, analyze, and present different types of information, such as numeric data, pictures, audio, video, and text. Satisfies the university requirements for computer literacy and oral communication.

**SOCI 3356. WOMEN, WORK AND SOCIAL CHANGE. 3 Hours.**

Women's work experiences, how these experiences are changing, and relationship between paid employment and non-wage household labor. Paid and unpaid work experiences are empirically examined in terms of a variety of theoretical perspectives. Offered as DIVR 3356, SOCI 3356 and GWSS 3356; credit will be granted only once.

**SOCI 3357. LAW AND SOCIETY. 3 Hours.**

Law as a social institution. The processes of defining criminal conduct and the social functions of law and of legal processes and systems. Prerequisite: sophomore standing or permission of the instructor.

**SOCI 3360. TOPICS IN SOCIOLOGY. 3 Hours.**

Selected topics in social issues, policy, processes and/or structure. May be repeated for credit with departmental permission.

**SOCI 3362. SOCIAL RESEARCH. 3 Hours.**

Students examine quantitative and qualitative research designs, such as experiments, survey research, and intensive interviewing. Additional topics including research ethics, literature reviews, measurement, sampling, and causation. Required of all sociology majors.

**SOCI 3365. PROGRAM EVALUATION & NEEDS ASSESSMENT. 3 Hours.**

Introduces basic concepts in evaluation research addressing the need for and implementation, effectiveness, and efficiency of social intervention efforts. Students will advance their skills in quantitative and qualitative research in partnership with community organizations. The course provides an opportunity to learn about and apply techniques for needs assessment, formative and summative program evaluation, developing and testing social impact models, examining costs and benefits, and communicating findings. Prerequisite: SOCI 3462.

**SOCI 3366. POPULATION TRENDS AND PROCESSES. 3 Hours.**

Examines the fact that all people are born, usually move from one place to another, and inevitably die. Societal patterns in human fertility, migration and mortality contribute to widely varied life-chances for people over time and across the planet. This course explores theories and research on demographic dimensions of human behavior as they affect social and economic issues. The course provides an understanding of how vital population trends and processes are for assessing social problems and offering solutions. Credit will not be granted for both SOCI 4325 and SOCI 3366.

**SOCI 3372. SOCIOLOGICAL THEORY. 3 Hours.**

This course introduces students to major theories and figures who have provided sociology with interpretations of the social world. Students will consider how sociologists use theoretical concepts to understand social interactions, social problems, and social change. Students will apply sociological theories to social phenomena. Prerequisite: junior standing or permission of the instructor.

**SOCI 3373. SOCIAL THEORY THROUGH POPULAR CULTURE. 3 Hours.**

This course examines major theories and figures who have provided sociology with interpretations of the social world. Students will read major social, cultural, and political theories through popular culture texts (including movies, television, music, video games, and comic books) in order to interpret sociological theory. The course is designed to demonstrate the relevance of social theory in students' everyday lives.

**SOCI 3380. SCIENCE AND TECHNOLOGY IN SOCIETY. 3 Hours.**

Explores the complex relationship between society, science, and technology. Themes include historical perspectives on the production and deployment of scientific knowledge, critical approaches to the social, cultural, and ethical impacts of scientific and technological developments, and the role of democracy in the advancement of science and technology.

**SOCI 3381. INFLUENCERS, CREATORS, AND UBER DRIVERS. 3 Hours.**

This course examines the way employers increasingly rely on temporary flexible labor, and what it feels like to be employed precariously. Themes may include creative labor, cultural production, automation, algorithmic hiring, labor contracts, and exploitation.

**SOCI 3390. HONORS COLLOQUIUM. 3 Hours.**

An interdisciplinary course designed to meet the needs of advanced undergraduates in the Honors College. Prerequisite: participation in the Honors College and/or permission of the instructor.

**SOCI 4191. CONFERENCE COURSE. 1 Hour.**

Topics assigned on an individual basis covering personal research or study in the designated areas. Prerequisite: permission of the instructor.

**SOCI 4193. INTERNSHIP IN SOCIOLOGY. 1 Hour.**

Supervised internship program in which a student interns at a company, non-profit organization, or governmental agency. Involves the application of sociology in a non-academic setting. Students may complete a maximum of 6 hours in any combination of SOCI 4193, SOCI 4293, and SOCI 4393. Prerequisite: SOCI 1311 or SOCI 2313; permission of the instructor; and junior standing.

**SOCI 4195. SERVICE LEARNING INDEPENDENT STUDY. 1 Hour.**

This course involves the investigation and application of sociological knowledge through community based service. Involves structured academic analysis of service experiences. The student and supervising faculty will identify the partner agency and social issue to be addressed. Prerequisite: permission of the instructor.

**SOCI 4291. CONFERENCE COURSE. 2 Hours.**

Topics assigned on an individual basis covering personal research or study in the designated areas. Prerequisite: permission of the instructor.

**SOCI 4293. INTERNSHIP IN SOCIOLOGY. 2 Hours.**

Supervised internship program in which a student interns at a company, non-profit organization, or governmental agency. Involves the application of sociology in a non-academic setting. Students may complete a maximum of 6 hours in any combination of SOCI 4193, SOCI 4293 and SOCI 4393. Prerequisite: SOCI 1311 or SOCI 2312; permission of the instructor; and junior standing.

**SOCI 4295. SERVICE LEARNING INDEPENDENT STUDY. 2 Hours.**

This course involves the investigation of sociological knowledge through community based service. Involves structured academic analysis of service experiences. The student and supervising faculty will identify the partner agency and social issue to be addressed. Prerequisite: permission of the instructor.

**SOCI 4303. WOMEN IN SOCIETY. 3 Hours.**

Women's status in contemporary American society, including the family, workplace, and politics. Women's status will also be examined in historical and crosscultural perspectives. Offered as SOCI 4303 and GWSS 4303; credit will be granted only once.

**SOCI 4306. QUALITATIVE RESEARCH METHODS. 3 Hours.**

Conceptual frameworks and techniques for planning, conducting, analyzing, reporting and evaluating qualitative research. Topics include interviewing, participant observation, coding, case studies and focus groups. Prerequisite: sophomore standing or permission of the instructor.

**SOCI 4309. WRITING FOR THE SOCIAL SCIENCES. 3 Hours.**

This course blends the theory and practice of social science writing in order to teach students how to move from the first draft to the final draft of term papers, theses, dissertations, and articles. The primary skill taught is self-editing --appraising one's work from the outside. The goal is to learn how to write for publication, drawing from postmodern perspectives on writing. Prerequisite: SOCI 1311 or permission of instructor.

**SOCI 4315. VIOLENCE IN SOCIETY. 3 Hours.**

Violence as a group process directed toward social change. Historical perspectives, current events, preventive and control techniques, public reaction, and individual behavior. Prerequisite: sophomore standing or permission of the instructor.

**SOCI 4320. MEDICAL SOCIOLOGY. 3 Hours.**

The relationships between different societies and social groups and their incidence of disease and mortality. Also examines culture-related causes of disease and treatment approaches, medicine as an occupation, healer-patient relationships, and the modern hospital as a bureaucratic organization.

**SOCI 4331. RACE, ETHNICITY & FAMILY FORMATION. 3 Hours.**

Investigates the ways in which cultural understandings of race and ethnicity have shaped historical and contemporary variations in family structure, familial experiences, and the legal possibilities for family formation. Junior standing (60 hours) or permission of the instructor required to enroll in this course. Offered as AAST 4331 and SOCI 4331; credit will be granted in only one department.

**SOCI 4341. INEQUALITIES IN PUBLIC EDUCATION. 3 Hours.**

This course examines the manner in which race, ethnicity, and class affect the quality of education in the public schools. Topics include the resegregation of schools, class and race based achievement and funding gaps, and the role the schools play in reproducing inequality. This course has a service learning component and requires volunteering in programs designed to reduce inequality in the schools. Offered as AAST 4341 and SOCI 4341; credit will be granted in only one department.

**SOCI 4365. TOPICS IN SOCIOLOGY. 3 Hours.**

Selected topics in social issues, policy, processes and/or structure. Prerequisite: junior standing or permission of the instructor. May be repeated for credit with departmental permission.

**SOCI 4370. SENIOR RESEARCH SEMINAR. 3 Hours.**

Provides sociology majors with an opportunity to gain practical experience in social research through in-depth participation in a cooperative research project. Integrates substantive knowledge with methodological skills. Oral, written, and computer application components are included. Prerequisite: SOCI 3362 or permission of the instructor.



**SOCI 4391. CONFERENCE COURSE. 3 Hours.**

Topics assigned on an individual basis covering personal research or study in the designated areas. Prerequisite: permission of the instructor.

**SOCI 4393. INTERNSHIP IN SOCIOLOGY. 3 Hours.**

Supervised internship program in which a student interns at a company, non-profit organization, or governmental agency. Involves the application of sociology in a non-academic setting. Students may complete a maximum of 6 hours in any combination of SOCI 4193, SOCI 4293, and SOCI 4393. Prerequisite: SOCI 1311 or SOCI 2312; permission of instructor; and junior standing.

**SOCI 4394. HONORS THESIS/SENIOR PROJECT. 3 Hours.**

Required of all students in the University Honors College. During the senior year, the student must complete a thesis or project of equivalent difficulty under the direction of a faculty member in the major department.

**SOCI 4395. SERVICE LEARNING INDEPENDENT STUDY. 3 Hours.**

This course involves the investigation and application of sociological knowledge through community based service. Involves structured academic analysis of service experiences. The student and supervising faculty will identify the partner agency and social issue to be addressed. Prerequisite: Permission of the Instructor.

**SOCI 4396. INTERNSHIP IN POPULAR CULTURE. 3 Hours.**

Supervised internship program in which a student interns at a company, non-profit organization, or governmental agency. Involves the application of popular culture knowledge in a non-academic setting. Prerequisite: SOCI 1310; permission of instructor; and junior standing.

**SOCI 5191. CONFERENCE COURSE. 1 Hour.****SOCI 5301. SOCIOLOGICAL THEORY. 3 Hours.**

A comprehensive review, analysis, and evaluation of the dominant conceptual perspectives, and their proponents, in sociological theory.

**SOCI 5303. RESEARCH DESIGN. 3 Hours.**

This seminar course overviews the process of designing, conducting, and presenting research. Topics include writing literature reviews, formulating research questions and hypotheses, designing measures for concepts, crafting research instruments, collecting data, analyzing data, and reporting the results. The course examines both quantitative methods, such as surveys and experiments, as well as qualitative methods, such as interviews and ethnographic observation.

**SOCI 5304. SOCIAL STATISTICS I. 3 Hours.**

This course reviews univariate and bivariate descriptive and inferential statistics, focuses on ordinary least squares multivariate regression (including statistical control, path analysis, dummy variables, interaction effects, nonlinear relationships, and regression assumptions), and introduces the generalized linear model (binary logistic regression). Emphasis is on the application of these methods to social science data.

**SOCI 5305. RACIAL AND ETHNIC GROUPS IN THE UNITED STATES. 3 Hours.**

This seminar course compares and contrasts the immigration, acculturation, and adjustment processes of various racial and ethnic groups in the United States. We will examine conventional and controversial arguments, as well as classical and contemporary theories concerning the dynamics of inter-group relations in America. Some of the more controversial topics in sociology-such as debates over assimilation, Americanization, and enduring conflicts between groups-are the foremost intellectual topics to be addressed. The reading list includes a diverse group of scholars who advance relevant research on race and ethnic relations.

**SOCI 5306. SEMINAR IN RACE AND ETHNICITY. 3 Hours.**

An advanced seminar on Race and Ethnicity in the United States. Past and present discrimination will be examined in relation to the current social conditions of minority groups living in the United States. A sociological approach to the topic begins with the assumption that race and ethnicity are socially and politically constructed phenomena. Race/ethnic categories within the United States have varied significantly across time and place. Sociology connects the concepts of race and ethnicity to social structures of inequality, power, and stratification. Scholarship on race and ethnicity is central to American sociology. We will empirically and theoretically explore: 1) the social, political and historical conditions under which segregation, racial hierarchies and racial conflict emerge, and 2) the institutions through which racial boundaries and hierarchies are produced and reproduced in the United States.

**SOCI 5307. INEQUALITY, POVERTY, AND MOBILITY. 3 Hours.**

This seminar course provides a graduate-level introduction to inequality, poverty, and mobility. We will focus on the United States, exploring the contemporary structure as well as long term trends in the distribution of material and nonmaterial resources and the economic, social, and cultural forces that generate and perpetuate the unequal distribution of resources. Our focus will be on inequalities in the areas and intersections of social class, gender, and race.

**SOCI 5308. COMPARATIVE ETHNIC AND RACIAL CONFLICT. 3 Hours.**

This seminar course provides a graduate-level introduction to ethnic and racial conflict from a comparative perspective. The course will focus on topics, such as the creation and maintenance of ethnic, racial, and national identities; the sources of conflict; the consequences of conflict; conflict prevention and resolution; and attaining justice. We will use a variety of cases to examine conflict, such as former Yugoslavia and Rwanda.

**SOCI 5309. CONTEMPORARY BLACK EXPERIENCE. 3 Hours.**

This seminar course is an overview of the contemporary sociological literature on the black experience in America. Some of the topics to be addressed include (but are not limited to) the debate over the "significance of race," tensions over the cultural/attitudinal adaptation to inequality, and emerging disputes within the black community regarding what it "means to be black" in the post-Civil Rights Era. By the end of this course, students should be more aware of the important role that class position plays in shaping African-American identities and ideologies.

**SOCI 5310. SEMINARS IN SOCIAL PSYCHOLOGY. 3 Hours.**

Introduction and discussion of theoretical and methodological perspectives in social psychology. Focusing on particular domains of social life, these seminars examine fundamental processes of social interaction and the influence of social situations and social experience on the thought, feeling, and behavior of individuals. (May be repeated for credit when topics vary.).

**SOCI 5311. SOCIOLOGY OF FAMILIES. 3 Hours.**

This seminar course explores major areas of inquiry in the sociological study of families in the contemporary U.S. We will examine the evolution of American families and the historical processes that have shaped them. Throughout the course, the interconnections between families and social structures will be emphasized. Particular attention will be given to the ways in which gender, class, race and ethnicity influence families.

**SOCI 5312. SOCIOLOGY OF REPRODUCTION. 3 Hours.**

This seminar course investigates the history and sociology of reproduction in the United States. We examine the history of reproductive politics, the changing meaning of children, childbirth education, the experience of birth for both men and women, pre-natal diagnostic testing, pregnancy loss, adoption, infertility, living "child-free," new reproductive technologies, sperm/egg donation, surrogacy, and the burgeoning "baby business." The course explores the cultural norms, social institutions, and experiences of women and men as they navigate contemporary reproduction, mindful of variations by race, class, and gender.

**SOCI 5313. RACE AND FAMILY. 3 Hours.**

Who can become a family? This seminar course investigates this question from a socio-historical perspective, focusing on the ways in which dominant cultural understandings of race and ethnicity have shaped the legal possibilities for family formation, family structure, and the experiences of families in the U.S. The course inspects historical and contemporary families, looking at the intersection of race and family formation.

**SOCI 5314. GENDER AND FAMILY. 3 Hours.**

This seminar course focuses on current issues in the sociology of families, focusing on the intersection of gender and family. The course is organized to provide an overview of the issues of particular interest to contemporary scholars, with theoretical, conceptual and empirical research/work included in the readings. We focus particularly on how gender affects how family is experienced.

**SOCI 5315. WOMEN AND WORK. 3 Hours.**

This seminar course focuses on current issues in the sociology of women and work. We address contemporary and historical patterns of women's paid and unpaid work focusing on theoretical, conceptual and empirical research.

**SOCI 5316. THE SOCIAL MIND AND INTERPERSONAL PROCESSES. 3 Hours.**

This seminar course is a study of the influence of the social context on human thoughts, feelings and actions, and on the processes that constitute social interaction. Relevant theories in social psychology and microsociology and original-source readings will be covered.

**SOCI 5317. CULTURAL SOCIOLOGY. 3 Hours.**

This seminar course examines the relationship between culture and society. Students will study contemporary debates around culture. Students will pay special attention to the use and experience of popular symbols for the ways that their use involves the creation of meanings.

**SOCI 5318. MEDIA, CULTURE, AND SOCIETY. 3 Hours.**

Media saturate our everyday lives. As such, they have a tremendous impact on the way we understand and interact with society. This seminar course will take a critical approach to the study of culture in order to examine the fundamental role of media in society. We will pay particular attention to the influence of the Culture Industry.

**SOCI 5319. SEMINARS IN SOCIAL INSTITUTIONS AND CHANGE. 3 Hours.**

Seminars in this area are concerned with the structure and change of the basic elements of society that represent ordered and regulated aspects of social life. Also examined are collective behavior and social movements which result from instability in institutional arrangements and represent efforts to enact social change. (May be repeated for credit when topics vary.).

**SOCI 5320. SOCIOLOGY OF EDUCATION. 3 Hours.**

This seminar course will examine the relationships between U.S. education institutions and society by reviewing a variety of sociological theories and empirical studies. A primary area of focus will be on the relationship between formal education and class, race/ethnicity, and gender-based inequality. Topics will include, but are not limited to, the following: the history and development of U.S. educational institutions, social mobility and stratification, social reproduction, the dynamics of race, class and gender in education, student teacher relationships, teaching as a profession, higher education, and an exploration of educational reforms.

**SOCI 5321. ENVIRONMENTAL SOCIOLOGY. 3 Hours.**

This seminar course covers advanced topics in environmental sociology. We will investigate how human social organization affects environmental problems and responses. Specifically, we will explore topics such as environmental inequality, the social construction of nature, risk assessment, consumption and materialism, environmental values and identities, and environmental social movements. We will also look at social problems tied to environmental issues, such as those stemming from disasters, climate change, and food production. We will conclude with new directions in sustainable development.

**SOCI 5322. SOCIOLOGY OF SPORT. 3 Hours.**

An advanced seminar on the Sociology of Sport. This course is a sociological examination of the institution of sport in American society. By examining selected topics (such as sport and socialization, sport and politics, sport and education, race and sport, violence in sport, women in sport, and the business of sport) this course will address the social significance of sport and its function as a major social institution. We will examine the manner in which society has been shaped by the institution of sport and how sport has been shaped by society.

**SOCI 5323. SOCIOLOGY OF RELIGION. 3 Hours.**

This seminar course provides an overview of the scientific study of religion from a sociological perspective. The focus in the course will be on theories, research, and trends concerning religion in the contemporary United States. Some of the topics to be addressed include (but are not limited to) understanding the rich variety of religious traditions and affiliations, religious practices and beliefs, as well as the role that religion plays in facilitating and limiting social change as well as conflict in society. We will also examine differences across various religious traditions such as "mainline" and "fundamentalist" believers, secularization, and the often-controversial ways that religion intersects with other spheres of society such as morality, politics, race and ethnic relations, sex and gender.

**SOCI 5324. QUALITATIVE RESEARCH METHODS. 3 Hours.**

This seminar course introduces students to the qualitative tradition in sociology. We will study the assumptions underlying qualitative methods and important ethical and theoretical issues in field work. Students will become familiar with ethnographic research techniques (participant-observation and in-depth interviewing) and implement those methods in an individual small-scale research project.

**SOCI 5325. READING THE QUALITATIVE CLASSICS. 3 Hours.**

What makes a classic a classic? In this seminar course we will sample-read, examine, and analyze the wealth of "classic" ethnographies within the field of Sociology. We will study the classics with an eye to exploring the qualities that make these exemplary texts which often connect people to and excite them about the field of Sociology.

**SOCI 5326. SOCIAL MOVEMENTS. 3 Hours.**

Examines core concepts and theoretical perspectives in social movements. Topics include recruitment and participation, tactics in activism, countermobilization, repression, and the effectiveness of movements in changing both policy and cultural norms.

**SOCI 5330. SEMINARS IN SOCIAL DIFFERENTIATION. 3 Hours.**

In all human societies, perceptions of differences in individuals, social positions and groups arise and form a basis for social evaluation. Seminars in this area examine the processes involved in social differentiation, social evaluation, and resulting forms of social inequality. (May be repeated for credit when topics vary).

**SOCI 5341. SEMINARS IN THEORY AND RESEARCH METHODS. 3 Hours.**

Research methods seminars address a variety of issues related to quantitative and qualitative approaches to data collection and analysis. Theory courses offer extended treatment of topics in theory and theory construction, reflecting systematic efforts to understand the nature and operation of human society and social behavior. (May be repeated for credit when topics vary.).

**SOCI 5385. NON-THESIS PROJECT. 3 Hours.**

A written essay synthesizing the students' coursework in response to one of two supplied prompts. The topic and scope of the written project must be approved by the non-thesis committee chair. A final presentation of the project to the non-thesis committee, composed of the non-thesis committee chair and two additional members of the graduate faculty, is required.

**SOCI 5388. RESEARCH PRACTICUM / INTERNSHIP. 3 Hours.****SOCI 5389. TEACHING SOCIOLOGY. 3 Hours.**

To learn strategies of coping with practical problems of teaching undergraduate sociology, students assist one or more professors in lecture preparation, grading, and examination construction. Not to be counted toward the degree requirement.

**SOCI 5392. CONFERENCE COURSE IN SOCIOLOGY. 3 Hours.**

There is not currently a description listed for this course since the content varies.

**SOCI 5393. THESIS SUBSTITUTE. 3 Hours.**

An academic literature review, research design, or an internship report on a selected sociological topic of individual interest. The topic and scope of the written project must be approved by the final thesis committee, which is composed of three graduate faculty members. A proposal defense and a final oral defense of the project is required.

**SOCI 5398. THESIS. 3 Hours.****SOCI 5698. THESIS. 6 Hours.**

Substantial original empirical or theoretical research project on a sociological topic of individual interest. The topic and scope of the written project must be approved by the final thesis committee, which is composed of three graduate faculty members. A proposal defense and a final oral defense of the project is required.

## COURSES

**SOCW 1331. SOCIAL WORK PROFESSIONALISM. 3 Hours.**

Equips students with skills and resources to prepare for academic and professional success. Empowers diverse students to identify their individual needs, reflect on opportunities for growth, determine what resources and self-care strategies are appropriate, recognize the faculty role in their development, and formulate a plan for an actively engaged and enriched experience from campus to career. Each class section has a Peer Academic Leader (PAL), who are students who have already taken the course and assist as a discussion leader for the class under the supervision of the instructor. This course is reserved exclusively for students planning to major in Social Work (e.g., BSW-Intended status) who are freshmen; this will be taken concurrently with UNIV 1131. This course or SOCW 3300 is required for admission to the BSW major.

**SOCW 1350. SPECIAL ISSUES IN SOCIAL WORK. 3 Hours.**

Relevant social work topics generated and explored in depth according to student and professional needs. The topic will be determined prior to registration. We sometimes transfer in 1000 level courses and need a generic 1000 level for allocation.

**SOCW 2302. HUMAN BEHAVIOR AND THE SOCIAL ENVIRONMENT. 3 Hours.**

Exploration of behavioral and social science knowledge of human behavior and development of diverse persons through the life course. Examines major systems in society: individual, group, family, and community; and the diversity of ethnicity, race, class, sexual orientation, and culture. This course is required for Social Work Practicum Instruction and Seminar I (SOCW 4951). This course satisfies the University of Texas at Arlington core curriculum requirement in Social and Behavioral Sciences. For students seeking the BSW major who are Field of Study complete in Social Work, this course is not required.

**SOCW 2325. INTRODUCTION TO STATISTICS FOR SOCIAL WORK AND THE SOCIAL SCIENCES. 3 Hours.**

This course is designed to enhance students' skills as research consumers and in performing research and statistical analyses in social work and the social sciences. This course teaches analytical methods that permit social workers to explore and understand the effects of individual differences on the impact of treatments and the success of interventions between various ethnic and cultural groups, gender identities, across the life span, and through different socio-economic levels. Included in the course are descriptive statistical procedures including measures of central tendency, variability, shape and distribution along with associations between two variables. In addition, inferential statistics are covered including estimation and hypothesis testing.

**SOCW 2350. SPECIAL ISSUES IN SOCIAL WORK. 3 Hours.**

Relevant social work topics generated and explored in depth according to student and professional needs. The topic will be determined prior to registration.

**SOCW 2361. INTRODUCTION TO SOCIAL WORK. 3 Hours. (TCCN = SOCW 2361)**

An overview of the social work profession, its fields of practice, methods of social intervention, its historical context, and its relationship to the social welfare system. This course is open to all students and satisfies the requirement for Social and Behavioral Sciences in the core curriculum. This course is required for the Bachelor of Social Work (BSW) program.

**SOCW 3300. SOCIAL WORK PROFESSIONALISM AND STUDENT SUCCESS. 3 Hours.**

Equips students with skills and resources to prepare for academic and professional success. Empowers diverse students to identify their individual needs, reflect on opportunities for growth, determine what resources and self-care strategies are appropriate, recognize the faculty role in their development, and formulate a plan for an actively engaged and enriched experience from campus to career. Each class section has a Peer Academic Leader (PAL), who are students who have already taken the course and assist as a discussion leader for the class under the supervision of the instructor. This course is reserved exclusively for students planning to major in Social Work (e.g., BSW-Intended status) who have transferred from another institution; this fulfills the university requirement for UNIV 1101. This course or SOCW 1231 is required for admission to the BSW major. Co-requisite: SOCW 2361.

**SOCW 3301. THEORIES OF HUMAN BEHAVIOR. 3 Hours.**

This course explores, within the context of a strengths and empowerment perspective, theories of human behavior. For social work majors, it is strongly recommended that SOCW 2302 be taken before this course. Offered as AAST 3301 and SOCW 3301; credit will be granted in only one department. This course is required for Social Work Field Instruction and Seminar I (SOCW 4951).

**SOCW 3303. SOCIAL WELFARE POLICY AND SERVICES. 3 Hours.**

Examines how social goals are met by social welfare institutions. Conceptual schemes are developed for analyzing the structure of social welfare institutions and evaluating social welfare sub-systems. The social work profession is also examined in the context of the evolution and function of the contemporary American social welfare system. This course is required for Social Work Field Instruction and Seminar II (SOCW 4952).

**SOCW 3305. SOCIAL WORK PRACTICE I. 3 Hours.**

This course is designed to promote a critical evaluation of the history and philosophy of social work and its value base as well as teach basic practice concepts including cultural humility, interviewing, communication, and problem-solving to use with diverse individuals, families, and groups across practice settings. Students will be able to make connections between social work's historical roots and present-day social work practice and demonstrate understanding of what they bring to practice as individuals and how that may support or hinder their work with diverse individuals, families, and groups. This course is required for admission to the Bachelor of Social Work (BSW) program. Co-requisite: SOCW 2311 or SOCW 2361.

