



Physics Major and Minor

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 major

The physics major requires the completion of 47 credits in physics distributed as follows.

Note: While not required, the introductory level honors courses, PHYS 0475, PHYS 0476, and PHYS 0520, are appropriate particularly for students seeking degrees in physics.

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

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

Laboratory courses

Choose at least 10 credits

- ___ PHYS 0219 Basic Lab Physics Science and Engineering (2 cr.)
- or
- ___ PHYS 0520 Modern Physical Measurements (3 cr.)
- ___ PHYS 0525 Analog and Digital Electronics (3 cr.)
- ___ PHYS 1361 Wave Motion and Optics (3 cr.)
- ___ PHYS 1426 Modern Physics Laboratory (2 cr.)
- ___ ASTRON 1263 Techniques of Astronomy (3 cr.)

Science electives; choose at least nine credits from groups A and B

Group A

- ___ BIOSC 0150 Foundations of Biology 1 (3 cr.)
- ___ BIOSC 0160 Foundations of Biology 3 (3 cr.)
- ___ BIOENG 1070 Introduction to Cell Biology 1 (3 cr.)
- ___ BIOENG 1071 Introduction to Cell Biology 2 (3 cr.)
- ___ CHEM 0110 General Chemistry 1 or CHEM 0710 Honors General Chemistry 1 (4 cr.)
- ___ CHEM 0120 General Chemistry 2 or CHEM 0720 Honors General Chemistry 2 (4 cr.)
- ___ CHEM 0310 Organic Chemistry 1 or CHEM 0730 Honors Organic Chemistry 1 (3 cr.)
- ___ CHEM 0320 Organic Chemistry 2 or CHEM 0740 Honors Organic Chemistry 2 (3 cr.)
- ___ CS 0401 Intermediate Programming Using Java (3 cr.)
- ___ CS 0445 Data Structures (3 cr.)
- ___ ENGR 0240 Nanotechnology and Nano-Engineering (3 cr.)
- ___ GEOL 0040 Physical Geology (3 cr.)
- ___ STAT 1151 Introduction to Probability (3 cr.)
- ___ STAT 1152 Introduction to Mathematical Statistics (3 cr.)

Group B; choose at least 3 credits

- ___ ASTRON 1120 Stellar Structure (3 cr.)
- ___ ASTRON 1121 Galaxies and Cosmology (3 cr.)
- ___ CHEM 1410 Physical Chemistry 1 (3 cr.)
- ___ CHEM 1420 Physical Chemistry 2 (3 cr.)
- ___ CHEM 1620 Atoms, Molecules and Materials (3 cr.)
- ___ ECE 1232 Introduction to Lasers & Optical Electronics (3 cr.)
- ___ ECE 1247 Semiconductor Device Theory (3 cr.)
- ___ GEOL 1410 Exploration Geophysics (3 cr.)
- ___ MATH 1470 Partial Differential Equations (3 cr.)
- ___ MATH 1550 Vector Analysis and Applications (3 cr.)
- ___ MATH 1560 Complex Variables and Applications (3 cr.)
- ___ MEMS 1054 Materials Science (3 cr.)
- ___ PHYS 0481 Applications of Modern Physics (3 cr.)
- ___ PHYS 1374 Introduction to Solid State Physics (3 cr.)
- ___ PHYS 1375 Foundations of Nanoscience (3 cr.)
- ___ PHYS 1376 Introduction to Biological Physics (3 cr.)
- ___ PHYS 1378 Introduction to Nuclear Particle Physics (3 cr.)

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, 1180, or 1185 Linear Algebra
- ___ MATH 0290 or 1270 Differential Equations

Grade requirements

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

Satisfactory/No Credit option

No PHYS 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 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 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 up to 10 credits of Physics courses from the standard Physics major requirements. This concentration requires seven credits of lab courses instead of the standard 10 credits.

Additional education related courses

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

Additional courses emphasizing the broader impact of science; choose at least 3 credits

- ___ PHYS 0086 Physics and Public Policy (3 cr.)
- ___ PHYS 0087 Physics and Society (3 cr.)
- ___ Any course offered by the Department of History of Philosophy and Science

Required courses from the Science electives

Group A

- ___ CHEM 0110 General Chemistry 1 or CHEM 0710 Honors General Chemistry 1 (4 cr.)
- ___ CHEM 0120 General Chemistry 2 or CHEM 0720 Honors General Chemistry 2 (4 cr.)

Group B

- ___ PHYS 0481 Applications of Modern Physics (3 cr.)

Physics courses removed

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

Graduate School Preparation concentration

This concentration adds at least six credits of Physics courses to the standard Physics major requirements. This concentration requires seven credits of lab courses instead of the standard 10 credits.

Additional intermediate and advanced Physics courses

- ___ PHYS 1371 Quantum Mechanics 2 (3 cr.)
- ___ PHYS 1372 Electromagnetic Theory (3 cr.)
- ___ PHYS 1373 Mathematical Methods of Physics (3 cr.)

Advising

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Checklist for the Physics minor

Select one

- ___ PHYS 0174
- ___ PHYS 0475

Select one

- ___ PHYS 0175
- ___ PHYS 0476

Select one

- ___ PHYS 0219
- ___ PHYS 0520

Select one

- ___ PHYS 0477
- ___ PHYS 0479

Select one

- ___ PHYS 0481
- ___ PHYS 1374
- ___ PHYS 1375
- ___ PHYS 1376
- ___ PHYS 1378

Note: Students must apply for any official minor they will complete or have completed at the time they apply for graduation.