College of Engineering

overview

Students in UTA's College of Engineering are making an impact in all areas of life as they perform research with award-winning faculty in state-of-the-art facilities, apply their knowledge to hands-on senior projects and internships, and start businesses to bring their ideas to market. The education they receive at UTA will allow them to face important issues, solve problems and develop new technology to improve the world around us.

For more than 60 years, the College has helped set the standard for educational excellence in North Texas. With more than 7,400 students and more than 36,000 alumni, it is the fourth-largest engineering school in the state. The College offers students one of the most comprehensive programs in the nation, with 11 baccalaureate, 13 master's, and nine doctoral programs. We are proud of our diversity. Our students come from 73 countries, our Hispanic population reflects UTA's status as a Hispanic-serving institution, and our population of female students and faculty continues to grow. The College of Engineering offers students one of the most comprehensive programs in the nation, with 11 baccalaureate, 13 master's, and nine doctoral programs. We are proud of our diversity. Our students come from 73 countries, our Hispanic population reflects UTA's status as a Hispanic-serving institution, and our population of female students and faculty continues to grow. We are tackling important issues and developing technology for the future as a as a Carnegie Foundation "Research-1: highest research activity" institution research university and recently became just the fourth institution in the state to achieve designation as a Texas Tier One university, a significant milestone of excellence in academics and research that brings with it access to the state's National Research University Fund. These designations have led to engineering faculty research expenditures of more than $41 million per year in key areas such as healthcare, security, energy, and the environment, with funding from agencies such as the National Science Foundation, National Institutes of Health, the U.S. Departments of Defense and Energy, NASA, and the American Heart Association, among others. Thousands of our alumni work in industry in the Dallas-Fort Worth Metroplex, and our influence is felt in dozens of Fortune 500 companies across the United States. We are an integral member of our community and we are making an impact on the daily lives of millions of people around the world.

undergraduate education

Baccalaureate degree programs are offered in aerospace engineering, architectural engineering, bioengineering, civil engineering, computer engineering, computer science, construction management, electrical engineering, industrial engineering, mechanical engineering, and software engineering. The programs in aerospace engineering, architectural engineering, civil engineering, computer engineering, electrical engineering, industrial engineering, mechanical engineering, and software engineering are accredited by the Engineering Accreditation Commission (EAC) of ABET, http://www.abet.org (http://www.abet.org/). The program in computer science is accredited by the Computing Accreditation Commission (CAC) of ABET. The program in Construction Management is accredited by the Applied and Natural Science Accreditation Commission (ANSAC) of ABET. Graduate degrees are offered in each of these disciplines and in another area of specialization: materials science and engineering. All of the graduate programs offer master's and doctoral degrees except construction management, engineering management, and software engineering, which offer only master's degrees. A combined B.S. (Biology) / M.S. (Biomedical Engineering) degree is available for students interested in tissue engineering and biotechnology; see the Other Engineering Subject Areas section and the Biology section of the Undergraduate Catalog and the Biomedical Engineering section of the Graduate Catalog for details. There are several engineering "Fast Track" programs where outstanding seniors may begin taking graduate classes for credit while still in their undergraduate course of study. More details on "Fast Track" programs are provided in a later section.

Preparation in High School for Admission to the College of Engineering

For students intending to pursue a major in engineering or computer science, the following preparation in high school is recommended. This course work can be completed within the Texas High School Graduation Program options, approved by the State Board of Education for students entering grade 9 beginning with the School Year 2014-2015.

Specifically, the following credits are recommended to prepare students for entry level college courses in engineering.

English Language Arts	**4**
4 credits of English Language Arts	
Mathematics	**4**
4 credits, including 1 credit each in Algebra I, Algebra II, and Geometry, and 1 credit which includes trigonometry. With the exception of students pursuing Construction Management, an additional year of advanced mathematics, such as calculus, is strongly encouraged.	
Science	**4**
4 credits, including 1 credit each in Biology, Chemistry, Physics, and 1 credit in another science elective	
Languages other than English	**2**
Foreign Language – 2 credits in a single foreign language	
Social Studies	**2**
2 credits, including 1 credit in U.S. History and 0.5 credit in U.S. Government, and 0.5 credit in Economics.	
Computer Science	**1**

Computer Science – 1 credit in computer science and coding	
Total Hours	**17**

In all areas, students are urged to take advantage of advanced placement opportunities and honors programs. A student who enrolls without having completed the above credits will not be optimally prepared, and the duration of the student's undergraduate program will likely be extended. In particular, the engineering and computer science programs offered by the college are based upon a student being fully prepared to begin study with the following courses: English 1301, MATH 1426, and CHEM 1441 or CHEM 1465.