**SOCW 3306. SOCIAL WORK PRACTICE III: MACRO PRACTICE. 3 Hours.**

Examines generalist community and administrative practice roles and includes the perspectives of historical inequities and social injustice and the impact on communities and diverse groups, strengths, empowerment, evidence-based practice, and global practice along with the values of social justice, diversity, and participation. Specific attention is given to assessing community assets and needs. Prerequisite: SOCW 1231 OR SOCW 3300, SOCW 2361, SOCW 3305, SOCW 3307, and MATH 1308 or SOCW 2325 or other equivalent statistics course approved by the Director of Undergraduate Programs.

**SOCW 3307. DIVERSE POPULATIONS. 3 Hours.**

Introduction to theoretical, practical, and policy issues related to diverse populations. Historical, political, and socioeconomic forces are examined that maintain discriminatory and oppressive values, attitudes, and behaviors in society in diverse populations and in all levels of organizational behavior. This course is required for admission to the Bachelor of Social Work (BSW) program. Offered as AAST 3317, SOCW 3307 and MAS 3319; credit will be granted in only one department.

**SOCW 3308. SOCIAL WORK RESEARCH METHODS. 3 Hours.**

This course is designed to provide students with the fundamental skills to understand, use, and conduct research to advance the knowledge base of the social work profession and assess the effectiveness of social work interventions in generalist social work practice. The course addresses elements of the research process, quantitative and qualitative methods, research ethics, and approaches to data analysis. Particular attention will be given to the role of research with populations-at-risk, social and economic justice, and cultural diversity. Prerequisite: SOCW 1231 OR SOCW 3300, SOCW 3305, SOCW 3307, and MATH 1308 or SOCW 2325 or other equivalent statistics course approved by the Director of Undergraduate Programs.

**SOCW 3309. SOCIAL WORK PRACTICE II. 3 Hours.**

Theories and methodologies of social work assessment, case management, and other generalist intervention at the individual, family, and group levels in diverse settings through the lens of intersectionality of race, gender, sexuality, age educational level and other aspects of identity. Prerequisite: SOCW 1231 OR SOCW 3300, SOCW 2361, SOCW 3305, SOCW 3307, and MATH 1308 or SOCW 2325 or other equivalent statistics course approved by the Director of Undergraduate Programs.

**SOCW 3310. ENVIRONMENTAL JUSTICE & GREEN SOCIAL WORK. 3 Hours.**

This course examines how a variety of vulnerable or marginalized populations are impacted by environmental injustices, and explores ways that social service professionals can solve environmental justice issues on the micro, mezzo and macro level. Students will explore how issues such as climate change, extreme weather events and environmental toxins intersect with health, mental health, children & youth, older adults, indigenous populations, food deserts, climate-forced migration, international conflict, environmental racism, and more and examine solutions including ecotherapy, climate policy, and community organizing. This course is also offered at the Master's level as SOCW 5310. Students who receive credit for this course in the undergraduate program may not repeat the course at the Master's level.

**SOCW 3312. DISABILITY & SOCIAL WORK. 3 Hours.**

Examines major themes in disability and social work. Topics include basic understandings of disability, lived experiences of people with disabilities, legal and policy perspectives, working with adults and children with a variety of disabilities, history of disability policy and disability rights, disability advocacy, and resources in the community, among others. Offered as DS 3312 and SOCW 3312; credit will only be granted in one department.

**SOCW 3314. THE LATINA EXPERIENCE. 3 Hours.**

A course on the social, cultural, and economic experiences of Latina and Latin American origin women in the United States. Offered as MAS 3314, SOCI 3314, SOCW 3314, GWSS 3314, and AAST 3321. Credit will be granted in only one department.

**SOCW 3315. INTRODUCTION TO SUBSTANCE USE DISORDERS. 3 Hours.**

This is an entry-level course that provides foundation-level social work students with the fundamental concepts of Substance Use Disorders (SUD) and the addictive process. Students will examine the prevalence and characteristics of substance use disorders and the impact of such disorders on the individual, family, and the community. Theories of addiction and application of these theories will be examined. Students will develop conceptual knowledge and self-awareness concerning the etiology of addiction, assessment strategies, and wellness strategies for facilitating optimal development and preventing SUD. The course will cover the prevalence of SUD varies among ethnic and cultural groups, between men and women, across the life span, and through different socio-economic levels. This course is taught as SOCW 3315 and SUT 3315. Credit will be granted only once.

**SOCW 3318. SCREENING, ASSESSMENT, & ENGAGEMENT. 3 Hours.**

Introduces screening and diagnostic instruments and techniques appropriate for determining whether a substance use disorder might exist. Explores the therapeutic alliance and practice engagement techniques taking into account intersections of race, gender, sexuality, age, educational level, and other aspects of identity. Students learn to assess suicide risk and a client's readiness for change. Students learn to diagnose substance use disorders and recognize intoxication, withdrawal, substance, and medication induced disorders. Offered as SUT 3318 and SOCW 3318. Credit will be granted only once. Prerequisite: Prerequisite OR Corequisite: SUT 3315 or SOCW 3315.

**SOCW 3319. TREATMENT PLANNING, COLLABORATION & REFERRAL. 3 Hours.**

This course addresses the clinical application of the biopsychosocial assessment in the development of a treatment plan. Potential treatment issues will be identified and a client-specific problem list will be developed. Individualized treatment goals will be established in collaboration with diverse clients. Client objectives and clinical interventions will also be developed. This course explores dynamics of the therapeutic alliance, and clinician-client collaboration within the context of a strengths and empowerment-based perspective. The student will gain insight into and an appreciation of collaboration, consultation, and referral throughout the continuum of care. Offered as SUT 3319 and SOCW 3319. Credit will be granted only once. Prerequisite: SOCW 3318 or SUT 3318.

**SOCW 3320. U.S. IMMIGRATION POLICY AND THE AMERICAN DREAM. 3 Hours.**

This course focuses on diverse ethnic and racial identities in America through the examination of immigration to the United States, past and present, and the evolution of U.S. immigration policy. Topics include U.S. attitudes and policy responses to European, Asian, and Latin American immigration and to the incorporation of the descendants of African slaves and Native Americans. Emphasis on the decline of the melting pot idea and the incorporation of recent immigrants. Offered as MAS 3320, AAST 3319, and SOCW 3320. Credit will be granted only once.

**SOCW 3321. SUBSTANCE USE TREATMENT. 3 Hours.**

This course is the culmination of the fundamentals of substance use disorders, treatment planning, collaboration and referral, and substance use treatment. Students will learn and acquire the special skills necessary to assist individuals, families, and groups through the sequela of substance use and addiction. Focus on cognitive-behavioral therapy, motivational interviewing, 12-step programs, nutrition and exercise, meditation, and other alternative treatment options. Students will study treatment modalities that consider the social, cultural, and economic influences that shape the client's world view and substance use experience. Offered as SUT 3321 and SOCW 3321. Credit will be granted only once. Prerequisite: Prerequisite or corequisite: SUT 3319 or SOCW 3319.



**SOCW 4191. CONFERENCE COURSE. 1 Hour.**

Topics assigned on an individual basis covering personal research or study in designated areas. Prerequisite: Permission of the Director.

**SOCW 4291. CONFERENCE COURSE. 2 Hours.**

Topics assigned on an individual basis covering personal research or study in designated areas. Prerequisite: Permission of the Director.

**SOCW 4310. SOCIAL WORK WITH CHILDREN AND FAMILIES. 3 Hours.**

A critical examination of social policies, research, and practices impacting at-risk children and families in child welfare, child mental health, and school settings. Emphasis is placed on the role of the social work practitioner in enhancing the well-being of children and families in contemporary society.

Prerequisite: SOCW 2302, SOCW 3301, and SOCW 3309.

**SOCW 4314. INTIMATE PARTNER VIOLENCE. 3 Hours.**

This course covers interdisciplinary theoretical frameworks for understanding and addressing intimate partner violence in diverse relationships, including critical feminism, psychological, and sociological models, as well as prevention and intervention practices that reflect a stance of cultural and critical humility. This course is also offered at the Master's level as SOCW 5314. Students who receive credit for this course in the undergraduate program may not repeat the course at the Master's level.

**SOCW 4335. AGING IN AMERICAN SOCIETY. 3 Hours.**

This course presents the major theories of aging, in the United States and across cultures, and explores the diverse factors of aging through the lens of intersectionality taking into account intersections of race, gender, sexuality, educational level and other aspects of identity. It includes various perspectives including psychological, biological, sociological, and spiritual. Students will examine current social and economic issues impacting older adults, such as aging & healthcare policy, living arrangements, caregiving, technology, and sexuality. Theories are integrated into practice thus providing students a sound foundation for social work practice with diverse older adults. Students who receive credit for this course in the undergraduate program (SOCW 4335) may not repeat the course at the Master's level (SOCW 5335). Prerequisite: SOCW 2302, SOCW 3301, and SOCW 3307.

**SOCW 4344. HEALTH INSURANCE AND ACCESS TO CARE. 3 Hours.**

Explores the history and underlying philosophy of managed care in health and social services, reviews interdisciplinary approaches and principles for understanding and critiquing health care systems, and covers current trends and practice issues. Assesses the potential for conflict between social work values and managed care systems. Builds skills for advancing health equity through administrative roles in managed care settings. This is offered at the MSW level as SOCW 5344. Students who receive credit for this course in the undergraduate program may not repeat the course at the Master's level.

**SOCW 4350. SPECIAL ISSUES IN SOCIAL WORK. 3 Hours.**

Relevant social work topics generated and explored in depth according to student and professional needs. The topic will be determined prior to registration. Prerequisite: Permission of the Director.

**SOCW 4364. PERSONAL RELATIONSHIPS. 3 Hours.**

Explores theoretical and empirical data on diverse personal relationships at the follow stages of relationship: initiation, maintenance, and termination. Identifies areas for intervention. Also offered as SOCW 5364 in the MSW program. Students who receive credit for this course in the undergraduate program may not repeat the course at the Master's level. Prerequisite: SOCW 3301, SOCW 2302, and SOCW 3307. Co-requisite: Social Work Practice II (SOCW 3309 [formerly 3304]).

**SOCW 4366. SEMINAR IN WOMEN'S ISSUES. 3 Hours.**

Explores women's issues in human behavior theory, practice theory, and policy. Using an intersectional lens, the historical, political, and socioeconomic forces that maintain sexism among diverse groups are discussed. Environmental influences are examined in relation to social justice, social work values, knowledge, and skills. This course is also offered as SOCW 5366 in the MSW program. Students who receive credit for this course in the undergraduate program may not repeat the course at the Master's level. Prerequisite: SOCW 3301, and SOCW 3307. Co-requisite: Social Work Practice II (SOCW 3309).

**SOCW 4370. SOCIAL WORK IN THE SCHOOLS. 3 Hours.**

The purpose of this course is to provide an overview of the various social work-related theoretical perspectives, models, and programs for intervention with diverse children and their families in the school setting. This includes skills in assessment, prevention, and intervention in providing services to students that are marginalized for numerous reasons including race, gender, skin color, religion, immigrant status, disability, sexual orientation, and socioeconomic status among other factors. Students will learn to use intervention skills that address each level of the ecosystem's perspective in schools. This is offered at the Master's level as SOCW 5370. Students who receive credit for this course in the undergraduate program may not repeat the course at the Master's level. Prerequisite: SOCW 3309.

**SOCW 4371. INEQUITIES AND INCARCERATION. 3 Hours.**

This course surveys mass incarceration in the U.S. criminal justice system as a racialized and classist system of control. First, this course will contextualize the US criminal justice system, both historically and through global comparisons. Then students will be introduced to four broad content areas: entering the criminal justice system (school-to-prison pipeline and policing), who is detained (demographics and common mental health and substance use issues) and what they experience in detention (including covid-19 in jails and prisons), experiences and problems encountered when returning citizens reenter society, and trends in criminal justice reform advocacy (including problem-solving courts and advocacy efforts such as Black Lives Matter). Finally, the course considers the social work grand challenge of smart decarceration as a path towards reform specific to social workers. Also offered as SOCW 5371 in the MSW program. Students who receive credit for this course in the undergraduate program may not repeat the course at the Master's level.

**SOCW 4391. CONFERENCE COURSE. 3 Hours.**

Topics assigned on an individual basis covering personal research or study in designated areas. Prerequisite: Permission of the Director.

**SOCW 4451. SOCIAL WORK FIELD SEMINAR I. 4 Hours.**

Students will spend three hours a week in a seminar course to reflect and integrate social work knowledge, theory, and skills learned over the course of the program that they are applying in their field placement. Students will discuss and reflect on their direct practice and macro practice experiences, how the Code of Ethics is applied at their agencies, what evidence-based best practices are utilized at their agencies, and how the planned change process is implemented at their agencies with their fellow students and Field Liaisons. For additional information and requirements, see the Field website.

Prerequisite: SOCW 2302, SOCW 3301, SOCW 3303, SOCW 3305, SOCW 3306, SOCW 3308, SOCW 3309, and 1 Social Work Elective.

**SOCW 4452. SOCIAL WORK FIELD SEMINAR II. 4 Hours.**

Students will spend three hours a week in a seminar course to reflect and integrate social work knowledge, theory, and skills learned over the course of the program that they are applying in their field placement. Students will discuss and reflect on their direct practice and macro practice experiences, how the Code of Ethics is applied at their agencies, what evidence-based best practices are utilized at their agencies, and how the planned change process is implemented at their agencies with their fellow students and Field Liaisons. For additional information and requirements, see the Field website.

Prerequisite: SOCW 2302, SOCW 3301, SOCW 3303, SOCW 3305, SOCW 3306, SOCW 3308, SOCW 3309, and 1 Social Work Elective.

**SOCW 4455. SOCIAL WORK FIELD SEMINAR BLOCK PART 1. 4 Hours.**

Students will spend three hours a week in a seminar course to reflect and integrate social work knowledge, theory, and skills learned over the course of the program that they are applying in their field placement. Students will discuss and reflect on their direct practice and macro practice experiences, how the Code of Ethics is applied at their agencies, what evidence-based best practices are utilized at their agencies, and how the planned change process is implemented at their agencies with their fellow students and Field Liaisons. For additional information and requirements, see the Field website.

Prerequisite: SOCW 2302, SOCW 3301, SOCW 3303, SOCW 3305, SOCW 3306, SOCW 3308, SOCW 3309, and 1 Social Work Elective.

**SOCW 4456. SOCIAL WORK FIELD SEMINAR BLOCK PART 2. 4 Hours.**

Students will spend three hours a week in a seminar course to reflect and integrate social work knowledge, theory, and skills learned over the course of the program that they are applying in their field placement. Students will discuss and reflect on their direct practice and macro practice experiences, how the Code of Ethics is applied at their agencies, what evidence-based best practices are utilized at their agencies, and how the planned change process is implemented at their agencies with their fellow students and Field Liaisons. For additional information and requirements, see the Field website.

Prerequisite: SOCW 2302, SOCW 3301, SOCW 3303, SOCW 3305, SOCW 3306, SOCW 3308, SOCW 3309, and 1 Social Work Elective.

**SOCW 4551. SOCIAL WORK PRACTICUM INSTRUCTION I. 5 Hours.**

Students will complete a minimum of 200 clock hours in a supervised practicum. Students will gain social work experience in an agency that will integrate generalist social work practice concepts into professional social work experience. Students will follow the NASW Code of Ethics and work with an anti-oppressive lens while in their practicum. For additional information and requirements, see the Field website. Prerequisite: SOCW 2302, SOCW 3301, SOCW 3303, SOCW 3305, SOCW 3306, SOCW 3308, SOCW 3309, and 1 Social Work Elective.

**SOCW 4552. SOCIAL WORK PRACTICUM INSTRUCTION II. 5 Hours.**

Students will complete a minimum of 200 clock hours in a supervised practicum. Students will gain social work experience in an agency that will integrate generalist social work practice concepts into professional social work experience. Students will follow the NASW Code of Ethics and work with an anti-oppressive lens while in their practicum. For additional information and requirements, see the Field website. Prerequisite: SOCW 2302, SOCW 3301, SOCW 3303, SOCW 3305, SOCW 3306, SOCW 3308, SOCW 3309, and 1 Social Work Elective.

**SOCW 4555. SOCIAL WORK PRACTICUM INSTRUCTION BLOCK PART 1. 5 Hours.**

Students will complete a minimum of 400 clock hours in a supervised practicum. Students will gain social work experience in an agency that will integrate generalist social work practice concepts into professional social work experience. Students will follow the NASW Code of Ethics and work with an anti-oppressive lens while in their practicum. For additional information and requirements, see the Field website. Prerequisite: SOCW 2302, SOCW 3301, SOCW 3303, SOCW 3305, SOCW 3306, SOCW 3308, SOCW 3309, and 1 Social Work Elective.

**SOCW 4556. SOCIAL WORK PRACTICUM INSTRUCTION BLOCK PART 2. 5 Hours.**

Students will complete a minimum of 400 clock hours in a supervised practicum. Students will gain social work experience in an agency that will integrate generalist social work practice concepts into professional social work experience. Students will follow the NASW Code of Ethics and work with an anti-oppressive lens while in their practicum. For additional information and requirements, see the Field website. Prerequisite: SOCW 2302, SOCW 3301, SOCW 3303, SOCW 3305, SOCW 3306, SOCW 3308, SOCW 3309, and 1 Social Work Elective.

**SOCW 5301. HUMAN BEHAVIOR AND THE SOCIAL ENVIRONMENT. 3 Hours.**

Exploration of behavioral and social science knowledge of human behavior and development of diverse persons through the life course. Examines major systems in society: individual, group, family, and community; and the diversity of ethnicity, race, class, sexual orientation, and culture.

**SOCW 5303. FOUNDATIONS OF SOCIAL POLICY AND SERVICES. 3 Hours.**

Examines how social goals of diverse populations are met by social welfare institutions. Conceptual schemes are developed for analyzing the structure of social welfare institutions and evaluating social welfare sub-systems. The social work profession also is examined in the context of the evolution and function of the contemporary American social welfare system.

**SOCW 5304. GENERALIST MICRO PRACTICE. 3 Hours.**

This foundation level course introduces graduate students to both theory and methods for social work practice with diverse individuals, families, and small groups. It emphasizes a generalist perspective, beginning interviewing and relationship skills, problem assessment, goal setting, and contracting. Special attention is given to the common roles assumed by social workers (e.g. facilitator, broker, advocate) as well as development of self-reflection skills in relationship to the dynamics of intersectionality of those served.

**SOCW 5306. GENERALIST MACRO PRACTICE. 3 Hours.**

Examines generalist community and administrative practice roles and includes the perspectives of historical inequities and social injustice and the impact on communities and diverse groups, strengths, empowerment, evidence-based practice, and global practice along with the values of social justice, diversity, and participation. Specific attention is given to assessing community assets and needs.

**SOCW 5307. DIVERSE POPULATIONS. 3 Hours.**

Introduction to theory, practice, and policy issues related to diverse populations. Historical, political, and socioeconomic forces are examined that maintain discriminatory and oppressive values, attitudes, and behaviors in society and in all levels of organizational behavior.

**SOCW 5308. RESEARCH AND EVALUATION METHODS IN SOCIAL WORK I. 3 Hours.**

This course is designed to provide students with an understanding of and ability to use the evidence-informed practice process to identify, analyze and apply evidence-informed interventions. Students will be able to comprehend both quantitative and qualitative research and to synthesize strengths and weaknesses of the social work literature. Students will be able to synthesize and evaluate research in terms of its content, quality, and applicability to clients. Students will understand scientific and ethical approaches to building knowledge to apply to and evaluate the impact of interventions on clients or clients' presenting problems.

**SOCW 5310. ENVIRONMENTAL JUSTICE & GREEN SOCIAL WORK. 3 Hours.**

This course examines how a variety of vulnerable or marginalized populations are impacted by environmental injustices, and explores ways that social service professionals can solve environmental justice issues on the micro, mezzo and macro level. Students will explore how issues such as climate change, extreme weather events and environmental toxins intersect with health, mental health, children & youth, older adults, indigenous populations, food deserts, climate-forced migration, international conflict, environmental racism, and more and examine solutions including ecotherapy, climate policy, and community organizing. This course is also offered at the undergraduate level as SOCW 3310. Students who receive credit for this course in the undergraduate program may not repeat the course at the Master's level.

**SOCW 5311. ADVANCED MICRO PRACTICE. 3 Hours.**

Builds on the generalist perspective and the basic familiarity with social work processes (such as problem identification, assessment, contracting, plan implementation, and outcome evaluation) in the context of (1) existing psychosocial intervention modalities; (2) the particular client values, personal goals, treatment preferences, and characteristics such as racial, ethnic, gender, sexual orientation, age, and ability identities; and (3) selection of change modalities appropriate in relation to clients' characteristics, social justice, and the client's presenting issues. Required of all Direct Practice students. Prerequisite: Advanced Standing OR SOCW 5307 AND SOCW 5303 AND SOCW 5308 AND SOCW 5381 OR SOCW 5385.

**SOCW 5312. COMMUNITY AND ADMINISTRATIVE PRACTICE. 3 Hours.**

This course surveys theory and builds skills in roles associated specifically with understanding the complex history and multilayered intersections, e.g. discrimination, oppression, disparities or other lived experiences that influence diverse community practice (e.g. community/locality history and development, social planning, social action) and culturally inclusive and sensitive administrative practice (e.g. supervision, administration, diverse management and management systems). Students complete an advanced culturally informed assignment in community and/or organizational assessment and program design. Required of all CAP (Community and Administrative Practice) students. Prerequisite: Advanced Standing OR SOCW 5307 AND SOCW 5303 AND SOCW 5308 AND SOCW 5381 OR SOCW 5385.

**SOCW 5313. RESEARCH AND EVALUATION METHODS IN SOCIAL WORK II. 3 Hours.**

This course is designed to provide students with an understanding of and ability to analyze, monitor, and evaluate evidence informed interventions and human service programs. In this course quantitative and qualitative research methods and approaches are applied to the scientific and ethical evaluation of evidence informed interventions and human service programs. Research skills and knowledge are presented from the perspective of promoting diversity and social and economic justice in anti-oppressive research and evaluation of social work. Students seeking a Master of Social Work (MSW) must take either SOCW 5313 or SOCW 5323. Prerequisite: Advanced Standing OR SOCW 5308.

**SOCW 5314. INTIMATE PARTNER VIOLENCE. 3 Hours.**

This course covers interdisciplinary theoretical frameworks for understanding and addressing intimate partner violence in diverse relationships, including critical feminism, psychological, and sociological models, as well as prevention and intervention practices that reflect a stance of cultural and critical humility. This course is also offered at the Bachelor's level as SOCW 4314. Students who receive credit for this course in the undergraduate program may not repeat the course at the Master's level. Co-requisite: SOCW 5311. If the co-requisite is dropped, this course will be as well.

**SOCW 5315. BRAIN AND BEHAVIOR. 3 Hours.**

The focus of this course is on current advances in knowledge of the neurobiological underpinnings of human behavior and development, the interaction between those underpinnings and the social context and environment, the relevance to social work practice with individuals, families, groups, programs/organizations, and communities, and related assessment and intervention practice behaviors across several practice domains. The domains include human development, genetics, mental health and substance misuse, cognition, stress and trauma, and violence and aggression. The implications of neurobiological and environmental influences (including public health issues and health disparities) will be examined in terms of social justice, social work values, knowledge, and skills, as well as in terms of those populations who have historically been harmed by structural and systematic arrangement and delivery of social welfare services at the micro, mezzo, and macro levels. Co-requisite: SOCW 5311. Please note that if the co-requisite course is dropped, this one will be also.

**SOCW 5316. STRESS, CRISIS, AND COPING. 3 Hours.**

The impact of specific crises on individuals and families will be examined including the unique stresses, crises, and coping responses of diverse cultural and social identities as these relate to the stresses of oppression and social injustice and inequity. Variations in cultural wellness and health relative to stress and recovery will also be explored. Typical crises will include life-threatening illness, trauma, physical and mental disability, and death. Assessment and evaluation of an individual's coping ability and appropriate strategies for social work interventions will be studied. Differential therapeutics relative to ethnicity, cultural norms, inclusiveness, and access to wellness resources, will be infused into course assignments and discussion. Co-requisite: SOCW 5311. Please note that if the co-requisite is dropped, this will be also.

**SOCW 5317. PALLIATIVE CARE. 3 Hours.**

This course introduces students to palliative care and the unique opportunities and challenges it presents to social workers employed in those settings. While a complete review of palliative care would be impossible to achieve within the confines of this course, the materials are designed to introduce students to key palliative care philosophies, values, and practice considerations. Students will be challenged to think critically about how dying and death is constructed and supported in Western medical settings, and leave with an understanding of social workers' role in delivery compassionate and personalized care to clients who are at the end of their lives. Co-requisite: SOCW 5311. Please note that if the co-requisite course is dropped, this one will be also.

**SOCW 5318. DEATH & DYING. 3 Hours.**

This course will give students an overview of the principles of thanatology from anthropological, sociological, psychological, medical, historical, spiritual, cultural, and political perspectives and the role(s) that social work can play in helping individuals, families, and communities from diverse backgrounds. Using life course and life span approaches, course content will include personal death awareness, the integration of theoretical perspectives and evidence-based practice interventions in working with dying, death, and bereavement with emphasis on cultural and religious/spiritual perspectives, bioethical principles, and end-of-life decision making, social justice, and advocacy for the dying. Particular attention is given to the intersections of older adults with gender, race, sexuality, age, education level, and other aspects of identity. Therefore, the class content promotes individual self-reflection and discussion through the lens of diversity and intersectionality across the developmental life span and life course about the meaning of life and death and implications for social work practice. This dialog is a precursor to engagement with clients, caregivers, grieving persons, and health care personnel about sensitive and culturally diverse issues around the experience of dying and death. Co-requisite: 5311. Please note that if the co-requisite is dropped, this course will be dropped as well.

**SOCW 5319. SUICIDE PREVENTION, INTERVENTION, & POSTVENTION. 3 Hours.**

This course will provide students with an overview of the public health problem of suicide, with specific attention to prevention, intervention, and postvention. Students will gain an understanding of suicide epidemiology and underlying theory, as well as risk and protective factors for suicidal thoughts and behaviors. This course will familiarize students with evidence-based practices and ethical considerations with clients engaging in suicidal thoughts and behaviors. Students will learn about state and national strategies for suicide prevention, as well as policies related to suicide. Students will gain skills in assessment and management of suicide risk, intervention and treatment techniques with suicidal clients, and postvention approaches with survivors of suicide loss at the individual, community, and national levels. Co-requisite: SOCW 5311. Please note that if the co-requisite course is dropped, this one will be also.

**SOCW 5320. ADVANCED ADMINISTRATIVE PRACTICE. 3 Hours.**

Focuses on selected topics, issues, and skills for effective social work administration. Content includes inclusive and anti-oppressive approaches to leadership, worker motivation, resource development, stakeholder engagement, interagency relations, and managing conflict and diversity in a climate of scarce resources. Prerequisite: SOCW 5312 or concurrent enrollment. Please note that if SOCW 5312 is dropped, this course will be dropped as well.

