

Applied Physics, BS

Requirements

The Bachelor of Science with a major in applied physics requires a minimum of 120 s.h., including at least 56-87 s.h. of work for the major. Total credit required for the major depends on a student's choice of concentration. Students must maintain a grade-point average of at least 2.00 in all courses for the major and in all UI courses for the major. They also must complete the College of Liberal Arts and Sciences GE CLAS Core.

The major in applied physics is intended primarily for students interested in a broad program of study in physics combined with a significant concentration of courses in a field that has immediate application to high-technology industries. The degree provides a foundation for a wide range of employment opportunities in high-technology industries, including research and development, product design and testing, sales, and quality control. It also is designed to include exposure to physics sufficient to allow students to continue with graduate studies in either physics or astronomy.

An essential component of each concentration is the successful completion of a related one-semester internship or practicum experience in a research laboratory (an applied physics research report is required for the latter option). Well-prepared students will be able to complete the degree in four years. Students should work closely with their advisors on a graduation plan.

All applied physics students complete a common set of courses that includes calculus, linear algebra, physics, and an experiential learning course. They also complete the courses required for their chosen concentration. The department encourages students to take additional coursework; advisors can suggest electives that will enrich programs and help students prepare for graduate work. Flexibility to customize an area of concentration or to develop a unique concentration is available in consultation with the applied physics coordinator.

Students who want to earn a double major in applied physics and astronomy must choose their coursework carefully; see the section titled "Double Major in Applied Physics and Astronomy."

Students who earn a BS in applied physics may not earn a BA or BS in physics.

The BS with a major in applied physics requires the following courses. Many upper-level physics courses have prerequisites; students should consult their advisors when choosing courses numbered 3000 or above.

Requirements	Hours
Common Requirements	34-41
Concentration Area Courses	22-46

Common Requirements

Students in all concentrations must successfully complete the following courses or their equivalents.

Mathematics

Course #	Title	Hours
All of these:		
MATH:1850 & MATH:1860	Calculus I-II	8
MATH:2700	Introduction to Linear Algebra	4
MATH:2850	Calculus III	4
Or all of these:		
MATH:1550	Engineering Mathematics I: Single Variable Calculus	4
MATH:1560	Engineering Mathematics II: Multivariable Calculus	4
MATH:2550	Engineering Mathematics III: Matrix Algebra	2
MATH:3550	Engineering Mathematics V: Vector Calculus	3

Physics

Course #	Title	Hours
One of these sequences:		
PHYS:1611- PHYS:1612	Introductory Physics I-II	8
PHYS:1701 & PHYS:1702 & PHYS:2703	Physics I-II - Physics III (strongly preferred)	12
All of these:		
PHYS:2704	Physics IV	4
PHYS:3710	Intermediate Mechanics	3
PHYS:3741	Introduction to Quantum Mechanics I	3
PHYS:3811	Electricity and Magnetism I	3

Experiential Learning

Course #	Title	Hours
One of these:		
A one-semester industrial internship (requires a research report)		
A one-semester practicum in a research laboratory (requires a research report)		

Concentrations

Students select one of four concentration areas, or, with approval from the applied physics advisor, a custom concentration is permitted, such as acoustics and propulsion science.

Computer Science Concentration

Course #	Title	Hours
All of these:		
PHYS:3730	Statistical Physics	3
PHYS:3756	Intermediate Laboratory	3
PHYS:3812	Electricity and Magnetism II	3
PHYS:3850	Electronics	4
CS:1210	Computer Science I: Fundamentals	4
CS:2210	Discrete Structures	3
CS:2230	Computer Science II: Data Structures	4

One additional computer science course numbered 3000 or above	3
Two of these:	
CS:2630 Computer Organization	4
CS:2820 Introduction to Software Development	4
CS:3330 Algorithms	3

Optics Concentration

Course #	Title	Hours
All of these:		
PHYS:3730	Statistical Physics	3
PHYS:3756	Intermediate Laboratory	3
PHYS:3812	Electricity and Magnetism II	3
PHYS:3850	Electronics	4
PHYS:4720	Introductory Optics	3
Two of these:		
PHYS:4726	Electro Optics	3
PHYS:4728	Introductory Solid State Physics	3
PHYS:4820	Optical Signal Processing	3

Solid-State Electronics Concentration

Course #	Title	Hours
All of these:		
PHYS:3730	Statistical Physics	3
PHYS:4728	Introductory Solid State Physics	3
ECE:2400	Linear Systems I	3
ECE:2410	Principles of Electronic Instrumentation	4
ECE:3320	Introduction to Digital Design	3
ECE:3410	Electronic Circuits	4
ENGR:1300	Introduction to Engineering Computing	3
ENGR:2120	Electrical Circuits	3
ENGR:2730	Computers in Engineering	3
One of these:		
PHYS:3742	Introduction to Quantum Mechanics II	3
PHYS:3812	Electricity and Magnetism II	3

Medical Physics Concentration

Course #	Title	Hours
All of these:		
PHYS:3756	Intermediate Laboratory	3
PHYS:3850	Electronics	4
BIOL:1411- BIOL:1412	Foundations of Biology - Diversity of Form and Function	8
CHEM:1110 & CHEM:1120	Principles of Chemistry I-II	8
CHEM:2210 & CHEM:2220	Organic Chemistry I-II	6
CHEM:2410	Organic Chemistry Laboratory	3
Two additional biology courses numbered 2000 or above		6-8

One of these:		
BIOS:4120	Introduction to Biostatistics	3
STAT:3510	Biostatistics	3
One of these:		
PHYS:3730	Statistical Physics	3
PHYS:3742	Introduction to Quantum Mechanics II	3
PHYS:3812	Electricity and Magnetism II	3
PHYS:4750	Advanced Laboratory	3
PHYS:4905	Special Topics in Physics (when topic is physics of the body)	3

Undergraduate majors who plan to pursue graduate study are advised to go as far as they can beyond the minimum requirements, including further work in mathematics. In planning this work, they should be guided by the College of Liberal Arts and Sciences maximum hours rule: students earning a BS may apply a maximum of 56 s.h. earned in one department to the minimum 120 s.h. required for graduation, whether or not the coursework is accepted toward the requirements for the major. Students who earn more than 56 s.h. from one department may use the additional semester hours to satisfy requirements for the major (if the department accepts them), and the grades they earn become part of their grade-point average, but they cannot apply the additional semester hours to the minimum 120 s.h. required for graduation.

Double Major in Applied Physics and Astronomy

Students working toward a Bachelor of Science with a double major in applied physics and in astronomy must complete all requirements for both majors and must earn a minimum of 56 s.h. outside the Department of Physics and Astronomy in order to graduate. Students interested in earning a double major should consult with their advisors. See Requirements for a Bachelor's Degree on the College of Liberal Arts and Sciences website.