Bachelor of Science in Physics (Engineering Emphasis)

About This Program

The Bachelor of Science in Physics with Engineering Emphasis allows students to augment a rigorous training in Physics with the choice of a minor in a suitable engineering discipline. Thus, students combine a theoretical understanding of the basic physical theories with a practical, more detailed understanding given in the College of Engineering. Such a combination would be a bonus for employment in the engineering-type professions often chosen by Physics majors.

Physics majors are encouraged to participate in research projects under faculty guidance for course credit or financial reward. This way, undergraduate students can gain hands-on experience in various research disciplines, including astrophysics, biophysics, computational physics, high-energy physics, medical physics, optics, space physics, and theoretical and experimental condensed matter physics.

Competencies

1. Program graduates will be able identify, formulate, and solve complex engineering problems using physics, mathematics, and engineering principles.
2. Program graduates will be able to communicating technical information, to both technical and non-technical audiences, through written reports, presentations, and other means.
3. Program graduate will be able to work effectively in teams and to collaborate with others to achieve goals and objectives.
4. Program graduates will be capable of developing and conducting experiments, analyzing data, and drawing conclusions using engineering judgment.
5. Program graduates will be able to use computational tools and data analysis techniques to find physics and engineering based solutions to real world problems.
6. Program graduates will be able to demonstrate a solid understanding of mathematics and physics principles.
7. Graduates will be able to articulate the skills and knowledge they have gained and apply them to future career, employment, or educational goals.
8. Program graduates will be able to recognize and apply ethical considerations in engineering situations, understanding the impact of engineering solutions on society and the environment.

Admissions Criteria

Students considering a Physics major should schedule an appointment with the undergraduate advisor in Physics to discuss admissions criteria and degree options.

Curriculum

Foundations		
General Core Requirements (https://catalog.uta.edu/academicregulations/degreerequirements/generalcorerequirements/)		42
Students must complete specific courses in certain core areas.		
For Communication select:		
ENGL 1301 & ENGL 1302	RHETORIC AND COMPOSITION I and RHETORIC AND COMPOSITION II	
For Life & Physical Science select:		
PHYS 1443 & PHYS 1444	GENERAL TECHNICAL PHYSICS I and GENERAL TECHNICAL PHYSICS II	
For Mathmatics select:		
MATH 1426 & MATH 2425	CALCULUS I and CALCULUS II	
For US History select:		
HIST 1301	HISTORY OF THE UNITED STATES TO 1865	
HIST 1302	HISTORY OF THE UNITED STATES, 1865 TO PRESENT	
Physics Foundations		
Additional hours required in core.		4
Communication Competence - satisfied by PHYS 4117		
Select one of the following for Computer Science:		3
DATA 3401	PYTHON FOR DATA SCIENCE 1	

PHYS 2321	COMPUTATIONAL PHYSICS	
MATH 3345	NUMERICAL ANALYSIS AND COMPUTER APPLICATIONS	
Any CSE course numbered 3401 or higher.		
Another suitable course approved by undergraduate advisor or chair of the Department of Physics.		
CHEM 1441	GENERAL CHEMISTRY I	4
Select a course for majors from Biology, Chemistry & Biochemistry, or Earth & Environmental Sciences.		4
MATH 2326	CALCULUS III	3
MATH 3319	DIFFERENTIAL EQUATIONS & LINEAR ALGEBRA	3
or MATH 3318	DIFFERENTIAL EQUATIONS	
Physics Specialization		
PHYS 2311	MATHEMATICAL METHODS OF PHYSICS	3
PHYS 3313	INTRODUCTION TO MODERN PHYSICS	3
PHYS 3183	MODERN PHYSICS LABORATORY	1
PHYS 3321	INTERMEDIATE ELECTRICITY AND MAGNETISM	3
PHYS 4117	INDIVIDUAL LEARNING BY SEMINAR	1
PHYS 4315	THERMODYNAMICS AND STATISTICAL MECHANICS	3
or PHYS 4319	ADVANCED MECHANICS	
PHYS 4324	ADVANCED ELECTRICITY AND MAGNETISM	3
PHYS 4326	INTRODUCTION TO QUANTUM MECHANICS	3
Select 3-4 PHYS electives approved by undergraduate advisor or chair of the Department of Physics.		12
Minor and Electives		
Engineering Minor		18
Complete 18 hours in an approved Engineering minor.		
Select electives sufficent to bring total hours to 120, with 36 hours at the 3000/4000-level.		7
Total Hours		**120**

SUGGESTED COURSE SEQUENCE

Details of a personal course sequence should be made with the guidance of the Physics undergraduate advisor, particularly since many courses in Physics are not offered every semester. Consultation with the Health Professions advisor is also encouraged. For all entering freshmen, it is important to begin the mathematics sequence, starting with MATH 1426 CALCULUS I, in the first semester.

First Year

First Semester	Hours	Second Semester	Hours
PHYS 1443	4	PHYS 1444	4
MATH 1426	4	ENGL 1302	3
ENGL 1301	3	MATH 2425	4
HIST 1301	3	HIST 1302	3
	14		**14**

Second Year

First Semester	Hours	Second Semester	Hours
PHYS 3313	3	PHYS 2311	3
MATH 2326	3	PHYS 3183	1
MATH 3319 or 3318	3	Engineering minor course	3
Engineering minor course	3	BIOL, CHEM, or GEOL course for majors	4
CHEM 1441	4	Creative Arts core course	3
	16		**14**

Third Year

First Semester	Hours	Second Semester	Hours
PHYS 3321	3	PHYS 4324	3
Approved PHYS elective	4	Approved PHYS elective	4
Engineering minor course	3	Engineering minor course	3
Computer Science course	3-4	Social & Behavioral Science core course	3
POLS 2311	3	POLS 2312	3
	16-17		**16**

Fourth Year			
First Semester	**Hours**	**Second Semester**	**Hours**
PHYS 4315	3	PHYS 4117	1
PHYS 4326	3	Approved PHYS elective	4
Engineering minor course	3	Engineering minor course	3
Language, Philosophy & Culture core course	3	Foundational Component Area core course	3
General elective	3	General Elective(s)	4
	15		**15**

Total Hours: 120-121

Advising Resources

Location:

Science Hall 328 C

Email:

kaycee.nikses@uta.edu

Phone:

817-272-9686

Web:

Schedule an Appointment (https://www.uta.edu/academics/schools-colleges/science/departments/physics/advising/)