**SOCW 5321. ADVANCED COMMUNITY PRACTICE. 3 Hours.**

This course explores research, theory and evidence-based approaches to community practice. Content is focused on the development of skills for partnering with neighborhoods, communities, and groups to address community problems rooted in structural inequalities. Major topics include the politics of empowerment, mobilizing coalitions, locating resources, and mediating conflict. Prerequisite: SOCW 5312 or concurrent enrollment.

**SOCW 5323. PROGRAM EVALUATION. 3 Hours.**

This course is designed to provide students with an understanding of and ability to evaluate human service programs. Relationships between program evaluation and program planning or administration are emphasized using both quantitative and qualitative data collection/analysis methods and approaches from the perspective of promoting diversity and social and economic justice in the evaluation of human service programs. Prerequisite: SOCW 5308 or Advanced Standing.

**SOCW 5324. SOCIAL WORK SUPERVISION. 3 Hours.**

This course introduces the culturally diverse roles, functions, and contexts of social work supervision between the supervisor and supervisee. Covers culturally sensitive administrative and clinical perspectives on the social work supervisor as a manager, educator, mentor, mediator, and leader in diverse human service organizations. Co-requisite: SOCW 5311 or SOCW 5312. Please note if co-requisite is dropped, this course will be dropped as well.

**SOCW 5325. BUDGETING AND FINANCIAL MANAGEMENT. 3 Hours.**

This course provides a basic overview of financial management applied specifically to human service agencies. Grounded in a historical lens that examines power relationships in human service financial management, this course emphasizes basic concepts and skill building in budgeting and fund raising; accounting principles; financial statements, and computerized financial information systems. Special emphasis is given to the role of participatory approaches in resource allocation and distribution for human services. Co-requisite: SOCW 5312. Please note that if the co-requisite is dropped, these course will be dropped also.

**SOCW 5326. GRANT PROPOSAL DEVELOPMENT SEMINAR. 3 Hours.**

Grant proposal development is a fundamental method of accessing funds and developing new programs in the social service arena. In this class, students will identify key funding opportunities in their fields of interest and will write a proposal using an actual federal application and a foundation funding announcement. The majority of the course will be devoted to the development of the skills and knowledge necessary to produce a competitive proposal. These include, but are not limited to: a) needs and capacities assessment, b) program development, c) strategic planning, d) budgeting, e) evaluation, and f) community collaboration. Co-requisite: SOCW 5312. If the co-requisite is dropped, this one will be as well.

**SOCW 5327. HUMAN BEHAVIOR IN MACRO ENVIRONMENTS. 3 Hours.**

Offers advanced students the opportunity to study diverse people's behavior within large and complex social settings including: natural helping networks and ontological communities, organizations, and bureaucracies, and social and political movements. Prerequisite: Advanced Standing OR SOCW 5301 and SOCW 5307.

**SOCW 5328. ADVOCACY AND SOCIAL POLICY. 3 Hours.**

Politics are key to developing equitable social policy. Students learn theory and skills to impact social and distributive justice at local, state, and national levels. Examines the role of the social work profession in politics. Prerequisite: SOCW 5303.

**SOCW 5329. POVERTY, INEQUALITY AND SOCIAL POLICY. 3 Hours.**

This course examines the nature and extent of poverty and inequality in the United States, their causes and consequences, and the debate concerning the role of government in providing anti-poverty programs. Many points of view concerning social and distributive justice are presented, from the radical left to radical right. Prerequisite: SOCW 5303.

**SOCW 5332. DIRECT PRACTICE WITH AGING. 3 Hours.**

Course presents an overview of current issues, trends, and practice in the care, treatment, and delivery of social services to diverse older adults and their families. Students learn practice procedures designed to equip them with the skills needed for effective social work practice, review major theories on aging, as well as evaluate needs and gaps in services to diverse older adults and their families. Particular attention is given to the intersections of older adults with gender, race, sexuality, age, education level, and other aspects of identity. Co-requisite: 5311. Please note if the co-requisite is dropped, this course will be dropped as well.

**SOCW 5333. AGING AND SOCIAL POLICY. 3 Hours.**

Social welfare policies and programs are examined in terms of the overall impact on older adults and society. Needs and gaps in services to older adults and their families are evaluated. Current issues in aging policy are examined. Particular attention is given to the intersections of policy with gender, race, sexuality, age, education level, and other aspects of identity. Prerequisite: SOCW 5303.

**SOCW 5334. FAMILY CAREGIVING & AGING. 3 Hours.**

This course will give students an overview of the individual and social impact of family caregiving and aging within a bio-psycho-social-spiritual context and the role(s) of social workers in helping individuals, families, and communities face the contemporary challenges of caregiving. Course content will be underscored by a strengths-based framework and will include the effects of culture on family caregiving, families' process of providing care to persons with chronic and/or complex illness across levels of care (e.g. hospital/rehabilitation/hospice), working with family caregivers within long-term care settings (e.g. nursing homes), dementia caregiving, end of life care as well as evidence-based assessment and intervention with family caregivers. Social services and policy related to effective practice with older adults and family caregivers are also discussed, including innovative and emerging approaches (e.g. technology). Particular attention is given to the intersections of family caregiving with gender, race, sexuality, age, education level, and other aspects of identity. Co-requisite: SOCW 5311. Please note if the co-requisite is not met, the course will be dropped.

**SOCW 5335. AGING IN AMERICAN SOCIETY. 3 Hours.**

This course presents the major theories of aging, in the United States and across cultures, and explores the diverse factors of aging through the lens of intersectionality taking into account intersections of race, gender, sexuality, educational level and other aspects of identity. It includes various perspectives including psychological, biological, sociological, and spiritual. Students will examine current social and economic issues impacting older adults, such as aging & healthcare policy, living arrangements, caregiving, technology, and sexuality. Theories are integrated into practice thus providing students a sound foundation for social work practice with diverse older adults. Students who receive credit for this course in the undergraduate program (SOCW 4335) may not repeat the course at the Master's level (SOCW 5335). Prerequisite: Prerequisite: SOCW 5301 and SOCW 5307 or Advanced Standing and not taken SOCW 4335.

**SOCW 5342. DIRECT PRACTICE IN HEALTH CARE. 3 Hours.**

Explores the central contribution of social work to comprehensive health care and health for diverse individuals and communities in theory and evidence; advanced knowledge and skills in human behavior theory relevant to health care including social determinants of health, as well as social work interventions to assess and ameliorate the psychological effects of illness and disability (across the lifespan), are included along with emerging roles for social work in prevention and health maintenance. Co-requisite: SOCW 5311. If the co-requisite is dropped, this course will be as well.

**SOCW 5343. HEALTH POLICY AND SOCIAL JUSTICE. 3 Hours.**

Provides a critical historical overview of health policy in the United States, current and projected national and local health policies and roles of providers and consumers of health care and public health is examined; service demands, economic, access, and regulatory issues analyzed; relationships between governmental, voluntary, and commercial sectors studied; analytic frameworks for developing and understanding the impact of policy on diverse populations explored. Prerequisite: SOCW 5303.



**SOCW 5344. HEALTH INSURANCE AND ACCESS TO CARE. 3 Hours.**

Explores the history and underlying philosophy of managed care in health and social services, reviews interdisciplinary approaches and principles for understanding and critiquing health care systems, and covers current trends and practice issues. Assesses the potential for conflict between social work values and managed care systems. Builds skills for advancing health equity through administrative roles in managed care settings. Co-requisite: SOCW 5311 OR SOCW 5312. Please note that if the co-requisite is dropped, this course will be dropped as well. This course is offered at the undergraduate level as SOCW 4344. Students who take this at the undergraduate level may not repeat it at the graduate level.

**SOCW 5345. SPECIAL TOPICS IN HEALTH EQUITY. 3 Hours.**

Building on a social determinants of health theoretical perspective and research methods in health care, this course undertakes a critical examination of both historical and present day policies, research and practices that contribute to health inequities across communities disproportionately impacted by health inequities. Topics vary each semester depending on the needs and interests of students and faculty. Potential topics may include, but are not limited to: community health, homelessness, HIV/AIDS, maternal and child health, immigrant health, and veteran health. Emphasis is placed on the role of the social work practitioner in promoting health equity and reducing health inequities. Co-requisites: SOCW 5311 OR SOCW 5312. Please note if the co-requisite is dropped, this course will be dropped as well.

**SOCW 5352. DIRECT PRACTICE IN MENTAL HEALTH. 3 Hours.**

Using a bio-psycho-social risk and resilience perspective this direct practice course focuses on assessment, intervention and appropriate evidence based practices with those evidencing acute and chronic mental health problems, and disabilities in diverse populations. Applying a critical lens, students will explore the delivery of services, review historical and current service delivery systems (community mental health, transinstitutionalization, managed behavioral health care), and a wide range of community mental health problems. Additional topics include the function and critique of the Diagnostic Statistical Manual with a social justice perspective, mental health recovery principles, ethics, case management, treatment planning, person in environment, and substance misuse. Co-requisite: SOCW 5311. Please note that if the co-requisite is dropped, this course will be dropped as well.

**SOCW 5353. SOCIAL POLICY AND MENTAL HEALTH. 3 Hours.**

This course explores programs, policies and systems in the field of mental health, and their impact on mental health consumers. Disparities occurring within mental healthcare systems will be explored using a health equity framework focusing on the differential impact policies may have on women, children and youth, individuals from diverse racial/ethnic backgrounds, LGBTQ+ individuals, veterans and immigrants/refugees. Approaches to policy analysis and implementation will be presented. Prerequisite: SOCW 5303.

**SOCW 5354. PRINCIPLES OF SUBSTANCE MISUSE TREATMENT. 3 Hours.**

This course provides a solid grounding in theory and treatment of substance misuse disorders. In keeping with the social work values of respecting the worth and dignity of all persons, the use of affirming and destigmatizing language is paramount. The application of assessment and screening tools, and implementation of evidence-based interventions, skills and techniques will be examined to include culturally informed diagnosis and treatment across a variety of behavioral health treatment settings. We will consider the importance of integrating identity into treatment through the consideration of gender, race, ethnicity, culture, age, and SOGIE (sexual orientation, gender identity and expression). This course will be taught from a strength-based social justice and trauma-informed perspective, with a focus on harm reduction, relapse prevention and sustained recovery. Prerequisite: SOCW 5311.

**SOCW 5355. MILITARY SOCIAL WORK. 3 Hours.**

The focus of this course is to examine military culture using a diversity framework that involves considering ethical implications for practice, comprehending prevalent social and health issues, and the effects of policies and health disparities across diverse social identities within varied military environments. Students enrolled in this course will analyze current advances in knowledge on the neurobiological underpinnings of human behavior and development pertinent to social and health issues as well as resilience to stress and adversity among diverse members of the military population. Students will identify and evaluate the relevant implications for social work practice with individuals, families, groups, programs/organizations, and communities using a multicultural multidimensional perspective in connection with social justice, social work values, knowledge, and skills. Students will also examine the structural and systematic arrangement and delivery of social welfare services at the micro, mezzo, and macro levels of social work practice.

**SOCW 5356. SEMINAR IN COGNITIVE-BEHAVIORAL INTERVENTION STRATEGIES. 3 Hours.**

Explores the three historical phases CBT's development: (1) Behavioral, (2) Cognitive, and now (3) Mindfulness, Acceptance, and Commitment. Addresses interventions across life-span development, culture, etc., to address such clinical issues as depression, anxiety, trauma, substance misuse, cognitive disorders, bereavement, etc., using a multicultural multidimensional perspective. Teaches assessment and interventions drawn from evidence-based practice knowledge and informed practice wisdom and includes a variety of interventions, such as DBT, behavioral activation, cognitive restructuring, mindfulness, etc. Prerequisite: SOCW 5311.

**SOCW 5357. GROUP DYNAMICS AND SOCIAL WORK PRACTICE. 3 Hours.**

Examines contemporary social-psychological concepts and small group research using a multicultural framework, with a view to testing their applicability to practice propositions and operational principles, in work with both task and treatment groups that include diverse populations. Group work will be examined in terms of social justice, social work values, knowledge, and skills, as well as in terms of those populations who have historically been harmed by structural and systematic arrangement and delivery of social welfare services at the micro, mezzo, and macro levels. Co-requisite: SOCW 5311. Please note if the co-requisite is dropped, this course will be as well.

**SOCW 5358. TREATMENT OF CHILDREN AND ADOLESCENTS. 3 Hours.**

Overview of the literature which describes physical, psychological, and the multitude of diverse cultural characteristics unique to childhood and adolescence. Attention then turned to treatment principles, and the specification of procedures for the amelioration of problems common to children and adolescents of diverse populations. Co-requisite: SOCW 5311. Please note if the co-requisite is dropped, this course will be as well.

**SOCW 5359. MILITARY FAMILIES. 3 Hours.**

This course studies the social milieu in which military-connected families exist, their intersectional identities, the strengths that characterize them, and the challenges they navigate. Topics include cultural competence, military community demographics, ethics and values, self-care of practitioners, social theories, military policies, diversity among military-connected families, differences in service status (e.g., active duty, National Guard, Reserves), operational challenges (e.g., deployment, frequent moves), Service Member/Veteran mental health, dependent special needs (e.g., educational, medical), marital issues (e.g., divorce, domestic violence), and transitions away from the Military (e.g., retirement, separation, death). Special emphasis is placed on diversity, intersectional identities, and military differences (e.g., rank, Branch, service status). Students who complete this course will integrate cultural competence, professional ethics (military and human service professions), social theories, and military policy into their understanding of military-connected families.

**SOCW 5360. TREATMENT OF MILITARY POPULATIONS. 3 Hours.**

The focus of this advanced course is on assessment and intervention and advanced theory and evidence with military populations across the life course, especially those evidencing service-connected acute and chronic mental health problems and disabilities and challenges in community reintegration during and after military service. The course addresses the delivery of services to various military groups (service members, veterans, military families, military spouses/partners, military health disparities groups), service delivery systems (community mental health, managed behavioral health care, Veterans Health Administration, Military Treatment Facilities), and a wide range of problems, including specific training in relevant social work practice skills such as diagnosis of signature injuries using standardized instruments/protocols, prolonged exposure therapy, psychosocial rehabilitation, and deployment-related psychoeducation. Topics include well-being, ethics, treatment planning, DSM conditions (including substance use and misuse), and military culture-based syndromes. Co-requisite: SOCW 5311. If the co-requisite is dropped, this course will be as well.

**SOCW 5361. MILITARY TRAUMA. 3 Hours.**

The focus of this course is to examine military culture using a trauma-informed framework that involves considering ethical implications for practice, comprehending the various types of trauma that may impact service members and their families, and the effects of policies and health disparities across diverse social identities within varied military environments. This course addresses the needs of service members, veterans and their families at different developmental phases of the military life cycle. In addition, theoretical and practical approaches to treatment of chronic stress, acute stress, and trauma-related stress disorders are examined with the goal of advancing students' knowledge of best practices and current evidence-based models. Prerequisite: SOCW 5355.

**SOCW 5362. DIRECT PRACTICE WITH CHILDREN AND FAMILIES. 3 Hours.**

This course focuses on the preparing students for social work practice who will work with children, youth, and families in various employment settings. Throughout this course students will examine evidence-based interventions (and their theoretical roots) that build on strengths and resources of families with the intention of promoting social justice and cultural competence in social work practice with children, youth, and families. The course will address key areas of diversity among children, youth, and families, such as family structure, age, ability, religion, spirituality, sexual orientation, gender (including gender identity and expression), racial and ethnic identity, class, and culture. Specific techniques considered include child therapy, play therapy, behavioral contracting, cognitive-behavioral interventions, and crisis intervention. Co-requisite: SOCW 5311. Please note if the co-requisite is dropped, this course will be as well.

**SOCW 5363. SOCIAL POLICY FOR CHILDREN & YOUTH. 3 Hours.**

Examination of current policies, programs and practices impacting children and youth. Disproportionality and disparities occurring within child and youth serving systems (such as child welfare, the education system, the healthcare system and the juvenile justice system) will be explored, focusing on the differential impact of these policies on youth from diverse racial/ethnic backgrounds, LGBTQ+ youth and immigrant/refugee youth. Through analysis, research, and advocacy, students will increase their knowledge of trauma informed, equitable policies and practice with children and youth. Prerequisite: SOCW 5303.

**SOCW 5365. CLINICAL ASSESSMENT OF CHILD MALTREATMENT. 3 Hours.**

Examines knowledge/technique in child physical/emotional/sexual abuse, physical/emotional neglect, among diverse populations. Includes interviewing, identification, legal issues, assessment/evaluation, and follow-up with an intersectional lens to examine the role of each of these in diverse communities. Prerequisite: SOCW 5311; Co-requisite: SOCW 5362 OR SOCW 5352 OR SOCW 5342. Please note that if the co-requisite course is dropped, this will be as well.

**SOCW 5366. SEMINAR IN WOMEN'S ISSUES. 3 Hours.**

Explores women's issues in human behavior theory, practice theory, and policy. Using an intersectional lens, the historical, political, and socioeconomic forces that maintain sexism among diverse groups are discussed. Environmental influences are examined in relation to social justice, social work values, knowledge, and skills. This course is also offered as SOCW 4366 in the BSW Program. Students receiving credit at the BSW level may not repeat this course for Master's level credit. Prerequisite: SOCW 5301, SOCW 5307.

**SOCW 5367. TREATING PARENT-CHILD RELATIONSHIPS. 3 Hours.**

Evidence-based treatment strategies and evaluation methods relevant to treating parent-child relationships in diverse families; intervention strategies and evaluation methods will be explored taking into account the developmental, social, and cultural factors that may influence the diversified parent-child dynamics, such as gender, power, socialization practices, race, ethnicity, and among others. Co-requisite: SOCW 5311. Please note if the co-requisite course is dropped, this will be dropped as well.

**SOCW 5368. SEMINAR IN DIRECT METHODS IN COUPLES COUNSELING. 3 Hours.**

Examination of various psychological, social, and cognitive-behavioral treatment approaches to problems in intimate couples across a variety of client populations. Emphasis is placed on the social environment, and its impact on the sources and patterns of intimate partner dissatisfaction and conflict. An additional focus will be on identifying components of mutually satisfying intimate partner relationships. Ways to appropriately adapt intervention approaches to be inclusive of couples of diverse sexual orientations/gender identities and from a wide range of religious, ethnic and cultural backgrounds will be explored. Prerequisite: SOCW 5311 or concurrent enrollment. Please note if the co-requisite course is dropped, this will be dropped as well.

**SOCW 5369. SEMINAR IN FAMILY THERAPY. 3 Hours.**

SOCW 5369 aims to compare various approaches to working with the family as a total system; enhance cognitive understanding of similarities and differences in theory and goals of family treatment in many fields of practice; and integrate strategies and techniques of each method into an individual style of therapy. Additionally, in recognition of power structures that have silenced indigenous and minority voices in assessing and treating families, this course will assign readings from diverse authors, as well as encourage student discussion and assignments in an activist-oriented classroom environment that seeks to understand how social work benefits from and perpetuates colonialism. Prerequisite: SOCW 5311.

**SOCW 5370. SOCIAL WORK IN SCHOOLS. 3 Hours.**

The purpose of this course is to provide an overview of the various social work-related theoretical perspectives, models, and programs for intervention with diverse children and their families in the school setting. This includes skills in assessment, prevention, and intervention in providing services to students that are marginalized for numerous reasons including race, gender, skin color, religion, immigrant status, disability, sexual orientation, and socioeconomic status among other factors. Students will learn to use intervention skills that address each level of the ecosystem's perspective in schools. Co-requisite: SOCW 5311. Please note if the co-requisite is dropped, this course will be dropped also.

**SOCW 5371. INEQUITIES AND INCARCERATION. 3 Hours.**

This course surveys mass incarceration in the U.S. criminal justice system as a racialized and classist system of control. First, this course will contextualize the US criminal justice system, both historically and through global comparisons. Then students will be introduced to four broad content areas: entering the criminal justice system (school-to-prison pipeline and policing), who is detained (demographics and common mental health and substance use issues) and what they experience in detention (including COVID-19 in jails and prisons), experiences and problems encountered when returning citizens reenter society, and trends in criminal justice reform advocacy (including problem-solving courts and advocacy efforts such as Black Lives Matter). Finally, the course considers the social work grand challenge of smart decarceration as a path towards reform specific to social workers. Also offered as SOCW 4371 in the BSW program. Students who take this course at the undergraduate level may not repeat it at the graduate level.

**SOCW 5381. FOUNDATION FIELD SPLIT II. 3 Hours.**

Students will complete a minimum of 240 clock hours in a supervised field placement. Students will gain social work experience in an agency that will integrate generalist social work practice concepts into professional social work experience. Students will follow the NASW Code of Ethics and work with an anti-oppressive lens while in their field placements. Prerequisite: SOCW 5581 and SOCW 5307.

**SOCW 5385. FOUNDATION FIELD BLOCK II. 3 Hours.**

Students will complete a minimum of 240 clock hours in a supervised field placement. Students will gain social work experience in an agency that will integrate generalist social work practice concepts into professional social work experience. Students will follow the NASW Code of Ethics and work with an anti-oppressive lens while in their field placements. Prerequisite: Pre-requisite or Co-requisite: SOCW 5307; Co-requisite: SOCW 5585. Please note if co-requisite is dropped, this course will be dropped as well.

**SOCW 5390. INDEPENDENT STUDY. 3 Hours.**

Arrangements may be made for a directed and supervised independent study in a select area of special interest to the student.

**SOCW 5392. SELECTED TOPICS IN SOCIAL WELFARE. 3 Hours.**

Topics vary from semester to semester depending on the needs and interest of the students.

**SOCW 5395. INTEGRATIVE SEMINAR. 3 Hours.**

This course focuses on the cycle of practice from assessment and engagement to termination and evaluation. This course serves as the capstone for non-thesis MSW students and integrates an anti-oppressive lens toward promoting social justice across all aspects of practice. Prerequisite: SOCW 5482 or SOCW 5882.

**SOCW 5396. THESIS RESEARCH. 3 Hours.**

Initial research in the student's area of concentration, leading to thesis.

**SOCW 5398. THESIS. 3 Hours.**

Requires an individual research project in the individual's area of concentration, with a minimum of six semester hours total needed for the project. Satisfactory completion requires approval of the supervising committee. Defense in a final oral examination is required. Prerequisite: SOCW 5396.

**SOCW 5482. ADVANCED PRACTICUM SPLIT I. 4 Hours.**

Students will complete a minimum of 250 clock hours in a supervised practicum. Students will gain social work experience in an agency that will integrate advanced social work practice concepts into professional social work experience. Students will follow the NASW Code of Ethics and work with an anti-oppressive lens while in their practicum. Prerequisite: SOCW 5312 OR SOCW 5311 AND SOCW 5332 OR SOCW 5342 OR SOCW 5352 OR SOCW 5362.

**SOCW 5483. ADVANCED PRACTICUM SPLIT II. 4 Hours.**

Students will complete a minimum of 250 clock hours in a supervised practicum. Students will gain social work experience in an agency that will integrate advanced social work practice concepts into professional social work experience. Students will follow the NASW Code of Ethics and work with an anti-oppressive lens while in their practicum. Prerequisite: SOCW 5482.

**SOCW 5485. ADVANCED PRACTICUM BLOCK I. 4 Hours.**

Students will complete a minimum of 500 clock hours in a supervised practicum. Students will gain social work experience in an agency that will integrate generalist social work practice concepts into professional social work experience. Students will follow the NASW Code of Ethics and work with an anti-oppressive lens while in their practicum. Prerequisite: SOCW 5312 OR SOCW 5311 AND SOCW 5332 OR SOCW 5342 OR SOCW 5352 OR SOCW 5362; Co-requisite: SOCW 5486.

**SOCW 5486. ADVANCED PRACTICUM BLOCK II. 4 Hours.**

Students will complete a minimum of 500 clock hours in a supervised practicum. Students will gain social work experience in an agency that will integrate advanced social work practice concepts into professional social work experience. Students will follow the NASW Code of Ethics and work with an anti-oppressive lens while in their practicum. Prerequisite: SOCW 5312 OR SOCW 5311 AND SOCW 5332 OR SOCW 5342 OR SOCW 5352 OR SOCW 5362; Co-requisite: SOCW 5485.

**SOCW 5581. FOUNDATION PRACTICUM SPLIT I. 5 Hours.**

Students will complete a minimum of 200 clock hours in a supervised practicum. Students will gain social work experience in an agency that will integrate generalist social work practice concepts into professional social work experience. Students will follow the NASW Code of Ethics and work with an anti-oppressive lens while in their practicum. Additionally, students will spend two hours a week in a seminar course to reflect and integrate social work knowledge, theory, and skills learned over the course of the program that they are applying in their practicum. Prerequisite: SOCW 5301, SOCW 5304, SOCW 5306; Co-requisite: SOCW 5307.

**SOCW 5585. FOUNDATION PRACTICUM BLOCK I. 5 Hours.**

Students will complete a minimum of 400 clock hours in a supervised practicum. Students will gain social work experience in an agency that will integrate generalist social work practice concepts into professional social work experience. Students will follow the NASW Code of Ethics and work with an anti-oppressive lens while in their practicum. Additionally, students will spend two hours a week in a seminar course to reflect and integrate social work knowledge, theory, and skills learned over the course of the program that they are applying in their practicum. Prerequisite: Pre-requisite or Co-requisite: SOCW 5307; Co-requisite: SOCW 5385. Please note that if the co-requisite is dropped, this course will also be dropped.

**SOCW 5698. THESIS. 6 Hours.**

Requires an individual research project in the individual's area of concentration, with a minimum of six semester hours total needed for the project. Satisfactory completion requires approval of the instructor in charge, a supervising committee appointed by the Dean of Graduate Studies. Defense in a final oral examination is required.

**SOCW 6039. FIRST YEAR SEMINAR. 0 Hours.**

This Seminar focuses on topics related to socialization, skill-building, and professional development for Social Work PhD students. Content will explore social work research as a discipline including past and current contextual influences, explicate program and professional milestones to support student professional development, identify emerging areas of research interest and forms of scholarly inquiry, support initial engagement in writing for publication, and provide a venue for students to explore the development of their scholarly identity.

**SOCW 6111. CAPSTONE PROPOSAL. 1 Hour.**

This 1-credit course is designed to guide students through the conceptualization of their two-part capstone project. Students will identify a relevant social work issue, conduct an informal review of the literature, and develop research questions aligned with their chosen area of focus. The course previews the capstone process, project objectives, methodology, and outcomes. By the end of the course, students will produce a formal capstone proposal for parts I and II of their capstone that integrates advanced social work theory, ethics, and practice, preparing them for the next phase of their doctoral project.

