Pitt | Kenneth P. Dietrich School of Arts and Sciences

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

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