



Physics and Astronomy Major

www.PhysicsAndAstronomy.Pitt.edu/Undergraduate/Degree-Programs

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The University of Pittsburgh's internationally recognized Department of Physics and Astronomy has been an important leader at the frontier of science and, with 500 PhD alumni, has launched many distinguished careers. Now, at the onset of the 21st Century, the department is maintaining its traditions of excellence and innovation while leading the field in breakthroughs that promise an ever-deeper understanding of the universe. From sub-nuclear particles to the unimaginably large, from the birth of the universe to the edge of technology – and at the intersection of quantum and classical physics – our faculty and students explore the fundamental laws of nature. Students may expect to pursue research that influences many fields, including biology, mathematics, medicine, chemistry, engineering, and computer science.

Required courses for the Physics and Astronomy major

The BS in physics and astronomy requires the completion of 50 credits in physics and astronomy distributed as follows.

Introductory Physics courses

Select one group

___ PHYS 0174 Basic Physics, Science and Engineering 1

___ PHYS 0175 Basic Physics, Science and Engineering 2

___ PHYS 0475 Intro to Physics, Science and Engineering 1

___ PHYS 0476 Intro to Physics, Science and Engineering 2

Introductory Astronomy course

___ ASTRON 0113 Introduction to Astronomy

Intermediate and advanced Physics courses

___ PHYS 0477 Introduction to Thermodynamics, Relativity, and Quantum Theory

___ PHYS 1310 Undergraduate Seminar

___ PHYS 1321 Computational Methods in Physics

___ PHYS 1331 Mechanics

___ PHYS 1341 Thermodynamics and Statistical Mechanics

___ PHYS 1351 Intermediate Electricity/Magnetism

___ PHYS 1370 Quantum Mechanics 1

Laboratory courses; choose at least seven credits

Required courses

___ PHYS 0219 Basic Lab Physics for Science and Engineering (2 cr.) or

PHYS 0520 Modern Physical Measurements (3 cr.)

___ ASTRON 1263 Techniques of Astronomy (3 cr.)

Additional courses

___ PHYS 0525 Analog and Digital Electronics (3 cr.)

___ PHYS 1361 Wave Motion and Optics (3 cr.)

___ PHYS 1426 Modern Physics Laboratory (2 cr.)

Intermediate and advanced Astronomy courses

___ ASTRON 1120 Stars: Stellar Structure and Evolution

___ ASTRON 1121 Galaxies and Cosmology

___ ASTRON 1122 The Solar System and Exoplanets *

* GEOL 1701 Geology of the Planets may be substituted

Science elective; choose at least three credits *

___ CHEM 0110 General Chemistry 1 or CHEM 0710 Honors General Chemistry 1

___ CHEM 0120 General Chemistry 2 or CHEM 0720 Honors General Chemistry 2

___ CHEM 1410 Physical Chemistry 1

___ CS 0401 Intermediate Programming using Java

___ CS 0445 Data Structures

___ GEOL 0040 Physical Geology

___ GEOL 1410 Exploration Geophysics

___ GEOL 1701 Geology of the Planets **

___ MATH 1470 Partial Differential Equations

___ MATH 1550 Vector Analysis and Applications

___ MATH 1560 Complex Variables and Applications

___ PHYS 0481 Applications of Modern Physics

___ PHYS 1371 Quantum Mechanics 2

___ PHYS 1372 Electromagnetic Theory

___ PHYS 1373 Mathematical Methods of Physics

___ PHYS 1378 Introduction to Nuclear/Particle Physics

___ STAT 1151 Introduction to Probability

___ STAT 1152 Introduction to Mathematical Statistics

* Some of these courses have prerequisites

** If this course is taken as a science elective, it cannot be used to satisfy the requirement for nine credits of intermediate and advanced courses.

Prerequisite Mathematics courses

___ MATH 0220 Analytic Geometry and Calculus 1

___ MATH 0230 Analytic Geometry and Calculus 2

___ MATH 0240 Analytic Geometry and Calculus 3

___ MATH 0280 or MATH 1180 or MATH 1185 Linear Algebra

___ MATH 0290 or MATH 1270 Differential Equations

Grade requirements

A minimum GPA of 2.0 in departmental courses is required for graduation.

Satisfactory/No Credit option

No PHYS or ASTRON courses beyond the introductory level may be taken on an S/NC basis.

Writing (W) requirement

Students must complete at least one W-course in the major.

Honors major requirements

Honors in physics and astronomy is granted if in addition to fulfilling all requirements for the major, the student:

- maintains a GPA of 3.2 or higher in the major;
- maintains a cumulative GPA of 3.0 or higher;
- completes ASTRON 1903 or PHYS 1903 Directed Research;
- submits a paper detailing the research within the department; and
- presents the research in a public forum (i.e. at the University's Science Symposium, the undergraduate poster fair hosted by the University Honors College).

Education concentration

This concentration removes nine credits from the standard Physics and Astronomy major requirements if one of the courses listed below is taken as a science elective.

Additional education related courses

- ___ PSYED 1001 Introduction to Educational Psychology (3 cr.)
- ___ IL 1580 Foundations of Special Education (3 cr.)

Physics courses removed

- ___ PHYS 1321 Computational Methods in Physics
- ___ PHYS 1341 Thermodynamics and Statistical Mechanics
- ___ PHSY 1370 Quantum Mechanics 1

Required laboratory courses; choose at least eight credits

- ___ PHYS 0219 Basic Lab Physics for Science and Engineering (2 cr.) or PHYS 0520 Modern Physical Measurements (3 cr.)
- ___ PHYS 1361 Wave Motion and Optics (3 cr.)
- ___ ASTRON 1263 Techniques of Astronomy (3 cr.)

Required selection of science electives

- ___ CHEM 0110 General Chemistry 1
- ___ CHEM 0120 General Chemistry 2
- ___ PHYS 0481 Applications of Modern Physics

Graduate School Preparation concentration

This concentration adds six credits to the standard Physics and Astronomy major requirements if one of the courses listed below is taken as a science elective.

Additional intermediate and advanced Physics courses

- ___ PHYS 1371 Quantum Mechanics 2
- ___ PHYS 1372 Electromagnetic Theory
- ___ PHYS 1373 Mathematical Methods of Physics

Advising

Russell Clark
Undergraduate Major Advisor
OEH 404
412-624-9204
RUC2@Pitt.edu

Michael Wood-Vasey
Director of Undergraduate Programs
308 Allen Hall
412-624-2751
WMWV@Pitt.edu