**SOCW 6190. TUTORIAL. 1 Hour.**

Arrangements may be made for a directed and supervised tutorial in a select area of special interest to the student.

**SOCW 6212. SOCIAL WORK ENTREPRENEURSHIP. 2 Hours.**

Students will explore entrepreneurship in social work, focusing on establishing private practices, consulting, and other entrepreneurial ventures. Topics include developing a strong professional brand, creating business plans, marketing strategies, and managing finances. Students will also learn about building client networks and leveraging technology for business growth. Through case studies and practical exercises, students will gain the skills to innovate and lead in a variety of social work practice realms.

**SOCW 6301. INTRODUCTION TO DOCTORAL STUDIES. 3 Hours.**

This course introduces students to the DSW identity as a scholar-practitioner and prepares students for success in a DSW program. The course emphasizes ethics and is aimed to develop effective online learning strategies, build a sense of belonging within the cohort, elevate professionalism, and strengthen critical thinking and writing skills, including preparation to write for publication. This course also guides students to begin conceptualizing their final capstone project.

**SOCW 6302. STRATEGIES OF INQUIRY. 3 Hours.**

This course explores the foundational paradigms that shape research and theoretical framework development in social work. Students will apply paradigms and theoretical orientations to analyze and conduct research that addresses complex social issues.

**SOCW 6303. THE SCIENCE OF SELF-CARE. 3 Hours.**

Explores evidence-based practices that promote wellness, prevent burnout, and support brain health. Topics include neuroplasticity, mindfulness, motivation, balance, trauma-informed approaches, and resilience-building strategies that enhance personal and professional wellbeing. Students will learn how self-care impacts brain function, emotional regulation, and overall health, with a focus on practical neuroscience applications in clinical, educational, and leadership settings. This course provides tools for modeling sustainable self-care routines and strategies that support individual growth and help others thrive in challenging professional contexts. Prerequisite: SOCW 6301: Introduction to Doctoral Studies.

**SOCW 6304. APPLIED RESEARCH FOR EVIDENCE-BASED SOCIAL WORK. 3 Hours.**

Provides a survey of research processes relevant to DSW scholars, including formulating research questions, exploring qualitative, quantitative, and mixed-methods approaches, and developing competencies in research ethics. Students will learn to critically evaluate journal articles, understand research design, and interpret basic statistical methods. The course emphasizes interpreting research findings and translating research into practice, with a focus on evidence-based practice to inform social work interventions. Prerequisite: SOCW 6302: Strategies of Inquiry.

**SOCW 6305. SOCIAL JUSTICE. 3 Hours.**

Focuses on the application of anti-racism, diversity, equity, and inclusion (ADEI) principles to social work practice settings. Students will explore implicit bias, systemic inequality, power dynamics, and strategies to promote social justice in various contexts. Emphasizing interdisciplinary practice, students will develop practical skills to address oppression, foster inclusivity, and advance equity in social work practice, leadership, and education.

**SOCW 6306. ADVANCED POLICY & ADVOCACY. 3 Hours.**

Provides students with the skills to critically analyze and advocate for social policies that promote justice and equity at the agency, local, federal, and global levels. Topics include policy analysis, comparative global social policy, research-informed policy solutions, and the role of technology in shaping policy. Students will explore best practices in leading policy development, lobbying, legislative advocacy, and media relations. Prerequisite: SOCW 6305: Social Justice.

**SOCW 6307. ADVANCED SOCIAL WORK LEADERSHIP & SUPERVISION. 3 Hours.**

This course equips students with practical skills to lead, mentor, and supervise in clinical, educational, and social service agency settings. It covers core leadership principles, supervision models, management techniques, interprofessional collaboration, and strategic planning for organizational development. Through real-world applications, the course emphasizes leadership in decision-making, ethical practice, and technological innovation across social work contexts. Prerequisite: SOCW 6303: The Science of Self-Care.

**SOCW 6308. ADVANCED GRANT WRITING & BUDGETING. 3 Hours.**

Equips students with the skills to develop competitive grant proposals and manage program budgets effectively. The course covers the entire grant-writing process, from identifying funding opportunities to writing compelling narratives and justifying budgets. Students will learn to design program budgets, allocate resources, and monitor financial performance. Practical applications will focus on writing grants for social services, research projects, and community initiatives, with an emphasis on ethical financial management and aligning funding strategies with organizational goals.

**SOCW 6309. ADVANCED PROGRAM EVALUATION. 3 Hours.**

Provides students with the foundational skills needed to design, implement, and assess social programs. Topics include understanding the principles and types of evaluation, creating logic models, and conducting both formative and summative evaluations. Students will explore needs assessment, data collection methods, survey design, and ethics in evaluation. The course emphasizes analyzing and interpreting data, measuring program impact, and communicating findings effectively. Students will also learn to use evaluation results to improve program design and implementation, ensuring sustainability and accountability.

**SOCW 6310. EDUCATION I: INTRODUCTION TO SOCIAL WORK ANDRAGOGY & CURRICULUM DEVELOPMENT. 3 Hours.**

This foundational course equips aspiring educators with the knowledge and skills to prepare to teach social work students. The course introduces students to the world of academia as they begin to develop a strong teaching identity as social work educators. Students will explore key concepts such as the history and signature andragogies of social work education, adult learning theories, teaching philosophies, curriculum design, and building inclusive, accessible, & decolonized learning environments. Students will learn to design a comprehensive syllabus and utilize teaching resources and mentorship.

**SOCW 6313. EDUCATION II: IMPLEMENTING EFFECTIVE TEACHING PRACTICES. 3 Hours.**

This course focuses on practical teaching methods and classroom management strategies for social work educators. Topics include engaging students, building a sense of belonging, and utilizing various teaching methods, such as lectures, discussions, group work, and experiential education. Students will explore giving effective feedback, using technology in the classroom, and managing both in-person and online environments. Emphasizing self-reflection and growth, the course also covers contributing to the field through trainings, publishing, conferences, and preparing for an academic career. Prerequisite: SOCW 6310: Education I.

**SOCW 6314. CAPSTONE I: SYSTEMATIC LITERATURE REVIEW. 3 Hours.**

Guides students through the process of conducting a comprehensive and systematic review of the existing literature on a specific social work topic of the student's choosing. The course focuses on data extraction, evaluating sources, synthesizing findings, and identifying research gaps. Students will produce a complete systematic literature review manuscript. Prerequisite: SOCW 6111: Capstone Proposal.

**SOCW 6315. APPLIED TEACHING PRACTICUM. 3 Hours.**

This course Introduces students to the academic instructor role through in-person or online teaching practice in social work or related field at either the graduate (MSW) or undergraduate level. Students will serve as a real course instructor at UTA or another pre-approved institution. Prerequisite: SOCW 6313- Education II: Implementing Effective Teaching Practices.



**SOCW 6316. CAPSTONE II: APPLIED PROJECT. 3 Hours.**

Focuses on the execution of an advanced, practice-based project that addresses a real-world social work issue in a clinical, leadership, or social work education setting. Students will apply research findings and theories from their Capstone I work to develop and implement a significant project within their practice setting. By the end, students will present their applied project in an online showcase, demonstrating mastery as a scholar-practitioner. Prerequisite: SOCW 6314: Capstone Project I- Systematic Literature Review.

**SOCW 6328. SOCIAL POLICY RESEARCH AND ANALYSIS. 3 Hours.**

Seminar examining methods for analyzing social policies and for assessing effects of policy. Students evaluate and apply different models for social policy analysis, including comparative models. Students work with social indicators and other data sources used in policy research. Prerequisite: acceptance into the Ph.D. program.

**SOCW 6340. ADVANCED RESEARCH METHODS IN HUMAN SERVICES. 3 Hours.**

Acquaints students at an advanced level with research methodology as it applies to the human services. Includes techniques and tools of research, problem conceptualization, measurement, research and instrument design and data collection methods. Prerequisite: acceptance into the Ph.D. program.

**SOCW 6341. ADVANCED STATISTICAL METHODS IN HUMAN SERVICES. 3 Hours.**

Advanced statistical applications in the human services. Emphasis on multivariate statistical approaches including multiple regression analysis, logistic regression, and advanced general linear modeling approaches to analyzing data from social work research. Prerequisite: SOCW 6347.

**SOCW 6346. TEACHING PRACTICUM. 3 Hours.**

Introduces students to the academic role through teaching practice at graduate and/or undergraduate level supervised by a full-time faculty member. Prerequisite: SOCW 6328, SOCW 6340, SOCW 6348, SOCW 6373.

**SOCW 6347. INTERMEDIATE STATISTICS. 3 Hours.**

Statistical applications for doctoral social work students. Emphasizes both parametric and non-parametric techniques, including t-tests, ANOVA, correlation and regression, chi-square, and other non-parametrics. Designed to provide a foundation for advanced multivariate statistical techniques. Prerequisite: acceptance into the Ph.D. program.

**SOCW 6348. SEMINAR IN QUALITATIVE RESEARCH METHODS. 3 Hours.**

Explores a variety of qualitative approaches to knowledge building and research. Designed to prepare students to carry out research projects within their areas of interest. Content includes discussions of knowledge development, study designs, data collection, analysis, and report writing. Prerequisite: acceptance into the Ph.D. program.

**SOCW 6349. MIXED METHODS RESEARCH. 3 Hours.**

This course will provide an applied overview of mixed methods research designs with an emphasis on their utility in social justice-oriented research. It will foster student synthesis and reflection on qualitative and quantitative research training, exploring mixed methods as one paradigm to enhance scholarly insight into critical issues. The course will cover the epistemological underpinnings of mixed methods research, the development of mixed methods research questions, core mixed methods research designs, complex mixed methods research designs, and appropriate methods for collecting, analyzing, integrating, and reporting mixed methods research. Prerequisite: SOCW 6340 and SOCW 6348.

**SOCW 6356. SEMINAR IN PROGRAM AND PRACTICE EVALUATION. 3 Hours.**

This course provides hands on opportunities to develop program and clinical evaluation plans for social work/welfare agencies. Educational principles and theoretical foundations are discussed as the actual plans are developed. Students work with agency decision makers and the instructor to generate a plan acceptable to the agency for implementation. Prerequisite: SOCW 6347.

**SOCW 6367. SEMINAR IN ADVANCED STATISTICAL APPLICATIONS. 3 Hours.**

This seminar covers statistical analysis of complex data and statistical modeling including latent variables. Emphasis is on structural equation model analysis using AMOS, LISREL, or EQS. The course focuses on applications of statistics using various data sets. Prerequisite: Knowledge of SPSS; SOCW 6341 and SOCW 6347.

**SOCW 6373. THEORY AND MODELING BUILDING IN SOCIAL WORK RESEARCH. 3 Hours.**

This course gives special emphasis on ways in which theory informs social work research. This course prepares students to perform application and critical analysis of social science and social work theory and theory-driven research. The course involves students in integrating theory, research, and social work practice with the goal of producing models of interventions, programs, and policies. Prerequisite: acceptance into the Ph.D. program.

**SOCW 6390. TUTORIAL. 3 Hours.**

Arrangements may be made for a directed and supervised tutorial in a select area of special interest to the student.

**SOCW 6392. SELECTED TOPICS IN SOCIAL WELFARE. 3 Hours.**

Topics vary from semester to semester based on the needs and interests of students.

**SOCW 6393. GRANT WRITING. 3 Hours.**

This course introduces the student to the process of writing grants. This includes knowledge of sponsors and opportunities as well as practical "know-how" in writing competitive grants for supporting research in social service and health service provision. The emphasis of the course will be on federal grants, but state and foundation grants will also be cited as case illustrations. Prerequisite: Doctoral standing or permission of the instructor.

**SOCW 6394. APPLIED RESEARCH PRACTICUM. 3 Hours.**

Students engage in an active program of applied research under direct supervision of a faculty member.

**SOCW 6396. SOCIAL WORK EDUCATION: PRINCIPLES AND SKILLS. 3 Hours.**

Considers a range of ideas in educational thought relevant to the formulation of an analytical appraisal of social work education and training. Educational methods and skills relevant to social work are addressed and practice opportunities offered. Prerequisite: acceptance into the Ph.D. program.

**SOCW 6397. WRITING FOR PUBLICATION. 3 Hours.**

This course will explore the world of academic publishing. Students will provide peer reviews of manuscripts, prepare and critique their ideas and draft sections of a manuscript, and present a final manuscript and publication plan. The intent is to help the students increase their chance of publishing manuscripts as a Ph.D. student and as a new faculty member. Although nothing can substitute for having information and research relevant for the field, the art of writing for publication should not be underestimated. Journal publishing, like any other human service endeavor, is easier as you become proficient. Most academics become proficient at communicating their ideas and research through trial and error. However, one's chances of becoming published can be increased by learning from experts in the field. Prerequisite: acceptance into the Ph.D. program.

**SOCW 6399. DISSERTATION. 3 Hours.**

Preparation and submission of a doctoral dissertation in an area in social work.

**SOCW 6694. APPLIED RESEARCH PRACTICUM. 6 Hours.**

Students engage in an active program of applied research under direct supervision of a faculty member.

**SOCW 6699. DISSERTATION. 6 Hours.**

Preparation and submission of a doctoral dissertation in an area in social work.

**SOCW 6999. DISSERTATION. 9 Hours.**

Preparation and submission of a doctoral dissertation in an area in social work.

**SOCW 7399. DOCTORAL DEGREE COMPLETION. 3 Hours.**

This course may be taken during the semester in which a student expects to complete all requirements for the doctoral degree and graduate. Enrolling in this course meets minimum enrollment requirements for graduation, for holding fellowships awarded by The Office of Graduate Studies and for full-time GTA or GRA positions. Students should verify that enrollment in this course meets other applicable enrollment requirements. To remain eligible in their final semester of study for grants, loans or other forms of financial aid administered by the Financial Aid Office must enroll in a minimum of 5 hours as required by the Office of Financial Aid. Other funding sources may also require more than 3-hours of enrollment. Additional hours may also be required to meet requirements set by immigration law or by the policies of the student's degree program. Students should contact the Financial Aid Office, other sources of funding, Office of International Education and/or their graduate advisor to verify enrollment requirements before registering for this course. This course may only be taken twice. Students who do not complete all graduation requirements while enrolled in this course must enroll in a minimum of 6 dissertation hours (6699 or 6999) in their graduation term. Graded P/F/R.

## COURSES

**SPAN 1441. BEGINNING SPANISH I. 4 Hours. (TCCN = SPAN 1411)**

Beginning study of Spanish language with emphasis on speaking, listening, reading, and writing. No prerequisites. Native or heritage speakers of Spanish may not take this course.

**SPAN 1442. BEGINNING SPANISH II. 4 Hours. (TCCN = SPAN 1412)**

Continuation of beginning Spanish. Prerequisite: SPAN 1441 with a grade of C or better. Native or heritage speakers of Spanish may not take this course.

**SPAN 1491. CONFERENCE COURSE. 4 Hours.**

Independent study; consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: Permission of the instructor.

**SPAN 2300. SPANISH IN THE UNITED STATES. 3 Hours.**

An overview of the historical, social, and cultural issues related to the use of Spanish in the United States alongside other languages, mainly English. Explores topics such as bilingualism, code-switching, Spanglish, and language maintenance vs. loss. Taught in English.

**SPAN 2301. TOPICS IN SPANISH LITERATURE IN TRANSLATION. 3 Hours.**

Study of the works of major authors and intellectual trends of a given period or periods. May be repeated for credit as topics or periods vary. SPAN 2301 may be taken to fulfill the foreign language literature requirement. Prerequisite: ENGL 1301 and ENGL 1302.

**SPAN 2310. HISPANIC CULTURE IN THE WORLD. 3 Hours.**

An overview of the cultures of the Spanish-speaking world in a global context, examining cultural products such as food, art, music, popular culture, literature, and/or film. Taught in English.

**SPAN 2312. SPANISH FOR NATIVE/HERITAGE SPEAKERS I. 3 Hours.**

This course focuses on the development of reading, writing, speaking, and listening skills in Spanish, as well as an understanding of Hispanic cultures and topics related to the identity of heritage speakers in the United States. This course is intended for native and heritage speakers of Spanish and is the curricular equivalent of SPAN 2313. Prerequisite: Appropriate CLEP, AP, or placement test score.

**SPAN 2313. INTERMEDIATE SPANISH I. 3 Hours. (TCCN = SPAN 2311)**

Intermediate study of Spanish language with emphasis on speaking, listening, reading, and writing. Prerequisite: SPAN 1442 with a grade of C or better. Native or heritage speakers of Spanish may not take this course.

**SPAN 2314. INTERMEDIATE SPANISH II. 3 Hours. (TCCN = SPAN 2312)**

Continuation of intermediate Spanish. Prerequisite: SPAN 2313 with a grade of C or better. Native or heritage speakers of Spanish may not take this course.

**SPAN 2315. SPANISH FOR NATIVE/HERITAGE SPEAKERS II. 3 Hours. (TCCN = SPAN 2315)**

This course focuses on the further development of reading, writing, speaking and listening skills in Spanish, as well as an understanding of Hispanic cultures and topics related to the identity of heritage speakers in the United States. This course is intended for native and heritage speakers of Spanish and is the curricular equivalent of SPAN 2314. This course satisfies the University of Texas at Arlington core curriculum requirement in language, philosophy and culture. Prerequisite: SPAN 2312 with a Grade of C or better, or appropriate placement test score.

**SPAN 2391. CONFERENCE COURSE. 3 Hours.**

Independent study; consultation with instructor on a regular basis. Prerequisite: Permission of the instructor.

**SPAN 3302. TOPICS IN HISPANIC LITERATURE IN TRANSLATION. 3 Hours.**

The works of major authors and intellectual trends of a given period. May be repeated for credit as topics or periods vary. Taught in English.

**SPAN 3303. ADVANCED SPANISH CONVERSATION. 3 Hours.**

Practice in oral expression with an emphasis on vocabulary building and grammar review. Of special interest to students who wish to improve their skills in pronunciation, comprehension, and oral expression. Credit will not be granted to native or heritage speakers of Spanish. Prerequisite: SPAN 2314 with a grade of C or better.

**SPAN 3304. LANGUAGE IN MEXICO. 3 Hours.**

An analysis of language in Mexico. Topics may include language variation, language and society, languages in contact, indigenous languages, or the history of Spanish in Mexico. Prerequisite: SPAN 2314 or SPAN 2315 with a grade of C or better.

**SPAN 3305. ADVANCED SPANISH FOR HERITAGE SPEAKERS. 3 Hours.**

A detailed study of Spanish grammar for heritage speakers. Capitalizes upon students' existing language skills, expands their knowledge base, and develops their ability to read, write, and communicate more effectively. Special attention is given to regional and dialectal differences. Prerequisite: SPAN 2315, or the equivalent, with a grade of C or better.

**SPAN 3308. SPANISH FOR HEALTH AND HUMAN SERVICES. 3 Hours.**

Practice in Spanish-language skills needed in the fields of healthcare, social work, and other human services. Emphasis on specialized vocabulary building, grammar, role play, and an understanding of Hispanic/Latino culture. For students interested in working with Spanish-speaking clients in nursing/medicine, translation/interpreting, social work, or mental health settings. Prerequisite: SPAN 2314 or SPAN 2315 with a grade of C or better, or appropriate placement test score.

**SPAN 3309. SPANISH FOR THE PROFESSIONS. 3 Hours.**

Practice in Spanish-language skills needed in the professional fields in order to communicate with Spanish-speaking individuals. Emphasis on specialized vocabulary building, role play, and an understanding of Hispanic culture. Topics may include Spanish for law enforcement, social services, education, medicine, business, and communications. Prerequisite: SPAN 2314 or SPAN 2315, or the equivalent, with a grade of C or better.

**SPAN 3310. SPANISH LOCALIZATION AND TRANSLATION I. 3 Hours.**

Introduction to linguistic and cultural issues in the translation of Spanish language texts. Students will explore current technologies used in various real-world localization and translation contexts and how to adapt texts, products, and services to the locale for which they are intended. Exclusively for students pursuing a minor in Localization and Translation-Spanish. Prerequisite: SPAN 2314 or SPAN 2315 or the equivalent with a grade of B or better.

**SPAN 3311. SPANISH CULTURE AND CIVILIZATION. 3 Hours.**

Spanish history with emphasis on cultural, intellectual, and artistic trends and existing social institutions. Prerequisite: SPAN 2314 or SPAN 2315 with a grade of C or better.

**SPAN 3312. LATIN AMERICAN CULTURE AND CIVILIZATION. 3 Hours.**

An interdisciplinary introduction to Latin American society, history and culture. Offered as MAS 3312 and SPAN 3312; credit will be granted for either MAS or SPAN. Prerequisite: SPAN 2314 or SPAN 2315 with a grade of C or better.

**SPAN 3313. TOPICS IN HISPANIC LANGUAGE, LITERATURE & CULTURE. 3 Hours.**

Topics may include Peninsular or Latin American film, music, radio, politics, human rights movements, literature, language or Hispanic linguistics. May be repeated as the topic changes. Prerequisite: SPAN 2314 or SPAN 2315 with a grade of C or better.

**SPAN 3314. ADVANCED SPANISH GRAMMAR. 3 Hours.**

A detailed study of Spanish grammar for non-native speakers. Credit will not be granted to native or heritage speakers of Spanish. Prerequisite: SPAN 2314 with a grade of C or better.

**SPAN 3315. SPANISH COMPOSITION. 3 Hours.**

Practice in writing and original composition in Spanish, including the study of a variety of texts. Of special interest to students who wish to improve their reading comprehension and their writing skills. Prerequisite: SPAN 3305 or SPAN 3314, with grade C or better.

**SPAN 3316. EXPLORING THE SPANISH LANGUAGE. 3 Hours.**

An overview of the history and diversity of the Spanish language, as well as a study of its structure. Topics include sounds and spelling, word and sentence formation, varieties of Spanish, and bilingualism. Application of course content to the use of Spanish in professional settings is explored. Prerequisite: SPAN 3305 or SPAN 3314, with a grade of C or better.

**SPAN 3317. MEXICAN CULTURE AND CIVILIZATION. 3 Hours.**

An examination of Mexican society, history, and culture with emphasis on intellectual and artistic trends. Prerequisite: SPAN 2314 or SPAN 2315 with a grade of C or better.

**SPAN 3318. MEXICAN POPULAR CULTURE. 3 Hours.**

An interdisciplinary examination of Mexican popular culture. Topics include: Mexican popular literature, film, comics, television, music, mass media, and the internet. Prerequisite: SPAN 2314 or SPAN 2315 with a grade of C or better.

**SPAN 3320. INTRODUCTION TO HISPANIC LITERATURE AND CULTURE. 3 Hours.**

An introduction to the tools of literary and cultural criticism as well as Spanish and Latin American literary history. Study of representative literary texts with the object of developing students' understanding of historical change and cultural crosscurrents. Prerequisite: SPAN 3315 with a grade of C or better.

**SPAN 3321. SPANISH LOCALIZATION AND TRANSLATION II. 3 Hours.**

Continued study of linguistic and cultural issues in the translation of Spanish and English language texts. Systematic development of advanced skills in localization and computer-aided translation tools. Students will build and train machine translation engines and explore text analytics in modern research and the enterprise. Prepares localization and translation specialists for real-world careers in the language-services industry of the 21st Century. Exclusively for students pursuing a minor in Localization and Translation-Spanish. Prerequisite: SPAN 3310 with a grade of B or better.

**SPAN 3322. THE SOUNDS OF SPANISH. 3 Hours.**

An examination of the sound system of Spanish. Topics include the articulatory system, characteristics and description of speech sounds, pronunciation, dialectal variation, and differences between speech sounds in English and Spanish. Students receive hands-on training in acoustic analysis in order to describe both the patterns observed in their own speech as well as speech patterns of Spanish speakers from different regions. Prerequisite: SPAN 3305 or SPAN 3314 with a grade of C or better.

**SPAN 3323. MULTIMEDIA TRANSLATION, TRANSCREATION, AND SOFTWARE LOCALIZATION. 3 Hours.**

An overview of the theoretical, methodological, and practical aspects of English to Spanish and Spanish to English multimedia translation. Topics include dubbing, subtitling, transcreation, media accessibility, and video game and software localization. Students will learn strategies to address linguistic and cultural translation problems, as well as techniques to address the specific problems in this field of translation. Students will also explore subtitling software, and software to increase translators' productivity. Prerequisite: SPAN 2314 or SPAN 2315 with a grade of C or better, or Avant Spanish placement test score of 6.00+ (PLACE) or 7.00+ (STAMP).

**SPAN 3324. INTRODUCTION TO CREATIVE WRITING. 3 Hours.**

An introductory course to the craft of creative writing through short-story, nouvelle, novel, poetry, flash fiction, memoir, and screenwriting. Prerequisite: SPAN 3305 or SPAN 3314, with grade C or better.

**SPAN 3340. COMMUNITY TRANSLATION. 3 Hours.**

This course is an introduction to the theory, methods and practice of community translation. The student will learn how to address translation problems related to culture and language as well as the fundamentals of translating general material from different fields such as journalism, tourism, health, business, law, education, etc. The student will also acquire basic knowledge of translation theory. Prerequisite: SPAN 2314 or SPAN 2315 with a grade of C or better, or Avant Spanish placement test score of 6.00+ (PLACE) or 7.00+ (STAMP).

**SPAN 3341. COMMUNITY INTERPRETING. 3 Hours.**

Introduction to the theory, methods, and practice of community interpreting. The student will become familiar with community interpreting (interpreting in school, medical, social services, and legal settings) and interpreting theory. The student will begin to interpret in the simultaneous and consecutive (bilateral) modes. The student will also learn about sight translation. Non-native/heritage speakers are encouraged to take SPAN 3303 prior to enrolling in SPAN 3341. Prerequisite: SPAN 2314 or SPAN 2315 with a grade of C or better, or Avant Spanish placement test score of 6.00+ (PLACE) or 7.00+ (STAMP).

**SPAN 3345. INTRODUCTION TO COMPUTER-ASSISTED TRANSLATION. 3 Hours.**

Introduction to computer-assisted translation (CAT), machine translation (MT), translation memory (TM) and terminology management tools in modern translation and localization workflows. Prepares students for real-world careers in the language services industry. For students enrolled in Localization and Translation/Interpreting programs only. Exclusively for students pursuing a minor in Localization and Translation-Spanish. SPAN 3310 is strongly recommended before SPAN 3345.

**SPAN 3391. CONFERENCE COURSE. 3 Hours.**

Independent study; consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: Permission of Instructor.

**SPAN 3393. SPANISH INTERNSHIP. 3 Hours.**

A combination of field-related experience in the business or service sector with an academic component. Coursework may include journal writing, outside readings, reflection papers, and formal presentations. Prerequisite: Permission of Instructor.

