



Physics and Quantum Computing Major

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

Revised: 10/2025

The University of Pittsburgh a collaboration between the Department of Physics and Astronomy in the Dietrich School of Arts and Sciences and the Department of Computer Science in the School of Computing and Information. This major is designed with an optional CS or Physics “Focus” add-on of three top-level classes to fill in classes required for entry into the respective graduate programs. 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 and Quantum Computing major requires the completion of 73 credits. Eighteen of these are pre-requisite math courses.

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.

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

Introductory Physics courses

- ___ 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

___ PHYS 0330 Introduction to Physics, Computer Science, and Quantum Information.

This is a proposed 1 hour seminar course drawing speakers from CS, Physics, and other departments.

Intermediate and advanced Physics courses

- ___ PHYS 0477 Introduction to Thermodynamics, Relativity, and Quantum Theory
- ___ PHYS 1331 Mechanics
- ___ PHYS 1341 Thermodynamics and Statistical Mechanics
- ___ PHYS 1351 Intermediate Electricity/Magnetism
- ___ PHYS 1370 Quantum Mechanics

Introductory and Intermediate Computer Science

- ___ CMPINF 0401 Intermediate Programming
- ___ CS 0441 Discrete Structures for CS
- ___ CS 0445 Algorithms and Data Structures 1
- ___ CS 0447 Computer Organization

Advanced Computer Science

- ___ CS 1501 Algorithms and Data Structures 2
- ___ CS 1502 Formal Methods in Computer Science
- ___ CS 1613 Quantum Computer Science

Physics Laboratory Courses

- ___ PHYS 0219 Basic Lab. Physics or PHYS 0520 Modern Physical Measurements
- ___ PHYS 0525 Analog and Digital Electronics
- ___ PHYS 1361 Wave Motion and Optics
- ___ PHYS 1426 Modern Physics Laboratory
- ___ PHYS 1415 Quantum Physics at the Nanoscale

Capstone Research or Project or Internship

All majors must complete a capstone experience prior to graduation. It is the intention that this mirror the format of the CS capstone project (physics lacks an equivalent, though directed research is common among physics undergraduates). The requirement can be satisfied by one semester of directed research with a physics or CS faculty member, or a CS Capstone Project (CS 1980, CS 1981). Alternately, students may instead undertake an internship in CS 1900.

Students who are planning to complete their Capstone project with CS 1900, 1901, 1950, MEMS 1097, PHYS 1900 or 1903 are required to send

- (i) a summary of their proposed research or internship to Professor Roger Mong (rmong@pitt.edu) prior to starting the course, and
- (ii) a summary of the work done upon completion of the course.

Optional Focus in Computer Science or Physics

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

Or

- ___ Three CS courses (9 cr. total) at 1500 level or above.

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).

Advising

Russell Clark
Undergraduate Major Advisor
OEH 404
412-624-9000
RUC2@Pitt.edu

Melanie Good
Director of Undergraduate Programs
100H Allen Hall
MIgood@pitt.edu

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