Admission to the College of Engineering

Admission to the College of Engineering is based on the University's undergraduate admission requirements plus the following additional admission criteria for the College.

Students Entering Directly from High School

Students entering directly from high school or with less than 24 hours of transfer credit will be evaluated on the basis of the following admission criteria:

- meeting UTA admissions requirements.
- presenting a satisfactory SAT or ACT score
- for all programs other than Construction Management, completing the prerequisites necessary to enroll in MATH 1426 and CHEM 1441 or CHEM 1465.

Students for whom English is the primary language must present a minimum of two high school units in a single foreign language. Students otherwise qualified, but not presenting such credit, will be admitted with a foreign language deficiency that must be removed prior to graduation. (Refer to College of Engineering Academic Regulations item 7, Foreign Language Deficiency Removal.) This requirement cannot be satisfied with computer science or programming language credit.

Students entering directly from high school or with less than 24 hours of transferrable credit will initially be advised by the Division of Student Success (DSS). Transitioning to advisement by College of Engineering advisors will occur as the student accomplishes certain GPA and course completion milestones.

Students Entering with Transfer Credit

Transfer students include those from other units within UTA and those from other educational institutions. Transfer students with less than 24 hours of transferable credit are admitted under the criteria for students entering directly from high school.

Transfer students with 24 hours or more of transferable credit will be evaluated on the basis of the following admission criteria:

- meet UTA admissions requirements.
- for transfer to all programs other than Construction Management, at minimum, complete the prerequisites necessary to enroll in MATH 1426 with no more than three attempts in any prerequisite course.
- have earned a GPA of 3.0 or above in transferred courses applicable to the degree plan requirements.
- have an overall GPA of 3.0 or above in all transferred courses.
- comply with the C-grade rule. (See Academic Regulation 5 below.)
- comply with the three-attempt rule. (See Academic Regulation 9 below.)

Students for whom English is the primary language must present a minimum of two high school units in a single foreign language. Students otherwise qualified, but not presenting such credit, will be admitted with a foreign language deficiency that must be satisfied prior to graduation. (Refer to College of Engineering Academic Regulations item 7, Foreign Language Deficiency Removal.) This requirement cannot be satisfied with computer science or programming language credit.

Advising

Students entering directly from high school and those with less than 24 hours of transferrable credit are advised initially in the Division of Student Success (DSS). Students are transitioned to advising in the College of Engineering as they progress successfully in their degree programs.

Students with 24 hours or more of transferrable credit are advised in the College of Engineering. New transfer students who are undecided about their engineering major or who are conditionally admitted are advised in Engineering Student Services; others are advised in their major department. New students will not be able to register for classes without first being advised and obtaining an approval to register.

Continuing students in all engineering majors must receive advising by their major departments before registering. One period in October and another in March are designated for preregistration advising. Students must be cleared (showing that they have been advised) before proceeding with registration.

The advising goal for students who have not yet attained professional program status is to strengthen their academic background sufficiently so that they are able to subsequently complete courses in their engineering degree plans. To this end, a student's advisor may require him or her to enroll in fewer courses than specified by the University and may require him or her to retake courses for which credit has already been received. See individual department program descriptions for requirements.

The College of Engineering's Engineering Student Services, located in 242 Nedderman Hall, houses the Co-op program and coordinated tutoring, assessment, and academic advising for engineering students.

Admission into the Professional Program

Students who have successfully completed the initial program of study may apply to their department for advancement to the professional program. Prior to admission to the professional program, students are required to demonstrate their intellectual talent, work habits, and professional ethics to warrant acceptance for study toward an engineering or computer science degree.

Hereafter, the term "pre-professional courses" is used for the set of courses, as specified by the degree plan, required for entrance into the professional program. The term "professional courses" is used for the later courses in the engineering major, generally 3000- and 4000-level courses. See each program's requirements for the degree in this catalog for specifics. The professional program includes students who have been accepted by an engineering department into the professional program course sequence. An official degree plan is filed upon acceptance into this category. For advancement to a department's professional program, students must meet the following requirements:

- **Academic performance:** Students must have completed all pre-professional courses with a grade of C or better, completed at least 12 hours of math, science and engineering courses required for the degree and taken at UTA, complied with the Three-Attempt Rule, and achieved a minimum three-calculation GPA as specified by the department. Refer to the College of Engineering Academic Regulations and individual department program descriptions for specific requirements in the desired program.