**SPAN 4191. CONFERENCE COURSE. 1 Hour.**

Independent study; consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: Permission of the instructor.

**SPAN 4310. TOPICS IN PENINSULAR SPANISH LITERATURE AND CULTURE TO THE EIGHTEENTH CENTURY. 3 Hours.**

Topics may include: Medieval Spanish literature and culture, Golden Age Spanish literature and culture, or any particular movement, genre, work or author prior to the eighteenth century. May be repeated for credit when content changes. Prerequisite: SPAN 3315 with a grade of C or better.

**SPAN 4311. TOPICS IN PENINSULAR SPANISH LITERATURE AND CULTURE, EIGHTEENTH CENTURY TO THE PRESENT. 3 Hours.**

Topics may include: Neoclassical peninsular Spanish literature and culture, peninsular Spanish literature and culture of the Romantic period, Realist or Naturalist Spanish literature and culture, peninsular Spanish literature and culture since 1900, as well as any particular movement, genre, work or author from the eighteenth century to the present. May be repeated for credit when content changes. Prerequisite: SPAN 3315 with a grade of C or better.

**SPAN 4312. INTERCULTURAL COMPETENCE FOR GLOBAL COMMUNICATION. 3 Hours.**

A study of the cultural differences between the U.S. and the Hispanic world with a focus on the development of intercultural competence: verbal and non-verbal communication, interpersonal skills, effective management strategies, and professional etiquette in multicultural settings. Prerequisite: SPAN 3315 with a grade of C or better.

**SPAN 4313. TOPICS IN HISPANIC CULTURE. 3 Hours.**

Among the topics are Spanish or Latin American music, television, radio, film, and literature as culture. May be repeated for credit as topic changes. Prerequisite: SPAN 3315 with a grade of C or better. Offered as MAS 4313 and SPAN 4313; credit will be given for MAS 4313 or SPAN 4313 but not both in a given semester.

**SPAN 4314. TOPICS IN LATIN-AMERICAN LITERATURE AND CULTURE TO MODERNISM. 3 Hours.**

Topics may include: Colonial Latin-American literature and culture, pre-modern Latin-American literature and culture, Latin-American literature and culture of the Enlightenment, or any particular movement, genre, work or author prior to Modernism. May be repeated for credit when content changes. Prerequisite: SPAN 3315 with a grade of C or better.

**SPAN 4315. TOPICS IN CONTEMPORARY LATIN-AMERICAN LITERATURE AND CULTURE, MODERNISM TO THE PRESENT. 3 Hours.**

Topics may include: Latin-American literature and culture of Modernism, modern Latin-American literature and culture, or any particular movement, genre, work or author from Modernism to the present. May be repeated for credit when content changes. Offered as MAS 4315 and SPAN 4315; credit will be given for MAS 4315 or SPAN 4315 but not both in a given semester. Prerequisite: SPAN 3315 with a grade of C or better.

**SPAN 4316. ADVANCED SPANISH LANGUAGE STUDY. 3 Hours.**

Study of the structure of the Spanish language including phonology, morphology, and syntax, as well as historical, regional, and social variation. Prerequisite: SPAN 3314 or SPAN 3305 with a grade of C or better.

**SPAN 4317. U.S.-MEXICO LITERATURE & CULTURE. 3 Hours.**

U.S.-Mexico cultural manifestations with particular attention to music, television, radio, film, performance art, and literature as culture. Cross-listed with MAS 4317. Prerequisite: SPAN 3315 with a grade of C or better.

**SPAN 4318. MEXICAN LITERATURE. 3 Hours.**

Studies in Mexican fiction, poetry, drama, and literary essay. Offered as MAS 4318 and SPAN 4318; credit will be given for MAS 4318 or SPAN 4318 but not both in a given semester. Prerequisite: SPAN 3315 with a grade of C or better.

**SPAN 4320. TOPICS IN SPANISH LANGUAGE, WRITING AND THEORY. 3 Hours.**

Review of advanced research methods and topics in Spanish, Latino and Latin American literature, culture and linguistics. Topics may include: literary and cultural theory in relation to Hispanic literature and culture, research trends, and methods in Spanish linguistics. Students conduct original research or writing projects in relation to the course topic. May be repeated for credit as topic changes. Prerequisite: SPAN 3315 with a grade of C or better.

**SPAN 4321. TOPICS IN PROFESSIONAL WRITING. 3 Hours.**

An integrated language approach to Professional Writing across disciplines and professions. Topics may include writing, editing, and publishing in various workplace environments and sectors such as the mass media, the internet, business, education, health, government, and the arts, among others. May be repeated for credit as topics vary. Prerequisite: SPAN 3315 with grade of B or better.

**SPAN 4322. TOPICS IN CREATIVE WRITING. 3 Hours.**

A creative writing course on topics that may include short story, poetry, novel, nouvelle, flash fiction, memoir, and non-fiction. May be repeated for credit as topics vary. Prerequisite: SPAN 3315 with grade of B or better.

**SPAN 4327. WOMEN IN HISPANIC LITERATURE. 3 Hours.**

Considers women as characters in and writers of Hispanic literature. Includes the analysis of themes, language, and how the writings of women often give voice to lesser known aspects of culture. Offered as SPAN 4327, MAS 4327, and GWSS 4327; credit will be granted only once. Prerequisite: SPAN 3315 with a grade of C or better.

**SPAN 4330. TOPICS IN SPANISH LINGUISTICS. 3 Hours.**

Topics may include: Spanish phonetics and phonology, morphology, syntax, semantics, lexicography, history of the Spanish language, Old Spanish, Spanish sociolinguistics, as well as the application of any theoretical approach to the study of the Spanish language, excluding the study of either peninsular or American Spanish dialectology. May be repeated for credit when content changes. Prerequisite: SPAN 3305 or SPAN 3314 with a grade of C or better.

**SPAN 4332. TOPICS IN SPANISH DIALECTOLOGY. 3 Hours.**

Topics may include: Modern peninsular Spanish dialectology, modern Spanish-American dialectology, Old Spanish dialectology, early American Spanish dialectology, as well as a detailed study of any one dialect or regional dialect of Spanish from either a synchronic or a diachronic perspective. Emphasis may be given to phonetics, phonology, morphology, syntax, semantics, or lexicon, as applied to the study of peninsular or American Spanish dialectology. May be repeated for credit when content changes. Prerequisite: SPAN 3305 or SPAN 3314 with a grade of C or better.



**SPAN 4334. CONTEMPORARY HISPANIC CULTURE. 3 Hours.**

An introduction to contemporary Spanish and/or Latin American culture, with special emphasis on globalization and current events affecting the Spanish-speaking world. Prerequisite: SPAN 3315 with a grade of C or better.

**SPAN 4335. BUSINESS SPANISH. 3 Hours.**

The study of business terminology and skills needed for writing business letters, conducting telephone conversations, engaging in commercial transactions, and understanding international procedures. Operational and strategic issues involved in interaction with Hispanic firms and markets; international trade; competitive, vendor-customer, and collaborative relations. Prerequisite: SPAN 3315 with a grade of C or better. Exclusively for International Business Spanish students, or students pursuing a Certificate in Spanish for the Professions.

**SPAN 4336. TOPICS IN SPANISH FOR THE PROFESSIONS. 3 Hours.**

Development of Spanish-language skills needed to work in a specific profession. Emphasis on reading and formal communication, including technical papers, letters, reports, proposals, and presentations. Topics may include Spanish for legal, medical, educational, or communications fields. May be repeated for credit when content changes. Prerequisite: SPAN 3315 with a grade of C or better.

**SPAN 4339. THE ACQUISITION OF SPANISH. 3 Hours.**

Topics, methods, and techniques specific to the teaching of the Spanish language. Prerequisite: SPAN 3305 or SPAN 3314 with a grade of C or better.

**SPAN 4341. BUSINESS AND LEGAL TRANSLATION. 3 Hours.**

An advanced course in translation with a focus on business and legal texts. Students deepen their knowledge of translation theory and are trained to build and consolidate their skills in specialized translation. May be taken concurrently with SPAN 4342. SPAN 4341 cannot be applied toward the B.A. in Spanish for Global Competence. Prerequisite: SPAN 2314 or SPAN 2315 with a grade of C or better, or Avant Spanish placement test score of 6.00+ (PLACE) or 7.00+ (STAMP).

**SPAN 4342. TRANSLATION IN HEALTHCARE SETTINGS. 3 Hours.**

An advanced course in translation with a focus on healthcare translation. Particular attention will be paid to healthcare terminology in English and Spanish, text types, and cultural elements. Students deepen their knowledge of translation theory and are trained to build and consolidate their skills in specialized translation. May be taken concurrently with SPAN 4341. SPAN 4342 cannot be applied toward the B.A. in Spanish for Global Competence. Prerequisite: SPAN 2314 or SPAN 2315 with a grade of C or better, or Avant Spanish placement test score of 6.00+ (PLACE) or 7.00+ (STAMP).

**SPAN 4343. INTERPRETING IN HEALTHCARE SETTINGS. 3 Hours.**

A study of different types of interpretation. Healthcare terminology in English and Spanish will be addressed with a special emphasis on the diverse roles of healthcare interpreters as well as various locations where they are needed, such as hospital clinics, doctors' offices, and hearings that deal with medical issues. Ethical standards of practice in healthcare interpreting will be examined. SPAN 4343 cannot be applied toward the B.A. in Spanish for Global Competence. Prerequisite: SPAN 2314 or SPAN 2315 with a grade of C or better, or Avant Spanish placement test score of 6.00+ (PLACE) or 7.00+ (STAMP).

**SPAN 4344. INTERPRETING IN LEGAL SETTINGS. 3 Hours.**

A study of different types of interpretation. Legal terminology in English and Spanish will be addressed with special emphasis on the diverse roles of legal interpreters as well as various locations where they are needed, such as courtrooms, lawyer's offices, and state, federal, or local law-enforcement facilities. Ethical standards of practice in legal interpreting will be examined. SPAN 4344 cannot be applied toward the B.A. in Spanish for Global Competence. Prerequisite: SPAN 2314 or SPAN 2315 with a grade of C or better, or Avant Spanish placement test score of 6.00+ (PLACE) or 7.00+ (STAMP).

**SPAN 4391. CONFERENCE COURSE. 3 Hours.**

Independent study in the preparation of a paper on a research topic; consultation with instructor on a regular basis. May be repeated for credit. Prerequisite: two 3000 level courses and permission of the instructor.

**SPAN 4392. SPANISH TRANSLATION AND INTERPRETING INTERNSHIP. 3 Hours.**

A combination of field-related experience in the business or service sector with an academic component. Coursework may include journal writing in Spanish, outside readings, and formal presentations. Prerequisite: Two Spanish 3000 level courses and permission of the instructor.

**SPAN 4393. SPANISH INTERNSHIP. 3 Hours.**

A combination of field-related experience in the business or service sector with an academic component. Coursework may include journal writing in Spanish, outside readings, and formal presentations. Prerequisite: Two SPAN 3000 level courses and permission of the instructor.

**SPAN 4394. HONORS THESIS / SENIOR PROJECT. 3 Hours.**

Required of all students in the University Honors College. During the senior year, the student must complete a thesis or a project under the direction of a faculty member in the major department. May not be repeated for credit. Prerequisite: two 3000 level courses and permission of the instructor.

**SPAN 5101. TEACHING PRACTICUM I. 1 Hour.**

Required of all teaching assistants in Spanish in their first semester. May not be counted toward a master's degree. Graded P/F/R.

**SPAN 5102. TEACHING PRACTICUM II. 1 Hour.**

Required of all teaching assistants in Spanish in their second semester. May not be counted toward a master's degree. Graded P/F/R.

**SPAN 5190. CONFERENCE COURSE IN SPANISH LANGUAGE AND LITERATURE. 1 Hour.**

Graded P/F/R.

**SPAN 5300. HISTORY OF THE SPANISH LANGUAGE. 3 Hours.**

Study in topics related to the development of the Spanish language, from its earliest forms to the present.

**SPAN 5302. SPANISH DIALECTOLOGY. 3 Hours.**

Phonological, grammatical, and lexical features of Spanish dialects worldwide.

**SPAN 5303. APPLIED SPANISH LINGUISTICS. 3 Hours.**

Pedagogy, pronunciation and orthography, morphology, syntax, semantics, and culture.

**SPAN 5310. TOPICS IN PENINSULAR SPANISH LITERATURE AND CULTURE TO THE EIGHTEENTH CENTURY. 3 Hours.**

Topics may include: Medieval Spanish literature and culture, Golden Age Spanish literature and culture, or any particular movement, genre, work or author prior to the eighteenth century. May be repeated for credit when content changes.

**SPAN 5311. TOPICS IN PENINSULAR SPANISH LITERATURE AND CULTURE, EIGHTEENTH CENTURY TO THE PRESENT. 3 Hours.**

Topics may include: Neoclassic peninsular Spanish literature and culture, peninsular Spanish literature and culture of the Romantic period, Realist or Naturalist Spanish literature and culture, peninsular Spanish literature and culture since 1900, as well as any particular movement, genre, work or author from the eighteenth century to the present. May be repeated for credit when content changes.

**SPAN 5313. TOPICS IN HISPANIC LITERATURE AND CULTURE. 3 Hours.**

Special studies in areas not ordinarily covered by regular course offerings. Different topics may be repeated for credit.

**SPAN 5314. TOPICS IN SPANISH-AMERICAN LITERATURE AND CULTURE TO MODERNISM. 3 Hours.**

Topics may include: Colonial Spanish-American literature and culture, pre-modern Spanish-American literature and culture, Spanish-American literature and culture of the Enlightenment, or any particular movement, genre, work or author prior to Modernism. May be repeated for credit when content changes.

**SPAN 5315. TOPICS IN CONTEMPORARY SPANISH-AMERICAN LITERATURE AND CULTURE, MODERNISM TO THE PRESENT. 3 Hours.**

Topics may include: Spanish-American literature and culture of Modernism, modern Spanish-American literature and culture, or any particular movement, genre, work or author from Modernism to the present. May be repeated for credit when content changes.

**SPAN 5317. U.S. LATINO LITERATURE AND CULTURE. 3 Hours.**

Readings of poetry, theater, and prose in relation to the specific socio-historical and political context of U.S. Latino life. Charts changing concepts of cultural identity and the evolution of cultural coding in texts written after 1960.

**SPAN 5318. MEXICAN LITERATURE AND CULTURE. 3 Hours.**

Readings in all Mexican literary genres from various critical perspectives. Particular attention given to the novel, poetry, and essay of the 20th Century and to interrelationships between text and culture.

**SPAN 5320. TOPICS IN SPANISH LINGUISTICS. 3 Hours.**

Special studies in linguistics not ordinarily covered by regular course offerings. May be repeated for credit when content changes.

**SPAN 5327. WOMEN IN HISPANIC LITERATURE. 3 Hours.**

Readings of literary texts by women writers from medieval Spain to contemporary Spanish America. Attention to recurrent motifs as well as to the literary expression of historical and cultural transformation.

**SPAN 5330. ADVANCED STUDIES IN SPANISH LINGUISTICS I. 3 Hours.**

Topics may include: sociolinguistics, bilingualism, modern Spanish dialectology, as well as a detailed study on any one dialect or regional dialect of contemporary Spanish. May be repeated for credit when content changes.

**SPAN 5332. ADVANCED STUDIES IN SPANISH LINGUISTICS II. 3 Hours.**

Topics may include: Old Spanish, Spanish philology, Spanish text linguistics, and Old Spanish dialectology, as well as a detailed study of any one dialect or regional dialect of Spanish. May be repeated for credit when content changes.

**SPAN 5366. SPANISH FOR SCHOOL ADMINISTRATORS AND TEACHERS. 3 Hours.**

Development of Spanish proficiency for teachers and administrators through an immersion approach. Emphasis on concepts and terminology related to education, program administration, community involvement and communication with Spanish-speaking parents. This course can be repeated.

**SPAN 5391. CONFERENCE COURSE IN SPANISH LINGUISTICS AND LITERATURE. 3 Hours.**

Graded R.

**SPAN 5393. GRADUATE SPANISH INTERNSHIP. 3 Hours.**

Graduate internship with the student performing duties within the field of Spanish. A combination of field-related experience at the graduate level with an academic component. Students are required to submit an approved academic project related to the work performed. May be repeated with approval of Graduate Advisor.

**SPAN 5398. THESIS. 3 Hours.**

**SPAN 5698. THESIS. 6 Hours.**

**SPAN 5998. THESIS. 9 Hours.**

## COURSES

**SPED 3301. CHARACTERISTICS OF INDIVIDUALS WITH DISABILITIES. 3 Hours.**

This course focuses on the characteristics of students with mild disabilities and their (a) related academic and social outcomes, and (b) implications for assessment and intervention. The course is specifically designed for students who seek certification in teaching children with mild disabilities, to include children who are defined by Federal and state regulations as experiencing learning disabilities (LD), intellectual disability (ID), emotional and/or behavioral disabilities (EBD), and attention deficit disorders/hyperactivity disorders (ADD/ADHD).

**SPED 3302. APPLIED BEHAVIOR ANALYSIS FOR TEACHERS. 3 Hours.**

This course is designed to present students with applied behavior analysis strategies and tactics to ensure they are able to make effective instructional decisions and to evaluate the results of those decisions. Procedures covered in class include those to accelerate, decelerate, and maintain student academic and social behavior. Application of learning theory, measurement procedures, and verification of functional relationships will be emphasized. Knowledge of current significant research in Applied Behavior Analysis will be facilitated through research readings.

**SPED 4301. STRATEGIES FOR TEACHING INDIVIDUALS WITH HIGH INCIDENCE DISABILITIES: READING AND WRITING. 3 Hours.**

This course is designed to prepare future special educators to plan and provide content area instruction to elementary and secondary students with mild disabilities in reading and writing. Course content will include information on assessment, curriculum and instruction, and the professional role as a teacher of students with mild disabilities.

**SPED 4302. COLLABORATIVE PRACTICES AND TRANSITION PLANNING IN SPECIAL EDUCATION. 3 Hours.**

The purpose of this course is to learn about the concepts, tools, and strategies considered essential for effective collaboration and teamwork. Methods of collaborating and consulting with other professionals in the field of education and family members of students with disabilities will be discussed. Transition planning and collaborative interagency issues related to transition will be examined. Context, process, and content of collaborative school consultation will be presented.

**SPED 4303. ADVANCED CONTENT AREA STRATEGIES FOR TEACHING INDIVIDUALS WITH DISABILITIES. 3 Hours.**

This course is designed to prepare future special educators to plan and provide content area instruction to elementary and secondary students with disabilities across the content areas. Course content will include information on assessment, curriculum and instruction, and the professional role as a teacher of students with disabilities.

**SPED 4304. ASSISTIVE TECHNOLOGY. 3 Hours.**

This course will address the use of technology in special education, including microcomputers, interactive video, auditory and visual enhancement, and other adaptive devices with individuals experiencing disabilities including learning disabilities, intellectual impairments, sensory and physical impairments. Current developments and research findings concerning rehabilitative, adaptive, and learning technologies applied to needs of individuals with learning, intellectual, physical, or sensory disabilities will also be addressed. Topics include selection and evaluation, instructional and administrative applications, and personal productivity tools.

**SPED 4307. SPECIAL EDUCATION LEGAL AND POLICY ISSUES. 3 Hours.**

This introductory course will discuss historical legal foundations of special education and the present legal and policy challenges facing the field. Course content will include information on the Individuals with Disabilities Education Act, the Americans with Disabilities Act, and Section 504 of the Vocational Rehabilitation Act. Students will also understand how important rules from the court system have interpreted laws governing special education and how current policies and issues could impact special education. At the undergraduate level, special focus will be given to applied aspects of the law (e.g., Individualized Education Plans; ARD meetings, etc.).

**SPED 4601. PRACTICUM IN SPECIAL EDUCATION. 6 Hours.**

This course is designed to provide practical opportunities for the pre-service candidate to develop skills in assessment and instruction of individuals with severe disabilities. In addition to providing direct services, an important component of the practicum is to collaborate with both classroom and school staff regarding all aspects of service provision. Finally, general professional protocol is emphasized in this course including dependability, attitude, and communication skills (both written and spoken).

**SPED 4687. CLINICAL TEACHING IN EC-6 AND SPECIAL EDUCATION. 6 Hours.**

Supervised and directed clinical teaching in student's targeted area of certification. The student will be assigned full time for the Independent School District calendar. Required seminars provide students with theory to integrate and apply during clinical teaching. Students will apply theory and research to practice through daily teaching and interaction with students, major assignments, and data analysis of practice. Prerequisite: Completion of program coursework, program approval.

**SPED 5301. CHARACTERISTICS OF INDIVIDUALS WITH DISABILITIES. 3 Hours.**

This introductory course focuses on the characteristics of students with mild disabilities and their (a) related academic and social outcomes, and (b) implications for assessment and intervention. The course is specifically designed for students who seek certification in teaching children with mild disabilities, to include children who are defined by Federal and state regulations as experiencing learning disabilities (LD), intellectual disability (ID), emotional and/or behavioral disabilities (EBD), and attention deficit disorders/hyperactivity disorders (ADD/ADHD). Graduate level students' understanding will be assessed and measured through additional readings and assignments designed to encourage deeper thinking regarding classroom level interventions for students with disabilities.

**SPED 5302. APPLIED BEHAVIOR ANALYSIS FOR TEACHERS. 3 Hours.**

This course is designed to present students with applied behavior analysis strategies and tactics to ensure they are able to make effective instructional decisions and to evaluate the results of those decisions. Procedures covered in class include those to accelerate, decelerate, and maintain student academic and social behavior. Application of learning theory, measurement procedures, and verification of functional relationships will be emphasized. Graduate level students' understanding will be assessed and measured through the direct application of concepts in the field and a written functional behavioral assessment inclusive of a behavior intervention plan.

**SPED 5303. COLLABORATIVE PRACTICES AND TRANSITION PLANNING IN SPECIAL EDUCATION. 3 Hours.**

This course focuses on the concepts, tools, and strategies considered essential for effective collaboration and teamwork. Methods of collaborating and consulting with other professionals in the field of education and family members of students with disabilities will be discussed. Transition planning and collaborative interagency issues related to transition will be examined. Graduate students will facilitate a mock ARD and transition planning meeting.

**SPED 5304. INSTRUCTIONAL STRATEGIES FOR STUDENTS WITH DISABILITIES. 3 Hours.**

This course is designed to prepare future special educators to plan and provide specialized instruction to elementary and secondary students with mild disabilities in reading, writing, mathematics, and across the content areas. Course content will include information on assessment, curriculum and instruction, and the professional role as a teacher of students with mild disabilities. Graduate students will demonstrate mastery of evidence-based practices for students with disabilities by teaching a lesson.

**SPED 5305. ADVANCED LEARNING DISABILITIES. 3 Hours.**

This course is designed to teach the definitions, characteristics, theories, and etiologies of students with specific learning disabilities. Students will analyze definitions of specific learning disabilities from the Individuals with Disabilities Education Act and professional learning disability organizations. Students will also analyze research describing the nature and characteristics of learning disabilities and how to best serve these students in an educational setting.

**SPED 5306. ASSISTIVE TECHNOLOGY. 3 Hours.**

This course will address the use of technology in special education, including microcomputers, interactive video, auditory and visual enhancement, and other adaptive devices with individuals experiencing disabilities including learning disabilities, intellectual impairments, sensory and physical impairments. Students will examine current developments and conduct research concerning rehabilitative, adaptive, and learning technologies applied to needs of individuals with disabilities.

**SPED 5307. SPECIAL EDUCATION LEGAL AND POLICY ISSUES. 3 Hours.**

This introductory course will discuss historical legal foundations of special education and the present legal and policy challenges facing the field. Course content will include information on the Individuals with Disabilities Education Act, the Americans with Disabilities Act, and Section 504 of the Vocational Rehabilitation Act. Students will also understand how important rules from the court system have interpreted laws governing special education and how current policies and issues could impact special education. At the undergraduate level, special focus will be given to applied aspects of the law (e.g., Individualized Education Plans; ARD meetings, etc.).

**SPED 5308. ADVANCED INTELLECTUAL DISABILITIES. 3 Hours.**

This course is designed to teach the definitions, characteristics, theories, and etiologies of students with intellectual disabilities. Students will analyze definitions of intellectual disabilities from the Individuals with Disabilities Education Act and professional intellectual disability organizations. Students will also analyze research describing the nature and characteristics of intellectual disabilities and how to best serve these students in an educational setting.

**SPED 5309. THE NEUROSCIENCE OF TYPICAL & ATYPICAL LANGUAGE DEVELOPMENT. 3 Hours.**

This course will examine the many levels of language including phonetics, phonology, semantics, syntax and pragmatics from both functional and neuroscientific perspectives. This will be closely tied to language acquisition and early language development. The focus on the pre-reading years will provide a solid basis for further study of literacy-related skills and overall learning. Sub-skills and precursors of reading will be examined from a neurological point of view and applied to researching reading difficulties as well as the teaching and learning in the classroom. Course offered as EDUC 5362 and SPED 5309; co-list credit will be granted only as one.

**SPED 5310. ADVANCED BEHAVIORAL DISORDERS. 3 Hours.**

This course will cover advanced principles, concepts, and practices related to educating students with Emotional/Behavioral Disorders and other IDEA disabilities categories with behaviorally related characteristics. Emphasis will be on school-based services, including advanced instructional and behavioral interventions for improving academic, social, and behavioral outcomes, as well as mental health and juvenile justice services.

**SPED 5311. CLASSROOM ASSESSMENT OF STUDENTS WITH DISABILITIES. 3 Hours.**

This course is designed to equip teachers with practical assessment strategies for students with a wide range of disabilities. Course content will include standardized norm-referenced assessments, curriculum-based assessment, curriculum-based measurement, and other progress monitoring strategies. Students will create various assessment tools and plans to collect meaningful instructional data from students with disabilities.

**SPED 5312. SPECIAL EDUCATION FIELD EXPERIENCE. 3 Hours.**

This course is designed to engage students in multiple field-based activities such as, direct observations, functional-behavior assessments, data-based instruction and decision making, and research as part of an independent field experience. At the conclusion of the field experience, students will be assessed on a written product and presentation (e.g., portfolio, research poster). Prerequisite: All other courses in program sequence; requires approval.

**SPED 5313. SINGLE SUBJECT RESEARCH. 3 Hours.**

This course is designed to provide students an introductory overview of single subject research methodology. Course content will include quality indicators of single subject research that can lead to identifying effective interventions. Students will design and implement a single-subject experiment.

**SPED 5314. CURRENT TOPICS IN SPECIAL EDUCATION AND RESEARCH. 3 Hours.**

This course is designed to discuss current events in special education with a focus on both practice and research. Students will think critically about intended and unintended consequences of various policy and practice issues. Specific topics for the course will be influenced by current policy concerns, problems of practice, and student interests.

