

College of Arts and Sciences

Physics

B.S. in Physics

Admission to the Program

Formal admission to the major requires a grade point average of 2.00 (on a 4.00 scale) and departmental approval.

University Requirements

- A total of 120 credit hours
- 6 credit hours of college writing
- 3 credit hours of college mathematics or the equivalent by examination

General Education Requirements

- A total of ten courses, consisting of one foundation course and one second-level course in an approved sequence from each of the five curricular areas
- No more than 6 credit hours may be taken in the same discipline

Tracks

Chemical Physics, Computational Physics, or Traditional Physics

Major Requirements

- 57 credit hours with grades of C or better

Course Requirements

Core (45 credit hours)

- CSC-280 Introduction to Computer Science I (4)
- MATH-221 Calculus I (4)
- MATH-222 Calculus II (4)
- MATH-313 Calculus III (4)
- MATH-321 Differential Equations (3)
- PHYS-110 University Physics I 5:1 (4)
- PHYS-210 University Physics II 5:2 (4)
(PHYS-110 and PHYS-210 may be waived for students with exceptional high school preparation)
- PHYS-365 Waves and Optics (3)
- PHYS-370 Modern Physics (3)
- PHYS-430 Classical Mechanics (3)
- PHYS-440 Experimental Physics (3)
- PHYS-450 Electricity and Magnetism (3)
- PHYS-470 Introduction to Quantum Mechanics (3)

Tracks (12 credit hours)

Chemical Physics

Prerequisite: CHEM-210 General Chemistry II 5:2 (4)

- 12 credit hours from the following:

CHEM-310 Organic Chemistry I (3)
CHEM-312 Organic Chemistry I Laboratory (1)
CHEM-320 Organic Chemistry II (3)
CHEM-322 Organic Chemistry II Laboratory (1)
CHEM-350 Quantitative Analysis (3)
CHEM-351 Quantitative Analysis Laboratory (2)
CHEM-410 Biophysical Chemistry (3)
CHEM-411 Biophysical Chemistry Laboratory (1)
CHEM-460 Instrumental Analysis (3)
CHEM-461 Instrumental Analysis Laboratory (2)

Computational Physics

- 12 credit hours from the following:
CSC-281 Introduction to Computer Science II (3)
CSC-330 Organization of Computer Systems (4)
CSC-432 Introduction to Simulation and Modeling (3)
CSC-520 Algorithms and Data Structures (3)
CSC-543 Object-Oriented Analysis and Design (3)

Traditional Physics

- 12 credit hours from the following:
MATH-310 Linear Algebra (3)
MATH-550 Complex Analysis (3)
MATH-551 Partial Differential Equations (3)
PHYS-220 Astronomy 5:2 (3)
PHYS-230 Changing Views of the Universe 5:2 (3)
PHYS-305 Acoustics (3)
PHYS-312 Electronics I (3)
PHYS-313 Electronics II (3)
PHYS-322 Electronics Lab I (2)
PHYS-323 Electronics Lab II (2)

University Honors Program

All University Honors students must complete at least 12 credit hours of advanced-level (300-level and above) Honors courses including a 3 to 6 credit hour Honors Senior Capstone Project. Students may graduate with University Honors in the major if they complete at least 12 advanced-level Honors courses including the Senior Capstone Project in the department. Each department has three levels of University Honors requirements: Level I Options (100-200-level Honors classes); Level II Options (300-level and above Honors classes); and Level III Options (Honors Senior Capstone). The department Honors coordinator advises students in the University Honors Program regarding departmental options. For more information, go to www.american.edu/academic.depts/honors/.

Minor in Applied Physics

- 18 credit hours with grades of C or better with at least 12 credit hours unique to the minor

Course Requirements

- PHYS-100 Physics for the Modern World 5:1 (4)
or
PHYS-105 College Physics I 5:1 (4)
or
PHYS-110 University Physics I 5:1 (4)
- PHYS-200 Physics for the New Millennium 5:2 (3)
or
PHYS-205 College Physics II 5:2 (4)
or
PHYS-210 University Physics II 5:2 (4)
- PHYS-220 Astronomy 5:2 (3)
or
PHYS-230 Changing Views of the Universe 5:2 (3)
- PHYS-370 Modern Physics (3)
- 6 credit hours in elective courses at the 300 level or above, including courses outside of physics in relevant areas of technology, society, and policy, as approved by the department.

Minor in Physics

- 24 credit hours with grades of C or better with at least 12 credit hours unique to the minor

Course Requirements

- MATH-221 Calculus I (4) *and*
MATH-222 Calculus II (4)
or
MATH-211 Applied Calculus I (4) *and*
MATH-212 Applied Calculus II (3)
- PHYS-105 College Physics I 5:1 (4)
or
PHYS-110 University Physics I 5:1 (4)
- PHYS-205 College Physics II 5:2 (4)
or
PHYS-210 University Physics II 5:2 (4)

- PHYS-370 Modern Physics (3)
- 6 credit hours in PHYS-xxx courses at the 300-level or above as approved by the student's advisor

Undergraduate Certificate in Applied Physics

Admission to the Program

Open to undergraduate degree and nondegree students. Credits earned for the certificate may be applied toward an undergraduate degree program.

Certificate Requirements

- 18 credit hours of approved course work with at least 9 credit hours at the 300-level or above, with grades of C or better. Grades of C- or D in certificate program courses are not accepted toward the fulfillment of certificate requirements, although these grades will be included in the calculation of the GPA. Students must have at least a 3.0 GPA in certificate courses in order to be awarded a certificate. Students in certificate programs must take a minimum of 6 credit hours during each 12-month period and complete the certificate in four years. International students must enroll in 12 credit hours each semester (except for summer). A maximum of 3 credit hours earned at an accredited college or university may be applied toward the certificate as transfer credit.

Course Requirements

- PHYS-100 Physics for the Modern World 5:1 (4) *and*
PHYS-200 Physics for the New Millennium 5:2 (3)
or
PHYS-105 College Physics I 5:1 (4) *and*
PHYS-205 College Physics II 5:2 (4)
or
PHYS-110 University Physics I 5:1 (4) *and*
PHYS-210 University Physics II 5:2 (4)
- PHYS-370 Modern Physics (3)
- 9 credit hours in elective courses, at least two of which must be at the 300 level or above, including courses outside of physics in relevant areas of technology, society, and policy, as approved by the department.