Competence in Oral Communication and Computer Use

Students in engineering and computer science satisfy the oral communication requirement by successfully completing COMS 2302. Programs in the College of Engineering have different requirements for demonstrating computer literacy. Students should consult their particular degree program for details.

College of Engineering Academic Regulations

All students pursuing a degree in one of the College's academic programs must abide by the academic regulations of the University and the following additional rules established by the College of Engineering:

Regulations Regarding Work at Other Institutions

1. Enrollment in Other Institution(s): To ensure adequate coverage of needed material, once enrolled at UTA as an engineering major, a student must obtain written permission from the department before enrolling in courses intended to be transferred to the University for credit toward a UTA engineering degree.

2. Transfer Courses: Only equivalent courses in a program accredited by ABET or those lower division courses accepted by the College of Engineering or the student's major department can be counted toward an engineering degree.

3. Validation of Transfer Credit: Transfer credit that constitutes a part of a continuing course sequence in the same area will be validated only upon satisfactory completion of the succeeding course in the sequence at UTA. Students whose performance in the subsequent courses at UTA is poor may be required to repeat courses taken elsewhere.

Regulations Regarding Work at UTA

4. Academic Honesty: The College of Engineering takes academic honesty and ethical behavior very seriously. Engineers are entrusted with the safety, health, and well-being of the public. Students found guilty of academic dishonesty will be punished to the full extent permitted by the rules and regulations of the University, up to and including dismissal from the College and/or the University.

5. C-Grade Rule: A grade of D or lower in a pre-professional course indicates unsatisfactory preparation for further engineering education. Any such course in which a D or lower is earned must by repeated before enrolling in any course for which it is a prerequisite. This requirement is subject to the Three-Attempt Rule. Students unable to raise their grade to at least a C in a pre-professional course within three enrollments (attempts) are required to change their major to a field outside of the College or to a College of Engineering program that does not include that course.

6. English as a Foreign Language: Courses in English as a foreign language will not substitute for either ENGL 1301 or ENGL 1302.

7. Foreign Language Deficiency Removal: Students admitted to the College of Engineering with a deficiency in foreign language must remove that deficiency prior to graduation by taking two courses in a single modern or classical language totaling not less than six semester hours credit (eight semester hours are required in the current UTA introductory modern and classical languages sequence). This requirement cannot be satisfied with computer science or programming language credit.

8. Academic Load: Students may not enroll in more than the University's maximum permitted academic load without receiving the permission of the their department and the Dean of Engineering. The College of Engineering considers 12 semester hours in the fall and spring terms and nine semester hours in the 11-week summer term to be a minimum "full load" for undergraduates.

9. Three-Attempt Rule: Students may attempt a course (at UTA and/or at any other institution) a maximum of three times and apply that course toward an undergraduate degree in the College of Engineering. The "course", in this context, is any course which is a degree requirement or preparatory to a degree requirement. Enrollment in a course for a period of time sufficient for assignment of a grade, including a grade of W, is considered an attempt.

Regulations Regarding Academic Standing

10. Three-Calculation GPA: The College of Engineering uses three GPA calculations to evaluate students for admission and continuation. The college will use the university's grade exclusion/forgiveness policy applicable to the student in determining the three GPA calculations.

Note: only grades earned at UTA are used in the COE GPA calculations. A student's COE three-calculation GPA must meet or exceed the requirement in each of the following three categories:

- All courses
- All math, science, engineering and construction management courses applicable to the degree being sought, and
- All courses in the major subject applicable to the degree being sought.

11. Satisfactory Academic Standing: College of Engineering pre-professional program students are in satisfactory academic standing if they are not on University probation and at the same time maintain a 3-calculation GPA of 2.25 in the pre-professional program, are not in violation of the 3-attempt rule, and meet the GPA requirements of their major program. College of Engineering professional program students are in satisfactory academic standing if they are not on University probation and at the same time maintain a major GPA and overall GPA of 2.0, are not in violation of the 3-attempt rule, and meet the GPA requirements of their major program. (See the major department section of the catalog for this requirement.)