**SPED 5315. MULTI-TIERED SYSTEM OF SUPPORT. 3 Hours.**

This course will focus on multi-tiered system of support frameworks for integrating instruction, evidence-based interventions, and assessments to meet the academic and behavior needs of all students. Specific frameworks such as, response to intervention and positive behavioral interventions and supports will be emphasized as systems for prevention of disabilities and identification of students with learning disabilities and emotional and behavioral disorders.

**SPED 5316. ADVANCED APPLIED BEHAVIORAL ANALYSIS. 3 Hours.**

This course is designed to present graduate students in special education with applied behavior analysis strategies and tactics to ensure they are able to make effective instructional decisions and to evaluate the results of those decisions in accordance with the master's degree program and initial and advanced licensure standards. This course is intended for students with foundational knowledge of Applied Behavior Analysis (ABA). Students will be required to plan, implement, and evaluate an applied behavior analysis project with a student in an educational setting.

**SPED 5317. AUTISM SPECTRUM DISORDERS. 3 Hours.**

This course focuses on the characteristics and issues encountered by individuals who experience autism spectrum disorders. Students will analyze definitions of ASD provided by IDEA, DSM-V, and professional organizations. Emphasis will be on characteristics, school-based and post-secondary supports, Applied Behavior Analysis (ABA), and assistive technology.

**SPED 5318. MEDICAL AND PHYSICAL MANAGEMENT OF STUDENTS WITH MULTIPLE DISABILITIES. 3 Hours.**

This course is designed to provide students with an examination of how the medical and physical needs of students affect a teacher's design of instruction. The medical and physical aspects of a wide variety of orthopedic, musculoskeletal and sensory disorders, as well as the educational models of intervention and service delivery for individuals with multiple disabilities will also be discussed.

**SPED 5319. METHODS OF TEACHING STUDENTS WITH MODERATE/SEVERE DISABILITIES AND AUTISM. 3 Hours.**

This course is designed to prepare future special educators to plan and provide specialized instruction to elementary and secondary students with moderate/severe disabilities and Autism Spectrum Disorders. Course content will include information on assessment and evidence-based instructional practices for academic, functional, adaptive, and behavioral skills. Students will demonstrate mastery of evidence-based practices for students with moderate/severe disabilities and Autism Spectrum Disorders and receive feedback on the implementation of these practices.

**SPED 5320. CHARACTERISTICS OF STUDENTS WITH SEVERE DISABILITIES. 3 Hours.**

This course focuses on the characteristics and issues encountered by individuals who experience severe and profound levels of intellectual disabilities. Characteristics addressed include learning, behavioral, social-emotional, and communicative abilities. Special emphasis is placed on implementing evidence-based practices and empirically supported treatments.

**SPED 5601. CLINICAL TEACHING. 6 Hours.**

Supervised and directed clinical teaching in student's targeted area of certification. The student will be assigned full time for the Independent School District calendar. Required seminars provide students with theory to integrate and apply during clinical teaching. Students will apply theory and research to practice through daily teaching and interaction with students, major assignments, and data analysis of practice. Prerequisite: Must complete all other courses in sequence first; permission required.

## COURSES

**STATS 1308. ELEMENTARY STATISTICAL ANALYSIS. 3 Hours.**

Topics may include collection, analysis, presentation, and interpretation of data. Analysis includes descriptive statistics, probability, relationships between variables and graphs, elementary statistical models, hypothesis testing, inference, estimation, correlation, regression and confidence intervals. The use of mathematical software and calculators is required. See course syllabus for details.

**STATS 3302. MULTIVARIATE STATISTICAL METHODS. 3 Hours.**

Topics in multivariate data analysis with applications in various areas of interest, including multiple regression, analysis of experimental designs, covariate adjustment, non-linear regression and the use of standard multivariate statistical packages. Offered as MATH 3302 and STATS 3302; credit will be granted in only one department. Prerequisite: C or better in MATH 3313 or STATS 3313 or MATH 3316 or STATS 3316 or MATH 3351 or BIOL 3351 or consent of the instructor.

**STATS 3313. INTRODUCTION TO PROBABILITY. 3 Hours.**

Basic concepts in probability, random variables, probability distributions, functions of random variables, moment generating functions, central limit theorem and its role in statistics, joint probability functions and joint probability density functions, joint cumulative distribution functions, conditional and marginal probability distributions, covariance and correlation coefficients, transformation and order statistics. Offered as MATH 3313 and STATS 3313; credit will be granted in only one department. Prerequisite: C or better in MATH 2326, or student group.



**STATS 3316. STATISTICAL INFERENCE. 3 Hours.**

A comprehensive study of basic data analysis, focused on reasoning process of statistical investigations from asking question and collecting data to analyzing data and drawing inferences. Topics include exploratory data analysis, sampling, sampling distribution, estimation, hypothesis tests, regression, and ANOVA, with an emphasis on applications of these techniques using statistical software. Offered as MATH 3316 and STATS 3316; credit will be granted in only one department. Prerequisite: C or better in 6 hours from the following: MATH 1302, MATH 1308, MATH 1322, MATH 1323, MATH 1330, MATH 1331, MATH 1332, MATH 1402, MATH 1421, MATH 1426, MATH 2425, MATH 2326, MATH 3300, MATH 3307, MATH 3314, MATH 3319, or MATH 3330; HONR-SC 1426, HONR-SC 2425, or student group.

**STATS 4311. STOCHASTIC MODELS AND SIMULATION. 3 Hours.**

A study of processes, whose outcomes are governed by chance, through a combination of lectures and computer lab sessions. Experiments include random number generation, coin tossing and other games of chance, random walks, Markov Chains, Poisson processes, birth-death processes, branching processes, and Brownian Motion. A foundation for modeling random phenomena in sciences, engineering and business. Prerequisite: C or better in MATH 2326 and knowledge of basic probability (MATH 3313/STATS 3313 or MATH 3351/BIOL 3351 or equivalent), or consent of instructor, or student group.

**STATS 4313. MATHEMATICAL STATISTICS. 3 Hours.**

A continuation of MATH 3313. Random sampling and sampling distributions, estimation of unknown parameters and main properties of estimators, confidence intervals for unknown parameters, testing of hypotheses. Prerequisite: C or better in MATH 3313 or STATS 3313.

**STATS 5305. STATISTICAL METHODS. 3 Hours.**

Topics include descriptive statistics, numeracy, and report writing; basic principles of experimental design and analysis; regression analysis; data analysis using the SAS package. Prerequisite: consent of the instructor.

**STATS 5312. MATHEMATICAL STATISTICS I. 3 Hours.**

Random variables and their expectations, some special distributions, moment generating functions, transformations of bivariate random variables, sampling distribution of statistics, Central Limit Theorem, confidence intervals, maximum likelihood estimation, introduction to hypothesis testing, maximum likelihood tests. Prerequisite: MATH 3335 or consent of instructor.

**STATS 5313. MATHEMATICAL STATISTICS II. 3 Hours.**

Multivariate distributions, consistency and limiting distributions, Rao-Cramer lower bound and efficiency, sufficiency and completeness, most powerful tests, uniformly most powerful tests, likelihood ratio test, the sequential probability ratio test, minimax and classification procedures. Prerequisite: MATH 5312/STATS 5312.

**STATS 5314. EXPERIMENTAL DESIGN. 3 Hours.**

This course covers the classical theory and methods of experimental design, including randomization, blocking, one-way and factorial treatment structures, confounding, statistical models, analysis of variance tables and multiple comparisons procedures. Prerequisite: MATH 5305/STATS 5305 or MATH 5355/STATS 5355 or permission of instructor.

**STATS 5353. APPLIED LINEAR MODELS. 3 Hours.**

The course covers, at an operational level, three topics: 1) the univariate linear model, including a self-contained review of the relevant distribution theory, basic inference methods, several parameterizations for experimental design and covariate-adjustment models and applications, and power calculation; 2) the multivariate linear model, including basic inference (e.g. the four forms of test criteria and simultaneous methods), applications to repeated measures experiments and power calculation; and 3) the univariate mixed model, including a discussion of the likelihood function and its maximization, approximate likelihood inference, and applications to complex experimental designs, missing data, unbalanced data, time series observations, variance component estimation, random effects estimation, power calculation and a comparison of the mixed model's capabilities relative to those of the classical multivariate model. Knowledge of the SAS package is required. Prerequisite: MATH 5358/STATS 5358 (Regression Analysis) or equivalent.

**STATS 5354. CATEGORICAL DATA ANALYSIS. 3 Hours.**

This course covers classical methods for analyzing categorical data from a variety of response/factor structures (univariate or multivariate responses, with or without multivariate factors), based on several different statistical rationales (weighted least squares, maximum likelihood and randomization-based). Included are logistic regression, multiple logit analysis, mean scores analysis, observer agreement analysis, association measures, methods for complex experimental designs with categorical responses and Poisson regression. The classical log-linear model for the association structure of multivariate responses is briefly reviewed. Randomization-based inference (e.g. Mantel-Haenzel) is discussed as well. The necessary distribution theory (multinomial, asymptotics of weighted least squares and maximum likelihood) are discussed at an operational level. Knowledge of the SAS package is required. Prerequisite: MATH 5358, or MATH 5305, or IE 5318 or by consent of instructor.

**STATS 5355. STATISTICAL THEORY FOR RESEARCH WORKERS. 3 Hours.**

Designed for graduate students not majoring in mathematics. Topics include basic probability theory, distributions of random variables, point estimation, interval estimation, testing hypotheses, regression, and an introduction to analysis of variance. Graduate credit not given to math majors. Prerequisite: calculus MATH 1426/MATH 2425/MATH 2326 or permission of instructor.

**STATS 5356. APPLIED MULTIVARIATE STATISTICAL ANALYSIS. 3 Hours.**

Statistical analysis for data collected in several variables, topics including sampling from multivariate normal distribution, Hotelling's  $T^2$ , multivariate analysis of variance, discriminant analysis, principal components, and factor analysis. Prerequisite: MATH 5312/STATS 5312 or consent of instructor.

**STATS 5357. SAMPLE SURVEYS. 3 Hours.**

A comprehensive account of sampling theory and methods, illustrations to show methodology and practice, simple random sampling, stratified random sample, ratio estimates, regression estimates, systematic sampling, cluster sampling, and nonsampling errors. Prerequisite: MATH 5312/STATS 5312 or consent of instructor.

**STATS 5358. REGRESSION ANALYSIS. 3 Hours.**

A comprehensive course including multiple linear regression, non-linear regression and logistic regression. Emphasis is on modeling, inference, diagnostics and application to real data sets. The course begins by developing a toolbox of methods via a sequence of guided homework assignments. It culminates with projects based on consulting-level data analysis problems involving stratification, covariate adjustment and messy data sets. Some knowledge of the SAS package is required. Prerequisites: MATH 5312/STATS 5312 or MATH 5305/STATS 5305 with a B or better or permission of the instructor.

**STATS 5359. SURVIVAL ANALYSIS. 3 Hours.**

This course covers analysis of lifetime data with applications in engineering and biomedical research. Topics may include survival function, hazard function, cumulative hazard function, parametric distributions to model lifetime data, censoring, Kaplan-Meier estimator, testing for survival times for two or more groups, Cox proportional hazards model (both fixed and time dependent covariate), parametric regression models, regression diagnostics, accelerated failure time models, sample size determination, extensive use of R statistical software. Prerequisites: MATH 5305/STATS 5305 or MATH 5312/STATS 5312 or permission of instructor.

**STATS 6353. GENERALIZED LINEAR MODELS. 3 Hours.**

This course covers modern methods for analyzing Bernoulli, multinomial and count data. It begins with a development of generalized linear model theory, including the exponential family, link function and maximum likelihood. Second is a discussion of the case of models for independent observations. Next is a discussion of models for repeated measures, based on quasi-likelihood methods. These include models (such as Markov chains) for categorical time series. Next is a treatment of models with random effects. Finally is a discussion of methods for handling missing data. Knowledge of the SAS package is required. Prerequisites: MATH 5358/STATS 5358 (Regression Analysis) and preferably MATH 5313/STATS 5313. (Students without 5313 can still succeed but must deal with the slightly higher mathematical level of this course.).

**STATS 6356. TIME SERIES ANALYSIS. 3 Hours.**

This course covers classical methods of time series analysis, for both the time and frequency domains. For covariance stationary series, these include ARIMA modeling and spectral analysis. For nonstationary series, they include methods for detrending and filtering. Also included is a treatment of multivariate series, as well as a discussion of the Kalman filter state-space model. Knowledge of the SAS package is required. Prerequisites: MATH 5358/STATS 5358 (Regression Analysis) and MATH 5313/STATS 5313.

**STATS 6357. NONPARAMETRIC STATISTICS. 3 Hours.**

This is a survey of classical nonparametric methods for inference in standard observational settings (one-sample, two-sample, k-samples and the univariate linear model), and includes a development of U-statistics, rank statistics and their asymptotic distribution theory. The mathematical level is fairly high. Prerequisite: MATH 5313/STATS 5313.

**STATS 6390. BAYESIAN DATA ANALYSIS. 3 Hours.**

Introduces the Bayesian framework to statistical inference and describes effective approaches for Bayesian modeling and computation. Prerequisite: Mathematical Statistic; statistical computing.

## COURSES

**SUST 5303. SUSTAINABILITY ISSUES SEMINAR III. 3 Hours.**

Governmental and regulatory issues as they relate to sustainability.

## COURSES

**SUT 1331. PROFESSIONALISM IN SUBSTANCE USE TREATMENT. 3 Hours.**

Equips students with skills and resources to prepare for academic and professional success in a substance use treatment career. Empowers diverse students to identify their individual needs, reflect on opportunities for growth, determine what resources and self-care strategies are appropriate, recognize the faculty role in their development, and formulate a plan for an actively engaged and enriched experience from campus to career. Each class section has a Peer Academic Leader (PAL), who are students who have already taken the course and assist as a discussion leader for the class under the supervision of the instructor. This course is reserved exclusively for students planning to with a Bachelor of Science in Substance Use & Treatment (e.g., SUT-Intended status) who are freshmen; this will be taken concurrently with UNIV 1131. This course or SUT 3300 is required for admission to the BSSUT major.

**SUT 1350. SPECIAL ISSUES IN SUBSTANCE USE TREATMENT. 3 Hours.**

Relevant substance use treatment topics generated and explored in depth according to student and professional needs. The topic will be determined prior to registration.

**SUT 2350. SPECIAL ISSUES IN SUBSTANCE USE TREATMENT. 3 Hours.**

Relevant substance use treatment topics generated and explored in depth according to student and professional needs. The topic will be determined prior to registration.

**SUT 3300. STUDENT SUCCESS & PROFESSIONALISM IN SUBSTANCE USE TREATMENT. 3 Hours.**

Equips students with skills and resources to prepare for academic and professional success in a substance use treatment career. Empowers diverse students to identify their individual needs, reflect on opportunities for growth, determine what resources and self-care strategies are appropriate, recognize the faculty role in their development, and formulate a plan for an actively engaged and enriched experience from campus to career. Each class section has a Peer Academic Leader (PAL), who are students who have already taken the course and assist as a discussion leader for the class under the supervision of the instructor. This course is reserved exclusively for students planning to major with a Bachelor of Science in Substance Use & Treatment (e.g., SUT-Intended status) who have changed majors or have transferred from another institution; this fulfills the university requirement for UNIV 1131. This course or SUT 1231 is required for admission to the BSSUT major.

**SUT 3303. SOCIAL WELFARE POLICY AND SERVICES. 3 Hours.**

Examines how social goals are met by social welfare institutions. Conceptual schemes are developed for analyzing the structure of social welfare institutions and evaluating social welfare sub-systems. The social services profession is also examined in the context of the evolution and function of the contemporary American social welfare system. This course is required for Social Work Field Instruction and Seminar II (SOCW 4952).

**SUT 3305. SUT WORK PRACTICE I INTERVIEWING SKILLS. 3 Hours.**

This course is designed to promote a critical evaluation of the history and philosophy of SUT practice skills and its value base as well as teach basic practice concepts including cultural humility, interviewing, communication, and problem-solving to use with diverse individuals, families, and groups across practice settings. Students will be able to make connections between substance abuse's historical roots and present-day intervention practices and demonstrate understanding of what they bring to practice as individuals and how that may support or hinder their work with diverse individuals, families, and groups. This course is required for admission to the Bachelor of Science in Substance Use Treatment (BSSUT) program.

**SUT 3308. SOCIAL WORK RESEARCH METHODS. 3 Hours.**

This course is designed to provide students with the fundamental skills to understand, use, and conduct research to advance the knowledge base of the social work profession and assess the effectiveness of social work interventions in generalist social work practice. The course addresses elements of the research process, quantitative and qualitative methods, research ethics, and approaches to data analysis. Particular attention will be given to the role of research with populations-at-risk, social and economic justice, and cultural diversity. Prerequisite: SUT 1231 or SOCW 1231, or SOCW 3300 or SUT 3300, SOCW 3305, SOCW 3307, and MATH 1308 or SOCW 2325 or other equivalent statistics course approved by the Director of Undergraduate Programs.

**SUT 3309. SUT PRACTIC II. 3 Hours.**

Theories and methodologies of social service assessment, case management, and other generalist intervention at the individual, family, and group levels in diverse settings through the lens of intersectionality of race, gender, sexuality, age educational level and other aspects of identity.

**SUT 3315. INTRODUCTION TO SUBSTANCE USE DISORDERS. 3 Hours.**

This is an entry-level course that provides foundation-level social work students with the fundamental concepts of Substance Use Disorders (SUD) and the addictive process. Students will examine the prevalence and characteristics of substance use disorders and the impact of such disorders on the individual, family, and the community. Theories of addiction and application of these theories will be examined. Students will develop conceptual knowledge and self-awareness concerning the etiology of addiction, assessment strategies, and wellness strategies for facilitating optimal development and preventing SUD. The course will cover the prevalence of SUD varies among ethnic and cultural groups, between men and women, across the life span, and through different socio-economic levels. This course is taught as SOCW 3315 and SUT 3315. Credit will be granted only once.

**SUT 3318. SCREENING, ASSESSMENT, & ENGAGEMENT. 3 Hours.**

Introduces screening and diagnostic instruments and techniques appropriate for determining whether a substance use disorder might exist. Explores the therapeutic alliance and practice engagement techniques taking into account intersections of race, gender, sexuality, age, educational level, and other aspects of identity. Students learn to assess suicide risk and a client's readiness for change. Students learn to diagnose substance use disorders and recognize intoxication, withdrawal, substance, and medication induced disorders. Offered as SUT 3318 and SOCW 3318. Credit will be granted only once. Prerequisite: Prerequisite OR Corequisite: SUT 3315 or SOCW 3315.

**SUT 3319. TREATMENT PLANNING, COLLABORATION & REFERRAL. 3 Hours.**

This course addresses the clinical application of the biopsychosocial assessment in the development of a treatment plan. Potential treatment issues will be identified and a client-specific problem list will be developed. Individualized treatment goals will be established in collaboration with diverse clients. Client objectives and clinical interventions will also be developed. This course explores dynamics of the therapeutic alliance, and clinician-client collaboration within the context of a strengths and empowerment-based perspective. The student will gain insight into and an appreciation of collaboration, consultation, and referral throughout the continuum of care. Offered as SUT 3319 and SOCW 3319. Credit will be granted only once. Prerequisite: SOCW 3318 or SUT 3318.

**SUT 3321. SUBSTANCE USE TREATMENT. 3 Hours.**

This course is the culmination of the fundamentals of substance use disorders, treatment planning, collaboration and referral, and substance use treatment. Students will learn and acquire the special skills necessary to assist individuals, families, and groups through the sequela of substance use and addiction. Focus on cognitive-behavioral therapy, motivational interviewing, 12-step programs, nutrition and exercise, meditation, and other alternative treatment options. Students will study treatment modalities that consider the social, cultural, and economic influences that shape the client's world view and substance use experience. Offered as SUT 3321 and SOCW 3321. Credit will be granted only once. Prerequisite: Prerequisite or corequisite: SUT 3319 or SOCW 3319.

**SUT 3322. PROFESSIONAL AND ETHICAL RESPONSIBILITY. 3 Hours.**

This course focuses on the importance of the ethical standards and professionalism in substance use treatment. Students will learn to apply the ethical standards required for careers in substance use treatment. Prerequisite: SUT 3321.

**SUT 3350. SPECIAL ISSUES IN SUT. 3 Hours.**

Relevant social work topics generated and explored in depth according to student and professional needs. The topic will be determined prior to registration. Prerequisite: Permission of the Director.

**SUT 4320. SOCIAL WORK & ADDICTIVE BEHAVIOR. 3 Hours.**

In this course students will explore substance use disorder issues at various levels of practice including direct practice and macro issues as relevant to addiction and the brain. Students will explore concepts about pharmacology and neuropsychology as it relates to substance use disorders and the physiological effect of alcohol and other drugs (AODs) on individuals. Students will learn how to apply diagnostic tools and counseling theories for intervention at various levels of care.

**SUT 4344. HEALTH INSURANCE AND ACCESS TO CARE. 3 Hours.**

Explores the history and underlying philosophy of managed care in health and social services, reviews interdisciplinary approaches and principles for understanding and critiquing health care systems, and covers current trends and practice issues. Assesses the potential for conflict between social work values and managed care systems. Builds skills for advancing health equity through administrative roles in managed care settings. This is offered at the MSW level as SOCW 5344. Students who receive credit for this course in the undergraduate program may not repeat the course at the Master's level.

**SUT 4350. SPECIAL ISSUES IN SUBSTANCE USE TREATMENT. 3 Hours.**

Relevant substance use treatment topics generated and explored in depth according to student and professional needs. The topic will be determined prior to registration.

**SUT 4451. SUBSTANCE USE TREATMENT FIELD SEMINAR I. 4 Hours.**

Students will spend three hours a week in a seminar course to reflect and integrate substance use treatment knowledge, theory, and skills learned over the course of the program that they are applying in their field placement. Students will discuss and reflect on their SUT practice experiences, how the Code of Ethics is applied at their agencies, what evidence-based best practices are utilized at their agencies, and how the planned change process is implemented at their agencies with their fellow students and Field Liaisons. For additional information and requirements, see the BSWB/ BSSUT Manual and Field website. Prerequisite: SOCW 3301, PSYC 3318, ECON 2337, SUT 3318, PSYC 3303, SOCW 3308, SUT 3319, SUT 3321, SUT 3322, SOCW 4344 and three General Electives.

**SUT 4452. SUBSTANCE USE TREATMENT FIELD SEMINAR II. 4 Hours.**

Students will spend three hours a week in a seminar course to reflect and integrate substance use treatment knowledge, theory, and skills learned over the course of the program that they are applying in their field placement. Students will discuss and reflect on their SUT practice experiences, how the Code of Ethics is applied at their agencies, what evidence-based best practices are utilized at their agencies, and how the planned change process is implemented at their agencies with their fellow students and Field Liaisons. For additional information and requirements, see the BSWB/ BSSUT Manual and Field website. Prerequisite: SOCW 3301, PSYC 3318, ECON 2337, SUT 3318, PSYC 3303, SOCW 3308, SUT 3319, SUT 3321, SUT 3322, SOCW 4344 and three General Electives. BSSUT students only.

**SUT 4455. SUBSTANCE USE TREATMENT FIELD SEMINAR BLOCK PART 1. 4 Hours.**

Students will spend three hours a week in a seminar course to reflect and integrate substance use treatment knowledge, theory, and skills learned over the course of the program that they are applying in their field placement. Students will discuss and reflect on their SUT practice experiences, how the Code of Ethics is applied at their agencies, what evidence-based best practices are utilized at their agencies, and how the planned change process is implemented at their agencies with their fellow students and Field Liaisons. For additional information and requirements, see the BSWB/ BSSUT Manual and Field website. Prerequisite: SOCW 3301, PSYC 3318, ECON 2337, SUT 3318, PSYC 3303, SOCW 3308, SUT 3319, SUT 3321, SUT 3322, SOCW 4344 and three General Electives.

**SUT 4456. SUBSTANCE USE TREATMENT FIELD SEMINAR BLOCK PART 2. 4 Hours.**

Students will spend three hours a week in a seminar course to reflect and integrate substance use treatment knowledge, theory, and skills learned over the course of the program that they are applying in their field placement. Students will discuss and reflect on their SUT practice experiences, how the Code of Ethics is applied at their agencies, what evidence-based best practices are utilized at their agencies, and how the planned change process is implemented at their agencies with their fellow students and Field Liaisons. For additional information and requirements, see the BSWB/ BSSUT Manual and Field website. Prerequisite: SOCW 3301, PSYC 3318, ECON 2337, SUT 3318, PSYC 3303, SOCW 3308, SUT 3319, SUT 3321, SUT 3322, SOCW 4344 and three General Electives.

**SUT 4551. SUBSTANCE USE TREATMENT FIELD INSTRUCTION I. 5 Hours.**

Students will complete a minimum of 240 clock hours with an agency that specializes in treatment of substance use disorders and/or co-occurring mental health and substance use disorders. Students will integrate the applicable treatment modalities, theories, and concepts learned in the classroom into professional practice. Students will follow the Professional Ethics and apply an anti-oppression lens while in their field placements. For additional information and requirements, see the BSWB/BSSUT Field Manual. Prerequisite: SOCW 3301, PSYC 3318, ECON 2337, SUT 3318, PSYC 3303, SOCW 3308, SUT 3319, SUT 3321, SUT 3322, SOCW 4344 and three General Electives.

**SUT 4552. SUBSTANCE USE TREATMENT FIELD INSTRUCTION II. 5 Hours.**

Students will complete a minimum of 240 clock hours with an agency that specializes in treatment of substance use disorders and/or co-occurring mental health and substance use disorders. . Students will integrate the applicable treatment modalities, theories, and concepts learned in the classroom into professional practice. Students will follow the Professional Ethics and apply an anti-oppression lens while in their field placements. Students will also spend an additional 2 hours weekly in the classroom. For additional information and requirements, see the BSWB/BSSUT Field Manual. BSSUT students only. Prerequisite: SOCW 3301, PSYC 3318, ECON 2337, SUT 3318, PSYC 3303, SOCW 3308, SUT 3319, SUT 3321, SUT 3322, SOCW 4344 and three General Electives.

**SUT 4555. SUBSTANCE USE TREATMENT FIELD INSTRUCTIONBLOCK PART 1. 5 Hours.**

Students will complete a minimum of 480 clock hours with an agency that specializes in treatment of substance use disorders and/or co-occurring mental health and substance use disorders. Students will integrate the applicable treatment modalities, theories, and concepts learned in the classroom into professional practice. Students will follow Professional Ethics and apply an anti-oppression lens while in their field placements. Prerequisite: SOCW 3301, PSYC 3318, ECON 2337, SUT 3318, PSYC 3303, SOCW 3308, SUT 3319, SUT 3321, SUT 3322, SOCW 4344 and three General Electives.