12. College of Engineering Probation: Academic standing is determined at the end of each semester after official grades post. College of Engineering students in the pre-professional portion of their program will be placed on College of Engineering probation if any one of the three GPA calculations falls below 2.25. Students on College of Engineering probation and in the pre-professional portion of the program are advised by an Engineering Student Services advisor. While on probation, students may be required to participate in student success activities, meet course grade requirements, and may be restricted in course load and/or course selection. Students remain on College of Engineering probation until either all three GPA calculations meet the minimum required 2.25 or they are dismissed from the College. Once in the professional program, students in a College of Engineering major may be placed on College of Engineering probation if their major GPA or overall GPA falls below their program's requirement for graduation, which is 2.0 for all programs.

Regulations Regarding Transient Student Enrollment in Engineering Courses

13. Enrollment of transient status students in COE courses will be approved on a case by case basis by the offering department. Criteria includes status of student in their home institution, academic record, and prerequisite status for courses requested.

Note: For all COE regulations, GPA requirements and calculations are truncated (not rounded) after three decimal places.

Designated Tuition Charge

In addition to fees applicable to the entire University, each engineering course carries a "designated tuition" charge (authorized by the Board of Regents per statute 54.0513) detailed under Description of Tuition and Fees (http://catalog.uta.edu/academicregulations/tuition_fees/).

College of Engineering Minors

A number of the undergraduate programs in the College of Engineering offer students in other disciplines the opportunity to earn a minor. In most cases a student has to complete 18 hours of course work as designated by the program. In many cases some of the courses in the minor may be used as an elective in the program the student is majoring in. The following departments in the College of Engineering offer minors: The Mechanical and Aerospace Engineering Department offers minors in Aerospace Engineering (http://www.uta.edu/engineering/future-students/undergraduate/programs/aerospace-engineering-minor.php) and Mechanical Engineering (https://www.uta.edu/academics/schools-colleges/engineering/academics/undergraduate/mechanical-minor-ug/). The Bioengineering Department offers a minor in Biomedical Engineering (https://www.uta.edu/engineering/future-students/undergraduate/programs/biomedical-engineering-minor.php). The Computer Science and Engineering Department offers a minor in Computer Science (http://www.uta.edu/engineering/future-students/undergraduate/programs/computer-science-minor.php). The Electrical Engineering Department offers a minor in Electrical Engineering (http://www.uta.edu/engineering/future-students/undergraduate/programs/electrical-engineering-minor.php). The Industrial, Manufacturing and Systems Engineering Department offers a minor in Industrial Engineering (http://www.uta.edu/engineering/future-students/undergraduate/programs/industrial-engineering-minor.php). The Materials Science and Engineering Department offers a minor in Materials Science and Engineering (https://www.uta.edu/academics/schools-colleges/engineering/academics/undergraduate/materials-minor/). The College of Engineering offers minors in Nuclear Engineering and Sustainable Engineering, as detailed in the following section.

Requirements for a Minor in Nuclear Engineering

To receive a minor in Nuclear Engineering, a student must complete the following courses with a grade of C or better in each:

NE 3301	INTRODUCTION TO NUCLEAR ENGINEERING	3
NE 4302	NUCLEAR REACTOR THEORY AND TECHNOLOGY OF THE NUCLEAR POWER PLANT	3
NE 4303	NUCLEAR POWER PLANT ENGINEERING	3
Select three of the following (with a grade of C or better in each):		9
MAE 3311	THERMODYNAMICS II	
MAE 3309	THERMAL ENGINEERING	
MAE 3314	HEAT TRANSFER	
MAE 4347	HEAT EXCHANGER DESIGN	
MAE 4310	INTRODUCTION TO AUTOMATIC CONTROL	
EE 3302	FUNDAMENTALS OF POWER SYSTEMS	
EE 4314	CONTROL SYSTEMS	
PHYS 3446	NUCLEAR AND PARTICLE PHYSICS	
Total Hours		**18**

Requirements for a Minor in Sustainable Engineering

To receive a minor in Sustainable Engineering, a student must complete the following courses with a grade of C or better in each:

CE 2300	INTRODUCTION TO SUSTAINABLE ENGINEERING	3
ENGR 4395	SUSTAINABLE ENGINEERING DESIGN PROJECT	3
Select 1 from the following Societal Context Electives (3 hours)		
ECON 2305	PRINCIPLES OF MACROECONOMICS	3
IE 2308	ECONOMICS FOR ENGINEERS	3
Select 3 from the following Sustainable Engineering Electives (9-10 hours)		
ARCH 3354	INTRODUCTION TO ENVIRONMENTAL & SUSTAINABILITY STUDIES	3
ARCH 3357	DESIGN TECHNOLOGIES - BUILDING INFORMATION MODELING FOR ARCHITECTS/ENGINEERS	3
ARCH 3361	ARCHITECTURE AND ENVIRONMENT	3
ARCH 3551	BASIC DESIGN FOR ENGINEERS	5
ARCH 3553	DESIGN STUDIO: ARCHITECTURE I	5
ARCH 4332	ENERGY USE AND CONSERVATION IN ARCHITECTURE	3
AREN 4307	CONSTRUCTION SUSTAINABILITY	3
AREN 4326	GIS/HYDROLOGIC & HYDRAULIC MODELING	3
BE 3415	FUNDAMENTALS OF BIOMOLECULAR ENGINEERING	4
BE 4331	BIOPOLYMERS AND BIOCOMPATIBILITY	3
BE 4368	AN INTRODUCTION TO TISSUE ENGINEERING AND DRUG DELIVERY	3
BE 4373	FORMULATION AND CHARACTERIZATION OF DRUG DELIVERY SYSTEMS	3
CE 4307	CONSTRUCTION SUSTAINABILITY	3
CE 4310	SYSTEM EVALUATION IN CIVIL ENGINEERING	3
CE 4323	LANDFILL DESIGN	3
CE 4326	GIS/HYDROLOGIC AND HYDRAULIC MODELING	3
CE 4350	INTRODUCTION TO AIR POLLUTION	3
CE 4351	PHYSICAL UNIT PROCESSES	3
CE 4353	WATER CHEMISTRY	3
CE 4354	INTRODUCTION TO SOLID WASTE ENGINEERING	3
CE 4355	DESIGN OF WATER AND WASTEWATER TREATMENT FACILITIES	3
CM 3337	CONSTRUCTION ADMINISTRATION AND ECONOMICS	3
CM 4357	SUSTAINABLE BUILDING PRACTICE	3
ECON 2337	ECONOMICS OF SOCIAL ISSUES	3
EE 3302	FUNDAMENTALS OF POWER SYSTEMS	3
EE 4314	CONTROL SYSTEMS	3

IE 3315	OPERATIONS RESEARCH I	3
IE 4345	DECISION ANALYSIS IN SYSTEM DESIGN	3
IE 4351	FUNDAMENTALS OF SYSTEMS ENGINEERING	3
MAE 4324	POWER PLANT ENGINEERING	3
MAE 4382	RESEARCH TRENDS IN RENEWABLE ENERGY TECHNOLOGIES	3
MAE 4386	WIND & OCEAN CURRENT ENERGY HARVESTING FUNDAMENTALS	3
GEOL 1301	EARTH SYSTEMS	3
GEOL 1330	GLOBAL WARMING	3
GEOL 2406	NATURAL RESOURCES & SUSTAINABILITY	4
GEOL 4323	ISSUES IN ENVIRONMENTAL HEALTH	3
GEOL 4356	ENVIRONMENTAL RISK ASSESSMENT	3
GEOL 4455	MATHEMATICAL MODELING OF ENVIRONMENTAL QUALITY SYSTEMS	4
PHYS 1351	ENERGY AND ENVIRONMENT	3
Total Hours		18

Requirements for an "Engineering Math" Minor

The Mathematics Department supports an Engineering Math minor available to students with a major in the College of Engineering. For specific requirements, please see the departmental advisor in the major program.

Undergraduate Certificates

Undergraduate certificates in areas of specialization are offered in the College of Engineering. These certificates include a Certificate in Automotive Engineering, Certificate in Nanotechnology and a Certificate in Unmanned Vehicle Systems, with others being added. Typically, students must complete 12 to 15 hours of course work as detailed in the requirements for specific programs to earn a certificate. These certificates can be earned by students who are pursuing their undergraduate degree at UTA, by students who are enrolled in other institutions, or by students who have already completed a degree at another institution and wish to specialize in a new field. More information about the certificates offered in the College of Engineering is provided in individual department sections of the catalog and on the web pages of the departments offering the certificates.

Honors Degree

College of Engineering students who wish to graduate with an Honors Degree in Engineering must be members of the Honors College in good standing. They must complete the major degree requirements and the requirements of the Honors College. Honors Degree requirements are compatible with all departmental and college requirements, but specific requirements vary with each engineering department’s program. It is particularly important that students pursuing an Honors Degree in Engineering consult carefully with an advisor in the College of Engineering and also in the Honors College before each registration to be sure all requirements are met.

Fast Track Program

The Fast Track Program enables outstanding UTA senior undergraduate students in several disciplines to satisfy degree requirements leading to a master’s degree in that discipline while completing their undergraduate studies. When senior-level students are within 15 hours of completing their undergraduate degree requirements, they may take up to nine hours of graduate level coursework designated by the program to satisfy both undergraduate and graduate degree requirements. Interested undergraduate students should discuss this option with their advisors. Information is provided in the department section of this catalog, with details available in departmental offices.

At this time, there are Fast Track programs in the following undergraduate programs:

- Aerospace Engineering leading to an M.S. Degree in Aerospace Engineering
- Biochemistry leading to an M.S. Degree in Biomedical Engineering
- Biology leading to an M.S. Degree in Biomedical Engineering
- Biomedical Engineering leading to an M.S. Degree in Biomedical Engineering
- Civil Engineering leading to a Master of Engineering Degree in Civil Engineering
- Civil Engineering leading to an M.S. Degree in Civil Engineering
- Computer Engineering leading to an M.S. Degree in Computer Engineering
- Computer Science leading to an M.S. Degree in Computer Science
- Electrical Engineering leading to an M.S. Degree in Electrical Engineering
- Industrial Engineering leading to an M.S. Degree in Industrial Engineering
- Mathematics leading to an M.S. Degree in Biomedical Engineering
- Mechanical Engineering leading to an M.S. Degree in Mechanical Engineering

- Mechanical Engineering leading to an M.S. Degree in Materials Science and Engineering
- Physics leading to an M.S. Degree in Materials Science and Engineering
- Physics leading to an M.S. Degree in Biomedical Engineering
- Software Engineering leading to an M.S. Degree in Software Engineering

Professional Licensure

The protection of the public welfare requires that those who practice engineering do so ethically and competently. Professional licensure requires an individual to meet examination and practice requirements defined by the laws of the state or states in which he or she intends to practice.

The first step toward licensure as a Professional Engineer (P.E.) is to pass the Fundamentals of Engineering (FE) examination. Graduating seniors are permitted to take the FE examination during their final year. The FE examination is offered by the Texas Board of Professional Engineers in both the fall and spring semesters. Since this examination is over topics common to all engineering degree programs, students are strongly urged to avail themselves of this opportunity at a time when their academic preparation is at a peak.

Pre-med and Pre-law Studies

Students graduating with degrees in engineering occasionally choose to go on to medical schools or law schools. Those students are advised to consult early with UTA pre-med or pre-law advisors so that additional requirements can be taken in a timely way. For example, a minimum set of additional courses for an engineer planning to apply to medical school consists of 4 chemistry courses (2 in general chemistry, 2 in organic chemistry), and 4 biology courses (2 in general biology plus 6 hours of advanced Biology).

Cooperative Education

The Cooperative Education Program is a partnership between the University and business, government, and industry that provides students the opportunity to obtain experience in their chosen engineering discipline by alternating periods of formal study with periods of work or through a parallel program which allows students to work part-time while taking courses. This program enhances a student's education through work-related experiences and by association with participating professional engineers, and also provides a competitive salary when working.

Students who successfully complete the Co-op Program will receive cooperative education certificates and have this accomplishment entered on their transcripts. Co-op Program students are expected to register each work term in an engineering course (ENGR 2100, ENGR 3100, ENGR 4100, ENGR 3000) specified by the Director of the Co-op Program. For enrollment reporting purposes only, students registered for one of these four courses will be considered full-time students. ENGR 2100 will be designated as the part- time co-op course. Students classified as full-time students under the Co-op Program are not eligible for financial aid, but can use this designation for enrollment reporting for insurance purposes. Students requiring financial aid must meet state and federal enrollment guidelines for enrollment in the required minimum semester credit hours each semester where aid is sought. The College of Engineering provides assistance in placing students with companies that are related to their specific needs and program of study.

Information on prerequisites for application and requirements for acceptance are available in the Cooperative Education Office, 242 Nedderman Hall, and on the College of Engineering web site (http://www.uta.edu/engineering/).

Research and Graduate Education:

The College of Engineering offers 9 doctoral degrees and 12 Master's degrees. The College of Engineering and its faculty, in conjunction with research centers, laboratories and groups across the University, have produced nearly $55 million in engineering-related research expenditures from government agencies and private industry.

Working professionals interested in pursuing a graduate degree may choose from more than 130 online courses available most semesters.