**SUT 4556. SUBSTANCE USE TREATMENT FIELD INSTRUCTION BLOCK PART 2. 5 Hours.**

Students will complete a minimum of 480 clock hours with an agency that specializes in treatment of substance use disorders and/or co-occurring mental health and substance use disorders. Students will integrate the applicable treatment modalities, theories, and concepts learned in the classroom into professional practice. Students will follow Professional Ethics and apply an anti-oppression lens while in their field placements. Prerequisite: SOCW 3301, PSYC 3318, ECON 2337, SUT 3318, PSYC 3303, SOCW 3308, SUT 3319, SUT 3321, SUT 3322, SOCW 4344 and three General Electives.

**COURSES****THEA 0010. BFA STUDIO. 0 Hours.**

BFA course offering master classes, guest artists, and lectures related to concentration specializations along with concentration-specific practice. Students enroll concurrently with foundational concentration course in BFA concentrations. Prerequisite: Permission of advisor.

**THEA 0011. BA THEATRE STUDIO. 0 Hours.**

Theatre BA course offering master classes, guest artists, and lectures related to concentration specializations along with concentration-specific practice. Students enroll concurrently with foundational concentration courses in the Theatre BA concentration. Prerequisite: Permission of Advisor.

**THEA 0181. THEATRE PRACTICUM. 1 Hour. (TCCN = DRAM 1120)**

Open to all students interested in participating in dramatic productions on-stage, backstage, or front of house. Considers aspects of play production which may include scenery construction, publicity, costumes, and lighting. Practicum students participate in auditions and are assigned to production crews. May be repeated for credit. All Theatre Arts majors register for THEA 0181 each semester. Prerequisite: Permission of advisor.

**THEA 0182. THEATRE ARTS TEACHING LAB. 1 Hour.**

The Theatre Arts Teaching Lab (TATL) is open to students interested in participating in theatre education and educational theatrical production. TATL is an experiential laboratory and training ground for future theatre teachers. Through immersion and training in creative and collaborative educational theatre-making processes, TATL students will be encouraged to experiment, collaborate, and adventure as they lead the production of several laboratory performances each semester; all the while honing skills that will foster their ability to become successful theatre teachers, directors, administrators, and leaders, as well as UIL directors, managers, and adjudicators in the classroom.

**THEA 1101. THEATRE ARTS SYMPOSIUM. 1 Hour.**

An orientation to academic and professional theatre skills and resources. Prerequisite: Permission of advisor.

**THEA 1140. PRIVATE LESSONS IN VOICE-MUSICAL THEATRE. 1 Hour.**

This sequence of courses is required of students who are pursuing the BFA in Musical Theatre. These courses may not be used as substitute voice lessons for those students pursuing a Bachelor of Music degree. Offered as MUSI 1140 and THEA 1140; credit will be granted only in one department. Prerequisite: Open to Musical Theatre majors only or by permission of the Department Chair.

**THEA 1141. PRIVATE LESSONS IN VOICE-MUSICAL THEATRE. 1 Hour.**

This sequence of courses is required of students who are pursuing the BFA in Musical Theatre. These courses may not be used as substitute voice lessons for those students pursuing a Bachelor of Music degree. Offered as MUSI 1141 and THEA 1141; credit will be granted only in one department. Prerequisite: C or better in MUSI 1140 or THEA 1140. Open to Musical Theatre majors only or by permission of the Department Chair.

**THEA 1302. VOICE AND SPEECH FUNDAMENTALS. 3 Hours.**

Introduction to the fundamentals of vocal production and communication for the stage. Emphasis on relaxation, breathing techniques, the creation of vocal sound, and the interconnection of voice and body for stage performance. Prerequisite: Permission of advisor.

**THEA 1303. FUNDAMENTALS OF PRESENTATION. 3 Hours.**

The fundamentals of vocal performance as it relates to effective oral communication. Students develop ideas for the purpose of communication and learn effective techniques for clarity of expression, ideas, and message while considering the effect on an audience. Theatrical communication techniques are one of several skill sets taught. Oral, aural, written, and visual literacy are all explored, with intense focus on oral presentation. This course satisfies the University of Texas at Arlington core curriculum requirement in Communication.

**THEA 1304. STAGECRAFT I. 3 Hours. (TCCN = DRAM 1330)**

An introduction to all areas of theatre craft, technology, and production. The development and application of technical skills, production organization, and an orientation to production facilities, equipment, and materials. Prerequisite: Permission of Advisor.

**THEA 1305. INTRODUCTION TO THEATRICAL DESIGN. 3 Hours.**

Fundamentals of design elements, theory and practice as applied to costume, scenic, properties, lighting, and sound design. Prerequisite: Permission of advisor.

**THEA 1307. ACTING: FUNDAMENTALS. 3 Hours. (TCCN = DRAM 1351)**

Study and exercise in fundamentals of the actor's craft utilizing the Stanislavsky Method. Emphasis on the development of basic acting techniques including characterization, objectives, beats, action, and script analysis. Performance requirements include improvisation and monologues. Attendance at productions outside of the classroom may be required. Prerequisite: Permission of advisor.



**THEA 1310. MUSICAL THEATRE MUSICIANSHIP I. 3 Hours.**

An introduction to music theory, sight-singing, and keyboard skills. This course is tailored to the BFA in Musical Theatre concentration and uses material from the American musical theater canon. Prerequisite: Only Musical Theatre majors may enroll, and permission of advisor.

**THEA 1315. THEATRICAL MAKEUP. 3 Hours.**

Types, styles, and techniques of make-up application for the stage. Prerequisite: Permission of advisor.

**THEA 1342. THEATRE AND FILM APPRECIATION. 3 Hours. (TCCN = DRAM 2366)**

Develops awareness of and appreciation for dramatic art as reflected in theatre and film. Designed to increase the student's enjoyment and knowledge of drama and its historical, social and cultural contexts. Students may be required to attend plays. Theatre Arts BFA and BA majors and minors may not use this course in place of THEA 1343. This course satisfies the University of Texas at Arlington core curriculum requirement in Creative Arts.

**THEA 1343. INTRODUCTION TO THEATRE. 3 Hours. (TCCN = DRAM 1310)**

Acquaints the student with major phases of theatrical activity and production research. Considers the duties and contributions of director, actor, scene designer, costumer, and others involved in play production. Students may be required to attend and review productions. This course satisfies the University of Texas at Arlington core curriculum requirement in Creative Arts.

**THEA 2140. PRIVATE LESSONS IN VOICE-MUSICAL THEATRE. 1 Hour.**

This sequence of courses is required of students who are pursuing the BFA in Musical Theatre. These courses may not be used as substitute voice lessons for those students pursuing a Bachelor of Music degree. Offered as MUSI 2140 and THEA 2140; credit will be granted only in one department. Prerequisite: C or better in MUSI 1141 or THEA 1141. Open to Musical Theatre majors only or by permission of the Department Chair.

**THEA 2141. PRIVATE LESSONS IN VOICE-MUSICAL THEATRE. 1 Hour.**

This sequence of courses is required of students who are pursuing the BFA in Musical Theatre. These courses may not be used as substitute voice lessons for those students pursuing a Bachelor of Music degree. Offered as MUSI 2141 and THEA 2141; credit will be granted only in one department. Prerequisite: C or better in MUSI 2140 or THEA 2140. Open to Musical Theatre majors only or by permission of the Department Chair.

**THEA 2302. VOCAL PRODUCTION. 3 Hours. (TCCN = DRAM 2336)**

Intermediate exploration of vocal production for the stage, including interaction in the studio setting to meet the needs of performance. Emphasis on relaxation, breathing techniques, the creation of vocal sound, and the interconnection of voice and body in performance. Prerequisite: THEA 1303 and permission of advisor.

**THEA 2306. COSTUME TECHNOLOGY. 3 Hours. (TCCN = DRAM 1342)**

Introduction to the process and application of the fundamental skills of costuming and costume design preparation methods. Prerequisite: Permission of advisor.

**THEA 2309. SCRIPT ANALYSIS. 3 Hours. (TCCN = DRAM 2355)**

An investigation of dramatic structure from the points of view of the director, actor, and designer. Elements of dramatic theory are included. Prerequisite: Permission of advisor.

**THEA 2310. DRAWING AND RENDERING FOR THE THEATRE. 3 Hours.**

The practical application of conventional and digital drawing and rendering principles, techniques, and materials as applied to theatrical design. Students will study and practice drawing techniques, including highlight and shadow, proportion, and perspective. Additionally, the course will explore the use of common rendering media used in theatre, such as watercolor, markers, and digital technology.

**THEA 2311. MUSICAL THEATRE MUSICIANSHIP II. 3 Hours.**

A continuation of music theory, sight-singing, and keyboard skills that builds on THEA 1310 Musical Theatre Musicianship I. This course is tailored to the BFA in Musical Theatre concentration and uses material from the American musical theater canon. Prerequisite: THEA 1310, and Permission of Advisor.

**THEA 2337. IMPROVISATION: SHORT FORM. 3 Hours.**

The study of modern improvisational skills and techniques for the performer, director, playwright, and instructor. This course focuses on short form improv, defined as unrelated games, scenes, and exercises that encourage spontaneity and group cohesion.

**THEA 2340. MOVEMENT PERFORMANCE: FUNDAMENTALS. 3 Hours.**

Development of movement techniques and movement performances. Freeing the body through exercises and experiences in relaxation, physical awareness, and movement through space. Focus on body awareness and the release of habitual patterns that restrict the body. Prerequisite: permission of advisor.

**THEA 2352. SCENE STUDY. 3 Hours. (TCCN = DRAM 1352)**

Acting technique exercise to enhance and develop acting skills through scene study. Methods of characterization, research, and role preparation. Prerequisite: THEA 1307 and permission of advisor.

**THEA 2363. STAGE MANAGEMENT. 3 Hours.**

Introduction to the principles and techniques of stage management, explores practical application, and examines topics specific to the work of a stage manager, including communication throughout the production processes, running rehearsals, calling a show, and employment after graduation.

**THEA 3140. PRIVATE LESSONS IN VOICE-MUSICAL THEATRE. 1 Hour.**

This sequence of courses is required of students who are pursuing the BFA in Musical Theatre. These courses may not be used as substitute voice lessons for those students pursuing a Bachelor of Music degree. Offered as MUSI 3140 and THEA 3140; credit will be granted only in one department. Prerequisite: C or better in MUSI 2141 or THEA 2141. Open to Musical Theatre majors only or by permission of the Department Chair.

**THEA 3141. PRIVATE LESSONS IN VOICE-MUSICAL THEATRE. 1 Hour.**

This sequence of courses is required of students who are pursuing the BFA in Musical Theatre. These courses may not be used as substitute voice lessons for those students pursuing a Bachelor of Music degree. Offered as MUSI 3141 and THEA 3141; credit will be granted only in one department. Prerequisite: C or better in MUSI 3140 or THEA 3140. Open to Musical Theatre majors only or by permission of the Department Chair.

**THEA 3300. DIRECTING I. 3 Hours.**

The techniques of staging plays. Play interpretation, casting, rehearsal procedure, staging, and the role of the director in character analysis and creation. Prerequisite: THEA 1305, THEA 1307, THEA 1343, and THEA 2309 or permission of advisor.

**THEA 3301. SCENE DESIGN I. 3 Hours.**

History, theory, and basic concepts of design methods with application for stage, television, and film. Aesthetic skills of color, line, texture, and form, and the interactions of these elements. Mechanics and techniques of illustration and rendering of design ideas. Prerequisites: THEA 1304, THEA 1305, THEA 1343, THEA 3309, THEA 3318, and permission of advisor.

**THEA 3302. FILM STUDIES. 3 Hours.**

Principles of film study, including history, genre, aesthetics, theory, and criticism of U.S. and international films. Lecture and discussion, including the viewing of selected films.

**THEA 3303. SOUND DESIGN. 3 Hours.**

The study of the fundamentals of sound design as related to the theatrical production environment. The study of basic sound design tools and the practical application of these tools through project work. Prerequisites: THEA 1305, THEA 3316, or permission of advisor.

**THEA 3304. SCENIC TECHNOLOGY. 3 Hours.**

An overview of and hands-on training in advanced production techniques, including metalworking and welding, theatrical rigging, automation principles, advanced wood joinery, and fabrication utilizing new materials, as well as an in-depth study of theatrical safety practices. Prerequisites: THEA 1304 or permission of advisor.

**THEA 3305. LIGHTING DESIGN I. 3 Hours.**

The study of basic design principles and techniques and their application in theatrical lighting design. The practical application of computer-aided design tools and the use of theatrical lighting equipment in realized design projects. Prerequisites: THEA 1305, THEA 3316, and THEA 3318 or permission of advisor.

**THEA 3306. SCENE PAINTING FOR THE STAGE. 3 Hours.**

Instructional and demonstrative approaches to scenic painting for the stage. Prerequisite: THEA 1304 or permission of advisor.

**THEA 3307. COSTUME HISTORY. 3 Hours.**

Historical styles and trends of fashion to the present as applied to stage, television, and film. Prerequisite: Permission of advisor.

**THEA 3308. ACTING FOR THE CAMERA AND DIGITAL MEDIA. 3 Hours.**

An intermediate acting course for the camera covering basic technique, terminology, and industry standards, as well as other digital media. Prerequisite: THEA 2352, and permission of advisor.

**THEA 3309. DRAMATURGY. 3 Hours.**

The examination of methods for experiencing, analyzing, and writing about theatre, dance, and other performing arts forms through the lenses of class, race, gender, nationalism, and disability/ability. Students will apply concepts of critical theory from its historical precedents to its contemporary forms. Attendance at fee-based arts events may be required. Prerequisite: THEA 2309 and permission of the advisor.

**THEA 3310. CREATIVE DRAMA. 3 Hours.**

The theory and practice of creative dramatics exercises and activities. The application of the artistic elements in creative drama and interdisciplinary applications of creative drama activities.

**THEA 3311. DIALECTS IN PERFORMANCE. 3 Hours.**

The study and application of selected dialects for performance. Prerequisite: THEA 1303 and Permission of advisor.

**THEA 3312. THEATRE FOR YOUNG AUDIENCES. 3 Hours.**

The theory and practice of creating and producing plays for young audiences. Students shall be required to act in selected works. Prerequisite: Permission of advisor.

**THEA 3313. PERIOD STYLES. 3 Hours.**

Survey of architectural elements, fashion, and decorations throughout history and their relationship to theatrical design. Provides a foundation in visual history and an historical framework in which to develop inspiration for visual ideas and needs for stage design.

**THEA 3314. VOICE AND MOVEMENT. 3 Hours.**

An intermediate course in vocal production and its integration with movement. Primarily focuses on articulation, breath support, and voice/movement interaction. Only Theatre Arts majors or minors may enroll. Prerequisite: Must be a Theatre Arts major or minor; THEA 1303, THEA 2340, and permission of advisor.

**THEA 3316. LIGHTING AND SOUND TECHNOLOGY. 3 Hours.**

An introduction to the equipment, technologies, terminology, and careers in the theatrical areas of lighting and sound. Examines the theories and application of optical control and distribution, the physics of audio, distribution of acoustical energy, and lighting color theory. Prerequisite: Permission of advisor.

**THEA 3317. SINGING FOR THE ACTOR I. 3 Hours.**

An applied study of the vocal apparatus, vocal placement, the voice/body relationship, character, working with text, phrasing, and auditioning as they relate to singing in musical theatre for the Broadway or West End theatre. Emphasis is placed on integrating singing and acting skills. Same as offering MUSI 3317; may not be repeated and credit will only be granted in one department. Prerequisites: THEA 1307 or permission of advisor.

**THEA 3318. DRAFTING FOR THE ARTS. 3 Hours.**

The principles and application of computer-aided drafting techniques for the entertainment industry. Prerequisite: Permission of advisor.

**THEA 3320. PLAYWRITING I. 3 Hours.**

The art and craft of constructing a play. Students write playlets, scenes, and one-act plays for in-house performance and/or instructor evaluation.

**THEA 3321. PERFORMANCE DEVISING. 3 Hours.**

Students will engage in a collaborative, devised process in an ensemble. Various methodologies and languages of the stage will be utilized, which may include, but is not limited to, acting, movement, dance, and design, thereby creating new works in performance. Prerequisite: THEA 2309 and permission of advisor.

**THEA 3337. IMPROVISATION: LONG FORM. 3 Hours.**

Revisits concepts learned from Improvisation: Short Form and applies them to an advanced structure of interrelated scenes, monologues, and stories based on a theme or idea. The students will explore this long-form structure as it applies to playwriting, acting, and directing.

**THEA 3342. COSPLAY COSTUME FABRICATION. 3 Hours.**

Exploration and practice of theatrical construction and fabrication techniques used in the cosplay industry.

**THEA 3343. MAKEUP FOR THE CAMERA. 3 Hours.**

Exploration and practice of styles, techniques, and types of make-up and make-up application for film, photography and fashion.

**THEA 3346. STAGE COMBAT. 3 Hours.**

An introduction to stage combat. Students will safely explore the choreographed illusion of stage violence through the skills of unarmed and armed combat. Prerequisite: Permission of advisor.

**THEA 3350. FABRIC MODIFICATION AND COSTUME CRAFTS. 3 Hours.**

Exploration and practice of the process and application of techniques in fabric modification and costume crafts. Prerequisite: Permission of advisor.

**THEA 3351. ROBOTS, DIGITAL HUMANITIES, AND THEATRE. 3 Hours.**

Lecture and applied practices of the emerging emotional interaction between robots and humans utilizing theatrical methodologies. Course will emphasize human and robot interactions from interdisciplinary approaches including cultural, historical, sociological, health-care, disability studies, and performing arts frameworks.

**THEA 3352. STAGE MANAGEMENT & THEATRE ADMINISTRATION. 3 Hours.**

Managerial activities and responsibilities as applicable to community or professional theatre. Prerequisite: THEA 1343 or permission of advisor.

**THEA 3355. UNIVERSAL DESIGN & ACCESSIBILITY IN THE PERFORMING ARTS. 3 Hours.**

Explores the principles of Universal Design using the performing arts as a case study: creating environments, events, buildings, and products to accommodate the broadest spectrum of human ability, size, age, and other characteristics. Investigates how to put into practice the accessibility guidelines of the Americans with Disabilities Act of 1990. Performing is not required. Offered as THEA 3355 and DS 3355; credit will only be granted in one department.

**THEA 3360. GENDER AND THE PERFORMING ARTS. 3 Hours.**

Examines the role of gender in the performing arts, including theory and practice focused on gender. Additional topics may include female pioneers in the performing arts, the image of gender in different media, the way gender affects actors and artists, and the effect of cultural definitions of gender on audience reception. Offered as THEA 3360 and GWSS 3360. Credit will be granted only once.

**THEA 3361. WOMEN IN THEATRE. 3 Hours.**

Examines the history, theory, and practice of women in theatre. Pioneering female writers, directors, producers, actors, designers, and activists will be explored as will their influence upon drama in its historical, social, and cultural contexts. Students will also be introduced to theory that examines female characters in plays and their impact on the artist and audience. Offered as THEA 3361 and GWSS 3361. Credit will be granted only once.

**THEA 3363. THEATRICAL PRODUCTION MANAGEMENT. 3 Hours.**

Lecture course focusing on topics of professional practice in operations, planning, management, leadership, and the collaborative processes for theatre practitioners. Participants will develop an understanding of the production manager role within an organization, the responsibilities of a production manager, and the tools of the production manager. Prerequisite: THEA 2363.

**THEA 3387. ART DIRECTION I. 3 Hours.**

The history, theory, and basic concepts of art direction methods and basic construction techniques for television and film. Prerequisite: Permission of advisor.

**THEA 4110. THEATRE PEDAGOGY FIELD-BASED EXPERIENCE. 1 Hour.**

Supervised and directed professional practice in local schools. The student will be assigned to a public-school site for five hours per week. Weekly seminars are required. Field-based experience must be taken the semester immediately preceding student teaching residency. Prerequisite: Permission of advisor.

**THEA 4140. PRIVATE LESSONS IN VOICE-MUSICAL THEATRE. 1 Hour.**

This sequence of courses is required of students who are pursuing the BFA in Musical Theatre. These courses may not be used as substitute voice lessons for those students pursuing a Bachelor of Music degree. Offered as MUSI 4140 and THEA 4140; credit will be granted only in one department. Prerequisite: C or better in MUSI 3141 or THEA 3141. Open to Musical Theatre majors only or by permission of the Department Chair.

**THEA 4141. PRIVATE LESSONS IN VOICE-MUSICAL THEATRE. 1 Hour.**

This sequence of courses is required of students who are pursuing the BFA in Musical Theatre. These courses may not be used as substitute voice lessons for those students pursuing a Bachelor of Music degree. Offered as MUSI 4141 and THEA 4141; credit will be granted only in one department. Prerequisite: C or better in MUSI 4140 or THEA 4140. Open to Musical Theatre majors only or by permission of the Department Chair.

**THEA 4191. CONFERENCE COURSE. 1 Hour.**

Topics assigned on an individual basis covering individual research or study in a designated area. May be repeated as the topic changes. Prerequisite: Permission of advisor.

**THEA 4201. BUSINESS OF ACTING. 2 Hours.**

An examination of the business of acting for the purpose of becoming a working professional in the entertainment industry. This course will cover headshots, resumes, networking, agents, unions, auditions and interviews, budgeting, marketing, and other aspects in preparing the student for work-readiness as they move into the profession. Prerequisite: permission of advisor.

**THEA 4270. PRIVATE LESSONS IN VOICE-MUSICAL THEATRE. 2 Hours.**

This sequence of courses is required of students who are pursuing the BFA in Musical Theatre. These courses may not be used as substitute voice lessons for those students pursuing a Bachelor of Music Degree. Prerequisite: Permission of Advisor.

**THEA 4271. PRIVATE LESSONS IN VOICE - MUSICAL THEATRE. 2 Hours.**

This sequence of courses is required of students who are pursuing the BFA in Musical Theatre. These courses may not be used as substitute voice lessons for those students pursuing a Bachelor of Music Degree. Prerequisite: Permission of advisor.

**THEA 4291. CONFERENCE COURSE. 2 Hours.**

Topics assigned on an individual basis covering individual research or study in a designated area. May be repeated as the topic changes. Prerequisite: Permission of advisor.

**THEA 4300. DIRECTING II. 3 Hours.**

Continuation of THEA 3300. Students will direct scenes and/or one-act plays. Prerequisite: THEA 3300 and permission of advisor.

**THEA 4301. ADVANCED ACTING: ENSEMBLE. 3 Hours.**

Students will perform solo and/or group performances devised from their own and/or other artists' research and development in a collaborative, ensemble environment. May not be repeated for credit. Prerequisite: THEA 2352, THEA 2340, and permission of advisor.

**THEA 4303. CLASSICAL THEATRE HISTORY. 3 Hours.**

The development of world theatre from its beginnings through the Renaissance. Analysis of representative plays of each period with particular emphasis on drama in its historical context. History of acting, costuming, and directing. Prerequisite: THEA 1343 and permission of advisor.

**THEA 4304. MODERN THEATRE HISTORY. 3 Hours.**

The development of Western theatre from the Renaissance to the present. Analysis of representative plays from Europe, England, and America. Development of the modern stage, acting methods, and production techniques. Prerequisite: THEA 1343 and permission of advisor.

**THEA 4305. SCENE DESIGN II. 3 Hours.**

Continuation of THEA 3301. Distinctions among stage, television, and film design, interaction of one with another, advanced methods, and application of scene design concepts. Prerequisite: THEA 3301 and permission of advisor.

**THEA 4306. LIGHTING DESIGN II. 3 Hours.**

Specialized topics and advanced design technique and application principles. Participation on light crews in departmental productions required. Prerequisite: THEA 3305 and permission of advisor.

**THEA 4310. MUSICAL THEATRE HISTORY. 3 Hours.**

The history, development, and contemporary manifestations of the musical theatre art form in America and London's West End, and its relation to the continually changing social milieu. The course follows the development of musical theatre from its inception to the present.

**THEA 4311. SHAKESPEARE AND VERSE IN PERFORMANCE. 3 Hours.**

The study and performance of iambic pentameter and verse as found in Shakespearean and verse plays. Prerequisite: THEA 1303, THEA 2352 and permission of advisor.

**THEA 4314. ADVANCED PRODUCTION TECHNIQUES. 3 Hours.**

An advanced examination of theatre craft, technology, and production. Prerequisite: THEA 3304.

**THEA 4315. SPECIAL EFFECTS MAKEUP DESIGN. 3 Hours.**

The examination of styles and techniques of specialty makeup applications for the stage and how these relate to television and film.

**THEA 4317. SINGING FOR THE ACTOR II. 3 Hours.**

The advanced study of musical theatre performance as it relates to the integration of acting, singing and movement skills into an effective performance. The analysis of the libretto, score, and character will be studied through musical theatre scene work. This course may be repeated once for credit. Prerequisite: THEA 1307 and THEA 3317, and permission of instructor.

**THEA 4320. STAGE WELDING, RIGGING, AND FABRICATION. 3 Hours.**

Styles and techniques of welding, rigging, and specialized materials fabrication for the stage and in video and film production. Prerequisite: THEA 1304 and permission of advisor.

**THEA 4322. PLAYWRITING II. 3 Hours.**

The art and craft of constructing a full-length, two-act play. Course content will include references to the work of major playwrights and playwriting theory. Students will receive course content through a combination of class lectures and one-on-one writing conferences with the instructor.

Prerequisites: THEA 3320 or permission of faculty.

**THEA 4325. PERFORMANCE THEORY. 3 Hours.**

The examination of methods for experiencing, analyzing, and writing about theatre, dance, and other performing arts forms through the lenses of class, race, gender, nationalism, and disability/ability. Students will apply concepts of critical theory from its historical precedents to its contemporary forms. Attendance at fee-based arts events may be required. Prerequisite: THEA 2309 and permission of advisor.

**THEA 4330. U.S. THEATRE HISTORY. 3 Hours.**

The evolution of theatre in the United States from its beginning in colonial times to the present day. Representative plays from various periods are studied.

**THEA 4333. MUSICAL THEATRE AUDITIONING AND SHOWCASE. 3 Hours.**

Advanced principles of audition technique and the business of musical theatre are explored with an emphasis on preparing the student for a professional career in the performing arts. The semester is structured toward developing an actor's repertoire, video clip reel, and website, culminating in an audition context presentation or showcase. Prerequisite: THEA 2352, THEA 4317, DNCE 3233 and permission of instructor.

**THEA 4334. ACTING: AUDITIONING AND SHOWCASE. 3 Hours.**

Advanced principles of audition technique with an emphasis on preparing the student for a professional career in the performing arts. The development and presentation of an actor's final portfolio culminating in an audition context presentation or showcase. Intended for BFA Theatre Majors with a Concentration in Acting. Prerequisite: THEA 1303, THEA 2309, THEA 2352, THEA 2340, THEA 4341 and permission of advisor.

**THEA 4340. PHYSICAL THEATRE. 3 Hours.**

The study and performance of physical theatre techniques. Prerequisites: THEA 2340, THEA 2352, and permission of advisor.

**THEA 4341. ADVANCED SCENE STUDY. 3 Hours.**

Advanced acting technique exercises to enhance and develop acting skills through scene study in preparation for work-readiness at the professional level. This includes advanced methods of characterization, research, and role preparation. Prerequisite: THEA 1303, THEA 1343, THEA 2352, THEA 2309, and THEA 2340, and permission of advisor.

**THEA 4343. COSTUME DESIGN. 3 Hours.**

Theory and practice of costume design and application of those principles to theatrical production. Prerequisites: THEA 1343, THEA 1305, THEA 2309 or permission of instructor.

**THEA 4344. PORTFOLIO & THE BUSINESS OF DESIGN. 3 Hours.**

Exploration of the business of theatre and development of professional materials essential to theatrical design and technology. The course will include the development of websites, digital, and paper portfolios and focus on fundamentals needed to manage a career as a theatrical designer, manager, and/or technician. Prerequisite: Permission of advisor.

**THEA 4345. SUMMER THEATRE ACTIVITIES. 3 Hours.**

The study and application of specialized production and performance activities in a summer repertory theatre setting.

**THEA 4346. THEATRICAL WEAPONRY. 3 Hours.**

This course fosters a practical and theoretical understanding for the process of creating the illusion of safe and credible violence for the stage. Emphasis is placed on textual characterization and working with the weapons most frequently used in stage violence. Depending upon the semester, the student may be trained in broadsword, single rapier, rapier and dagger, small sword, or quarterstaff.

**THEA 4347. ADVANCED STUDIES IN THEATRE DESIGN/PRODUCTION PRACTICUM. 3 Hours.**

Advanced studies practicum in theatre design and/or production. Topic varies from semester to semester. May be repeated as topic changes. Prerequisite: Permission of advisor.

**THEA 4355. STRATEGIES, ASSESSMENT, AND CHILD DEVELOPMENT IN THEATRE PEDAGOGY. 3 Hours.**

Open to theatre majors only. Current trends in theatre education will be examined. Topics include effective differentiated instruction, classroom management, strategies for working with diverse learners, and examination of major learning theories and principles of cognitive, social, emotional, physical and aesthetic development. This course will also examine a variety of assessment techniques that are used in a theatre classroom. Assessment tools such as rubrics, rating scales, National Standards, TEKS, STAAR, and TExES will be examined and implemented into lesson planning. Prerequisite: For Theatre Arts majors only. Admission into the College of Education.

**THEA 4363. THEATRE MANAGEMENT AND ADMINISTRATION. 3 Hours.**

Lecture course focusing on topics of professional practice in operations, planning, management, and the collaborative processes for theatre leadership. Participants will explore current and past trends in company formation, fundraising, marketing, and the business of the arts. Students will develop an understanding of the various leadership roles within an organization, the responsibilities of those positions, and the tools of the arts manager. Prerequisite: THEA 2363.



**THEA 4387. ART DIRECTION II. 3 Hours.**

An applied course in art direction methods, construction practices and techniques in video and film production. Prerequisite: Permission of faculty.

**THEA 4391. CONFERENCE COURSE. 3 Hours.**

Topics assigned on an individual basis covering individual research or study in a designated area. May be repeated as the topic changes. Prerequisite: Permission of advisor.

**THEA 4393. SPECIAL TOPICS. 3 Hours.**

Special studies in drama and theatre. Topic varies from semester to semester. May be repeated as topic changes or until a maximum of six credit hours is attained. Prerequisite: Permission of advisor.

**THEA 4394. SENIOR PROJECT. 3 Hours.**

During the senior year, the student must complete a thesis or project of equivalent difficulty under the direction of a faculty member in the major department. Prerequisite: Permission of advisor.

**THEA 4395. THEATRE INTERNSHIP LEVEL I. 3 Hours.**

Individual research through working with a professional theatre or performing arts organization. Individual conference to be arranged. Graded on a pass/fail basis. Prerequisite: Theatre Arts major with permission of advisor and department chair.

**THEA 4695. THEATRE INTERNSHIP LEVEL 2. 6 Hours.**

Individual research through working with a professional theatre or performing arts organization. Individual conference between sponsor and departmental advisor required. Graded on a pass/fail basis. Prerequisite: Theatre Arts major with permission of advisor and department chair.

**THEA 4995. THEATRE INTERNSHIP LEVEL 3. 9 Hours.**

Individual research through working with a professional theatre or performing arts organization. Individual conference between sponsor and departmental advisor required. Graded on a pass/fail basis. Prerequisite: Theatre Arts major with permission of advisor and department chair.

**THEA 5391. CONFERENCE COURSE. 3 Hours.**

Topics assigned on an individual basis covering individual research or study in a designated area. May be repeated as the topic changes. Prerequisite: Permission of instructor.

**THEA 5393. TOPICS IN THEATRE ARTS. 3 Hours.**

Special topics in theatre; offered periodically with subject matter determined by instructor and student interest. Previous topics have included: Design Portfolio Workshop; Alternative Actor Training Workshop; Playwriting; Improvisation; and Styles in Acting. Prerequisite: Permission of advisor.

## COURSES

**UDES 1301. INTRODUCTION TO PRINCIPLES OF SUSTAINABLE URBAN DESIGN. 3 Hours.**

This course is an introduction to sustainable urban design and its principles through the lenses of the college's four disciplines: landscape architecture, architecture, planning and public affairs. How these disciplines interface with environmental, economic, socio-cultural and design sustainability is the focus of the course, culminating with an exploration of urban ecology.

**UDES 1304. DIGITAL METHODS IN SUSTAINABLE URBAN DESIGN. 3 Hours.**

This course introduces students to the use of digital tools with a focus on their applications in sustainable urban design. The course will cover a wide spectrum of digital art methodologies: image creation and manipulation; simple animation and sound design; static and moving images; digital fabrication outputs; utilizing both pixel and vector-based applications. Prerequisite: C or better in UDES 1301 and UDES 1341. Restricted to Sustainable Urban Design\_INT and Sustainable Urban Design\_UNIV students.

**UDES 1341. DESIGN COMMUNICATIONS. 3 Hours.**

Design Communications is an introduction course to analog and digital representation with emphasis on notational techniques of freehand drawing, proportioning strategies, and analysis. Students will also be exposed to physical and digital model-making, craftsmanship, file organization, orthographic and axonometric delineation, line weights, and digital documentation. Prerequisite: Restricted to SUDBSINT and SUDBS\_UNIV majors.

**UDES 2441. URBAN DIAGRAMMING AND COMMUNICATION I. 4 Hours.**

This course establishes a framework for understanding how design is used to create sustainable urban communities. An interdisciplinary course, its focus is upon heightening student awareness of the built environment by investigative sketching and measuring, as well as by digital means. This process of documenting encompasses the human uses of objects and systems that comprise an urban community: buildings, public spaces, landscape, transportation systems, waterways, and other infrastructure. Issues of social and economic equity are introduced, as well as the roles that human interaction and participation play in successful design strategies. Prerequisite: "C" or better in UDES 1301, credit or concurrent enrollment in UDES 2303. Restricted to Sustainable Urban Design-intended and SUDBS\_UNIV students.

**UDES 2442. URBAN DIAGRAMMING AND COMMUNICATION II. 4 Hours.**

This course continues developing students' abilities to visually document urban environments in relation to urban ecologies, while beginning to investigate how designs are created to address the range of scales and ecological impact in a city, from the individual site to a neighborhood. This course focuses upon the impact of infrastructure upon a city's human and ecological systems, encompassing the plant and animal species that are part of urban environments. Prerequisite: C or better in UDES 1301, UDES 2303, and UDES 2441. Restricted to Sustainable Urban Design-intended students.

**UDES 2551. URBAN DESIGN STUDIO I: URBAN RESILIENCY. 5 Hours.**

This studio focuses upon the planning and design for disaster recovery and the impact upon infrastructure caused by natural events such as earthquakes, flooding and tornadoes. The studio explores the latest and most reliable recovery strategies for rebuilding and repairing a city's human and ecological systems. Students document streets, waterways, transportation and landscape, examining issues of congestion, pollution, storm water management, and transportation access. Group design projects are based on both the scale of neighborhoods and regions. Prerequisite: C or better in UDES 2442. Restricted to Sustainable Urban Design majors. Students must have a minimum cumulative GPA of 2.8 and a minimum major course GPA of 2.8.

**UDES 3303. HISTORY OF URBAN DESIGN, FORM, AND INFRASTRUCTURE. 3 Hours.**

This course examines the history of urban design, form and infrastructure in a variety of cities, providing students with an understanding of how decisions about design, form and infrastructure impact the lives of inhabitants. Prerequisite: "C" or better in UDES 3552 and LARC 4324. Restricted to Sustainable Urban Design majors.

**UDES 3552. URBAN DESIGN STUDIO II: MOBILITY. 5 Hours.**

This studio examines the major shifts in the organization and spatial allocation of cities that are transforming urban mobility infrastructures, from light rail to pedestrian zones to cyclist lanes. The interface of transportation, public open spaces, buildings and landscape architecture is explored as well as issues of diversity, equity, and inclusion. A series of group design projects at the neighborhood scale continues the refinement of students' graphic and written skills. Prerequisite: C or better in UDES 1301, UDES 3551. Restricted to Sustainable Urban Design majors. Students must have a minimum cumulative GPA of 2.8 and a minimum major course GPA of 2.8.

**UDES 4304. URBAN SUSTAINABILITY CAPSTONE PREP. 3 Hours.**

This course includes preparation for the Urban Sustainable Design Capstone Project which can encompass design thinking, technology, history, or professional principles of Sustainable Urban Design. The course instructor will guide students in selecting a faculty advisor and committee and prepare students to complete a proposal in preparation for the Capstone Project undertaken in the final semester of the program. Prerequisite: C or better in UDES 4551. Restricted to Sustainable Urban Design majors. Students must have a minimum cumulative GPA of 2.8 and a minimum major course GPA of 2.8.

**UDES 4391. CONFERENCE COURSE. 3 Hours.**

Independent study guided by an instructor on a regular basis. May be repeated for credit. Prerequisite: Permission of the department.

**UDES 4395. TOPICS IN SUSTAINABLE URBAN DESIGN. 3 Hours.**

Studio and lecture courses to explore and present selected topics in architecture and design. May be repeated for credit as topics change. Prerequisite: Permission of the department.

**UDES 4404. URBAN SUSTAINABILITY PROJECT CAPSTONE. 4 Hours.**

In the Capstone Course, students will culminate their learning by completing a sustainability project at the Institute for Sustainability and Global Impact (ISGI) at UT Arlington under the supervision of the Chief Sustainability Officer. Student capstone projects will address pressing issues concerning sustainable urban communities. Students may collaborate and work on a project for an external organization, or work on sustainability programs and projects at UT Arlington. Potential capstone sites will range from local non-profits and government agencies to faculty research projects and private sector initiatives. The Capstone Course is a one-semester project. Prerequisite: C or better in UDES 3552. Restricted to Sustainable Urban Design majors. Students must have a minimum cumulative GPA of 2.8 and a minimum major course GPA of 2.8.

**UDES 4551. URBAN DESIGN STUDIO III: CLIMATE CHANGE. 5 Hours.**

This studio examines specific climate change issues as selected by the instructor. The studio is a recognition of an evolving set of data with shifting timelines and levels of impact for evaluating the ecological impact of climate change, upon the built environment. One of the areas of study will include sea-level rising and its global impact upon coastal cities. The students will engage in problem solving, using contemporary design and planning strategies on a regional scale. Prerequisite: C or better in UDES 3552. Restricted to Sustainable Urban Design majors. Students must have a minimum cumulative GPA of 2.8 and a minimum major course GPA of 2.8.

**UDES 4552. URBAN DESIGN STUDIO IV: ADVANCED SUSTAINABLE URBAN DESIGN. 5 Hours.**

This studio examines the roles that smart city technologies play in sustainable urban design. The group design projects in the Urban Resiliency and Urban Mobility studios are reassessed, and the course culminates with individual design projects based upon new locations. Prerequisite: C or better in UDES 4551. Restricted to Sustainable Urban Design majors. Students must have a minimum cumulative GPA of 2.8 and a minimum major course GPA of 2.8.

## COURSES

**UNIV 1000. FIRST YEAR EXPERIENCE. 0 Hours.**

A first-year seminar that orients students to life on UTA's campus and emphasizes engagement beyond the classroom. Students in this course will experience the UTA community by attending campus events and making connections beyond their studies, including interaction with career services, the library and financial literacy services. Students will also be able to identify campus resources to support their wellness from multiple aspects of their lives, both the social and the physical. Students will understand how critical thinking and study skills can be applied to academic content, explore chosen majors and possible career pathways, and connect to activities and resources on campus.

**UNIV 1101. CAREER PREPARATION AND STUDENT SUCCESS. 1 Hour.**

A course for new transfer students that will help students transition into UTA and achieve academic and personal success through recognition of campus resources and community building. Students will discover effective ways to balance personal and career obligations with academic goals. The course will allow for the discovery of marketable skills within a chosen academic discipline and the professions associated with that program of study. Experiential learning opportunities will be discussed, including undergraduate research, leadership, international engagement, community engagement and career development. Students will understand how critical thinking and study skills can be applied to academic content, explore chosen majors and possible career pathways, and connect to activities and resources on campus.

**UNIV 1131. STUDENT SUCCESS. 1 Hour.**

A first-year seminar that introduces new students to academic and success skills to aid their transition into college. The goal of the course is to help students identify their individual needs, determine what resources are appropriate, recognize the faculty role in their development, and formulate a plan for an actively engaged and enriched experience from campus to career. Experiential learning opportunities will be discussed, including undergraduate research, leadership, international engagement, community engagement and career development. Students will understand how critical thinking and study skills can be applied to academic content, explore chosen majors and possible career pathways, and connect to activities and resources on campus.

**UNIV 1302. COLLEGE LEARNING. 3 Hours.**

A first-year seminar that introduces students to the strategies and behaviors necessary for academic success, personal growth, and career development. Emphasizing self-assessment, self-exploration, and cognitive theories, students will complete a self-change project to apply these concepts. The course aids the transition to college by helping students identify their individual needs, recognize the role of faculty in their development, and formulate a plan for an actively engaged academic experience. Topics include critical thinking, study skills, major exploration, and career pathways. Experiential learning opportunities, such as undergraduate research, leadership, global connections, community engagement, and career development, will be explored, connecting students to campus activities and resources that support their goals from college to career.

**UNIV 3335. PEER ACADEMIC LEADER TRAINING. 3 Hours.**

Students are trained on the expectations and responsibilities of becoming a Peer Academic Leader (PAL). These students will work as group leaders for UNIV 1131 after successful completion of the course. Students will learn group instruction procedures and requisite guidance material to explain academic regulations and student services, analyze study skills, initiate appropriate study habits, and make appropriate referrals when necessary. Focus on classroom management, learning theory, and lesson plan development. Elective credit; does not count as part of the professional education certification requirements. Prerequisite: Permission of the instructor.

**COURSES****UNIV-AR 1101. CAREER PREPARATION AND STUDENT SUCCESS. 1 Hour.**

A course for new transfer students that will help students transition into UTA and achieve academic and personal success through recognition of campus resources and community building. Students will discover effective ways to balance personal and career obligations with academic goals. The course will allow for the discovery of marketable skills within a chosen academic discipline and the professions associated with that program of study. Experiential learning opportunities will be discussed, including undergraduate research, leadership, international engagement, community engagement and career development. Students will understand how critical thinking and study skills can be applied to academic content, explore chosen majors and possible career pathways, and connect to activities and resources on campus.

**UNIV-AR 1131. STUDENT SUCCESS. 1 Hour.**

A first-year seminar that introduces new students to academic and success skills to aid their transition into college. The goal of the course is to help students identify their individual needs, determine what resources are appropriate, recognize the faculty role in their development, and formulate a plan for an actively engaged and enriched experience from campus to career. Students will understand how critical thinking and study skills can be applied to academic content, explore chosen majors and possible career pathways, and connect to activities and resources on campus. Experiential learning opportunities will be discussed, including undergraduate research, leadership, international engagement, community engagement and career development. Also offered as ARCH 1101 and INTD 1101, credit can only be granted once.

**COURSES****UNIV-AT 1131. STUDENT SUCCESS. 1 Hour.**

A first-year seminar that introduces new students to academic and success skills to aid their transition into college. The goal of the course is to help students identify their individual needs, determine what resources are appropriate, recognize the faculty role in their development, and formulate a plan for an actively engaged and enriched experience from campus to career. Experiential learning opportunities will be discussed, including undergraduate research, leadership, international engagement, community engagement and career development. Students will understand how critical thinking and study skills can be applied to academic content, explore chosen majors and possible career pathways, and connect to activities and resources on campus.

## COURSES

### **UNIV-BU 1101. CAREER PREPARATION AND STUDENT SUCCESS. 1 Hour.**

An optional course for new business transfer students that will help students transition into UTA and achieve academic and personal success through recognition of campus resources and community building. Students will discover effective ways to balance personal and career obligations with academic goals. The course will allow for the discovery of marketable skills within a chosen academic discipline and the professions associated with that program of study. Experiential learning opportunities will be discussed, including undergraduate research, leadership, international engagement, community engagement and career development. Students will understand how critical thinking and study skills can be applied to academic content, explore chosen majors and possible career pathways, and connect to activities and resources on campus. Business transfer students have the option to enroll in UNIV-BU 1101 as a one-hour elective. It is not a required course.

### **UNIV-BU 1131. STUDENT SUCCESS. 1 Hour.**

A first-year seminar that introduces new students to academic and success skills to aid their transition into college. The goal of the course is to help students identify their individual needs, determine what resources are appropriate, recognize the faculty role in their development, and formulate a plan for an actively engaged and enriched experience from campus to career. Experiential learning opportunities will be discussed, including undergraduate research, leadership, international engagement, community engagement and career development. Students will understand how critical thinking and study skills can be applied to academic content, explore chosen majors and possible career pathways, and connect to activities and resources on campus.

## COURSES

### **UNIV-ED 1000. FIRST YEAR EXPERIENCE. 0 Hours.**

A course that orients students to life on UTA's campus and emphasizes engagement beyond the classroom. Students in this course will experience the UTA community by attending campus events and making connections beyond their studies, including interaction with career services, the library and financial literacy services. Students will also be able to identify campus resources to support their wellness from multiple aspects of their lives, both the social and the physical. Each UNIV 1000 class section has a Peer Academic Leader (PAL), who is a student that has already taken the course and assists as a discussion leader for the class under the supervision of the instructor. PALs will work with students on finding their place on campus, learning academic success skills, and developing a degree map.

### **UNIV-ED 1101. CAREER PREPARATION AND STUDENT SUCCESS. 1 Hour.**

A course for new transfer students that will help students transition into UTA and achieve academic and personal success through recognition of campus resources and community building. Students will discover effective ways to balance personal and career obligations with academic goals. The course will allow for the discovery of marketable skills within a chosen academic discipline and the professions associated with that program of study. Experiential learning opportunities will be discussed, including undergraduate research, leadership, international engagement, community engagement and career development. Students will understand how critical thinking and study skills can be applied to academic content, explore chosen majors and possible career pathways, and connect to activities and resources on campus.

### **UNIV-ED 1131. STUDENT SUCCESS. 1 Hour.**

A first-year seminar that introduces new students to academic and success skills to aid their transition into college. The goal of the course is to help students identify their individual needs, determine what resources are appropriate, recognize the faculty role in their development, and formulate a plan for an actively engaged and enriched experience from campus to career. Experiential learning opportunities will be discussed, including undergraduate research, leadership, international engagement, community engagement and career development. Students will understand how critical thinking and study skills can be applied to academic content, explore chosen majors and possible career pathways, and connect to activities and resources on campus.

## COURSES

### **UNIV-EN 1131. STUDENT SUCCESS. 1 Hour.**

A first-year seminar that introduces new students to academic and success skills to aid their transition into college. The goal of the course is to help students identify their individual needs, determine what resources are appropriate, recognize the faculty role in their development, and formulate a plan for an actively engaged and enriched experience from campus to career. Experiential learning opportunities will be discussed, including undergraduate research, leadership, international engagement, community engagement and career development. Students will understand how critical thinking and study skills can be applied to academic content, explore chosen majors and possible career pathways, and connect to activities and resources on campus.

## COURSES

### **UNIV-HN 1101. CAREER PREPARATION AND STUDENT SUCCESS. 1 Hour.**

A course for new transfer students that will help students transition into UTA and achieve academic and personal success through recognition of campus resources and community building. Students will discover effective ways to balance personal and career obligations with academic goals. The course will allow for the discovery of marketable skills within a chosen academic discipline and the professions associated with that program of study. Experiential learning opportunities will be discussed, including undergraduate research, leadership, international engagement, community engagement and career development. Students will understand how critical thinking and study skills can be applied to academic content, explore chosen majors and possible career pathways, and connect to activities and resources on campus.

**UNIV-HN 1131. STUDENT SUCCESS. 1 Hour.**

A first-year seminar that introduces new students to academic and success skills to aid their transition into college. The goal of the course is to help students identify their individual needs, determine what resources are appropriate, recognize the faculty role in their development, and formulate a plan for an actively engaged and enriched experience from campus to career. Experiential learning opportunities will be discussed, including undergraduate research, leadership, international engagement, community engagement and career development. Students will understand how critical thinking and study skills can be applied to academic content, explore chosen majors and possible career pathways, and connect to activities and resources on campus.

**COURSES****UNIV-LA 1000. FIRST YEAR EXPERIENCE. 0 Hours.**

A first-year seminar that orients students to life on UTA's campus and emphasizes engagement beyond the classroom. Students in this course will experience the UTA community by attending campus events and making connections beyond their studies, including interaction with career services, the library and financial literacy services. Students will also be able to identify campus resources to support their wellness from multiple aspects of their lives, both the social and the physical. Students will understand how critical thinking and study skills can be applied to academic content, explore chosen majors and possible career pathways, and connect to activities and resources on campus.

**UNIV-LA 1101. CAREER PREPARATION AND STUDENT SUCCESS. 1 Hour.**

A course for new transfer students that will help students transition into UTA and achieve academic and personal success through recognition of campus resources and community building. Students will discover effective ways to balance personal and career obligations with academic goals. The course will allow for the discovery of marketable skills within a chosen academic discipline and the professions associated with that program of study. Experiential learning opportunities will be discussed, including undergraduate research, leadership, international engagement, community engagement and career development. Students will understand how critical thinking and study skills can be applied to academic content, explore chosen majors and possible career pathways, and connect to activities and resources on campus.

**UNIV-LA 1131. STUDENT SUCCESS. 1 Hour.**

A first-year seminar that introduces new students to academic and success skills to aid their transition into college. The goal of the course is to help students identify their individual needs, determine what resources are appropriate, recognize the faculty role in their development, and formulate a plan for an actively engaged and enriched experience from campus to career. Experiential learning opportunities will be discussed, including undergraduate research, leadership, international engagement, community engagement and career development. Students will understand how critical thinking and study skills can be applied to academic content, explore chosen majors and possible career pathways, and connect to activities and resources on campus.

**COURSES****UNIV-NU 1000. FIRST YEAR EXPERIENCE. 0 Hours.**

A course that orients students to life on UTA's campus and emphasizes engagement beyond the classroom. Students in this course will experience the UTA community by attending campus events and making connections beyond their studies, including interaction with career services, the library and financial literacy services. Students will also be able to identify campus resources to support their wellness from multiple aspects of their lives, both the social and the physical. Each UNIV 1000 class section has a Peer Academic Leader (PAL), who is a student that has already taken the course and assists as a discussion leader for the class under the supervision of the instructor. PALs will work with students on finding their place on campus, learning academic success skills, and developing a degree map.

**UNIV-NU 1101. CAREER PREPARATION AND STUDENT SUCCESS. 1 Hour.**

A course for new transfer students that will help students transition into UTA and achieve academic and personal success through recognition of campus resources and community building. Students will discover effective ways to balance personal and career obligations with academic goals. The course will allow for the discovery of marketable skills within a chosen academic discipline and the professions associated with that program of study. Experiential learning opportunities will be discussed, including undergraduate research, leadership, international engagement, community engagement and career development. Students will understand how critical thinking and study skills can be applied to academic content, explore chosen majors and possible career pathways, and connect to activities and resources on campus.

**UNIV-NU 1131. STUDENT SUCCESS. 1 Hour.**

A first-year seminar that introduces new students to academic and success skills to aid their transition into college. The goal of the course is to help students identify their individual needs, determine what resources are appropriate, recognize the faculty role in their development, and formulate a plan for an actively engaged and enriched experience from campus to career. Experiential learning opportunities will be discussed, including undergraduate research, leadership, international engagement, community engagement and career development. Students will understand how critical thinking and study skills can be applied to academic content, explore chosen majors and possible career pathways, and connect to activities and resources on campus.



## COURSES

### **UNIV-SC 1101. CAREER PREPARATION AND STUDENT SUCCESS. 1 Hour.**

A course for new transfer students that will help students transition into UTA and achieve academic and personal success through recognition of campus resources and community building. Students will discover effective ways to balance personal and career obligations with academic goals. The course will allow for the discovery of marketable skills within a chosen academic discipline and the professions associated with that program of study. Experiential learning opportunities will be discussed, including undergraduate research, leadership, international engagement, community engagement and career development. Students will understand how critical thinking and study skills can be applied to academic content, explore chosen majors and possible career pathways, and connect to activities and resources on campus.

### **UNIV-SC 1131. STUDENT SUCCESS. 1 Hour.**

A first-year seminar that introduces new students to academic and success skills to aid their transition into college. The goal of the course is to help students identify their individual needs, determine what resources are appropriate, recognize the faculty role in their development, and formulate a plan for an actively engaged and enriched experience from campus to career. Experiential learning opportunities will be discussed, including undergraduate research, leadership, international engagement, community engagement and career development. Students will understand how critical thinking and study skills can be applied to academic content, explore chosen majors and possible career pathways, and connect to activities and resources on campus.

## COURSES

### **UNIV-SW 1131. STUDENT SUCCESS. 1 Hour.**

A first-year seminar that introduces new students to academic and success skills to aid their transition into college. The goal of the course is to help students identify their individual needs, determine what resources are appropriate, recognize the faculty role in their development, and formulate a plan for an actively engaged and enriched experience from campus to career. Experiential learning opportunities will be discussed, including undergraduate research, leadership, international engagement, community engagement and career development. Students will understand how critical thinking and study skills can be applied to academic content, explore chosen majors and possible career pathways, and connect to activities and resources on campus.