Research Interests of Faculty

Bioengineering **(**http://www.uta.edu/bioengineering/**)**

Biomaterials, biosensors, drug delivery, ultrasound medical imaging, tissue engineering, regenerative medical engineering, acousto-optical imaging, biological signal processing, electroencephalogram (EEG) and magnetoencephalography (MEG), soft and hard-tissue mechanics, neural engineering.

Civil Engineering **(**http://www.uta.edu/ce/**)**

Construction, environmental, geotechnical, infrastructure, structural, transpiration and water resources engineering; service life prediction of infrastructure and pipelines, structural hazard mitigation; bridge design and rehabilitation; structural reliability; earthquake engineering; non-destructive testing of structural systems; advanced construction materials; resilient and sustainable construction; risk-based construction optimization; chemical analysis of construction materials; transportation planning, traffic flow theory; traffic engineering; highway capacity analysis; transportation systems analysis; operations research; hydrology; flood prediction; flood mitigation; remote sensing hydrology, water infrastructure, radar hydrology; active and passing remote sensing of water; climate change and hazard resilience of water infrastructure; toxic-waste abatement; biological and chemical processes in water quality control; water reclamation and reuse; natural systems for wastewater treatment; solid waste treatment; soil

stabilization and reliability based foundation design; geothermal energy; slope stabilization of bridge abutment using novel sustainable material; sustainable waste/resource management.

Computer Science and Engineering (http://cse.uta.edu)

Artificial intelligence, computer vision, machine learning, robotics, database, data analytics, data mining, data science, natural language processing, blockchain, cloud computing, cyber-physical systems, distributed systems, embedded systems, high-performance computing, Internet of things, mobile computing, networks, operating systems, sustainable computing, assistive technologies, biomedical computing, medical image analysis, smart assessment, human-computer interaction, human-robot interaction, training and rehabilitation technologies, cybersecurity, information security, privacy, software engineering, software testing, software analysis, reverse engineering, mobile software engineering.

Electrical Engineering (http://www.uta.edu/ee/)

Nanotechnology, quantum optics, quantum well devices, integrated optics, fiber optics, biophotonics, MEMS, electron-device modeling, nanoelectronics, analog and digital CMOS sensing ICs, neuromorphic circuit design, power electronics, power systems, utility deregulation issues, renewable energy and vehicular technology, robotics, UAS, feedback control, cooperative decisions and game theory, flight simulation and management, cyber physical systems, signal and image processing, deep learning and neural networks, machine learning, information extraction from large datasets, large system optimization, IoT and 5G communications, remote sensing and wave scattering, millimeter-wave beamforming antennas, real-time digital and analog systems, human performance.

Industrial, Manufacturing & Systems Engineering (http://www.uta.edu/ie/)

Decision analytics, design for producibility and reliability, manufacturing systems, automation, CAD/CAM, robotics, engineering design and development process, environmental health & safety, computer-integrated enterprise, statistical process control, manufacturing error analysis, linear models, work sampling, discrete event computer simulation, economic decision making, production and inventory control, engineering management, manufacturing, logistics, enterprise engineering, operations research, statistics.

Materials Science and Engineering (http://www.uta.edu/mse/)

Phase transformations and diffusion in materials; mechanical behavior, fatigue and fracture of materials; materials characterization and analysis; nanomaterials; nanotechnology; nanoelectronics; semiconductor processing; biomaterials and bio-sensors; soft materials; surface engineering, thin films and coatings; tribology; corrosion; high temperature materials; materials for energy applications; materials for microelectronics; materials reliability; computational materials science; construction and cementitious materials chemistry.

Mechanical & Aerospace Engineering (http://www.uta.edu/mae/)

Computational and experimental fluid dynamics, flight dynamics and controls, supersonic and hypersonic aerodynamics, hypersonic propulsion, detonations and pressure gain combustion, smart structures/materials. Dynamic systems and controls, design and manufacturing, fluid mechanics, heat transfer, sprays, and combustion, solid mechanics and structures, biomedical applications of heat and mass transfer. Composites: damage tolerance, fatigue and fracture analysis. Thermal science and energy systems: energy systems and sustainability, energy efficiency of data centers, and micro and power electronics packaging including heterogeneous integration.

The University hosts two formal research centers, The University of Texas at Arlington Research Institute and the Shimadzu Institute Nanotechnology Research Center, where a significant amount of the ongoing research is related to engineering and a number of the College's graduate students and faculty participate.

Many College of Engineering faculty members collaborate with professors and researchers in other colleges at UTA and other institutions in the state, around the U.S., and around the world. Therefore, for those interested in doing research as part of graduate training, there are many opportunities to work on research projects that are either within the home department or interdisciplinary with other departments.

Programs

Graduate work in engineering at UT Arlington may lead to the master of science, master of engineering or doctor of philosophy in the following programs:

- Aerospace Engineering (MS (http://www.uta.edu/engineering/future-students/programs-masters/mechanical-and-aerospace-engineering/msae.php), ME (http://www.uta.edu/engineering/future-students/programs-masters/mechanical-and-aerospace-engineering/meae.php) and Ph.D. (http://www.uta.edu/engineering/future-students/programs-phd/aerospace-engineering-phd.php))
- Biomedical Engineering (MS (http://www.uta.edu/engineering/future-students/programs-masters/bioengineering/msb.php) and Ph.D. (http://www.uta.edu/engineering/future-students/programs-phd/biomedical-engineering-phd.php))
- Civil Engineering (MS (http://www.uta.edu/engineering/future-students/programs-masters/civil-engineering/msce.php), ME (http://www.uta.edu/engineering/future-students/programs-masters/civil-engineering/mece.php) and Ph.D. (http://www.uta.edu/engineering/future-students/programs-phd/civil-engineering-phd.php))
- Computer Science (MS (http://www.uta.edu/engineering/future-students/programs-masters/computer-science-and-engineering/mscs.php) and Ph.D. (http://www.uta.edu/engineering/future-students/programs-phd/computer-science-phd.php))
- Computer Engineering (MS (http://www.uta.edu/engineering/future-students/programs-masters/computer-science-and-engineering/msce.php) and Ph.D. (http://www.uta.edu/engineering/future-students/programs-phd/computer-engineering-phd.php))

- Electrical Engineering (MS (http://www.uta.edu/engineering/future-students/programs-masters/electrical-engineering/msee.php), ME (http://www.uta.edu/engineering/future-students/programs-masters/electrical-engineering/meee.php) and Ph.D. (http://www.uta.edu/engineering/future-students/programs-phd/electrical-engineering-phd.php))
- Industrial Engineering (MS (http://www.uta.edu/engineering/future-students/programs-masters/industrial-and-manufacturing-systems-engineering/msie.php), ME (https://www.uta.edu/academics/schools-colleges/engineering/academics/departments/industrial/) and Ph.D. (http://www.uta.edu/engineering/future-students/programs-phd/industrial-engineering-phd.php))
- Materials Science and Engineering (MS (http://www.uta.edu/engineering/future-students/programs-masters/materials-science-and-engineering/msmse.php), ME (http://www.uta.edu/engineering/future-students/programs-masters/materials-science-and-engineering/memse.php) and Ph.D. (http://www.uta.edu/engineering/future-students/programs-phd/materials-science-and-engineering-phd.php))
- Mechanical Engineering (MS (http://www.uta.edu/engineering/future-students/programs-masters/mechanical-and-aerospace-engineering/msme.php), ME (http://www.uta.edu/engineering/future-students/programs-masters/mechanical-and-aerospace-engineering/meme.php) and Ph.D. (http://www.uta.edu/engineering/future-students/programs-phd/mechanical-engineering-phd.php))

In addition, master's degree programs are available in:

- Engineering Management (MS (http://www.uta.edu/engineering/future-students/programs-masters/industrial-and-manufacturing-systems-engineering/msem.php))
- Software Engineering (MS (http://www.uta.edu/engineering/future-students/programs-masters/computer-science-and-engineering/msse.php))

And a new interdisciplinary master's degree is available in:

- Data Science (MS (http://www.uta.edu/academics/schools-colleges/engineering/academics/masters/data-science-ms/))

Graduate work leading to a practice-oriented master's degree usually requires a design project, report, internship or additional coursework. Details are given in the individual program descriptions that follow.

Biomedical Engineering is a joint program between the Bioengineering Department and The University of Texas Southwestern Medical Center. The Master of Science in Logistics and Master of Science in Engineering Management are offered in partnership with the College of Business.

In addition to specific graduate degrees, students currently enrolled in degree-earning graduate programs, as well as applicants who have earned undergraduate degrees elsewhere, may earn Graduate Certificates in various areas of specialization. Typically, graduate certificates require the completion of 12-15 hours of graduate course work in a specified set of courses. Details are provided in individual departmental sections of the catalog.

Please visit the graduate program Web Site http://www.uta.edu/engineering/future-students/index.php (http://www.uta.edu/engineering/future-students/) for detailed information.