

Physics (PhD)

The Department of Physics has active research groups in ten main areas of current physics research: atomic, molecular, and optical physics; classical physics; nuclear physics; statistical and thermal physics; fusion plasma physics and high energy density plasma physics; condensed matter physics; biophysics; nonlinear dynamics; gravitation and cosmology; and elementary particle physics. In most of these fields both experimental and theoretical work is in progress.

Graduate Handbook

Graduate handbook information is updated and maintained by each program. Graduate handbooks are available within each program's office and [online](#). Please contact the program with concerns or questions.

Admission

It is assumed that the student has an undergraduate background that includes upper-division classical mechanics, electricity and magnetism, statistical mechanics and thermodynamics, and quantum mechanics.

Total Hours Required: 30

Requirements

To be admitted to candidacy for the doctoral degree, the student must:

Code	Title	Hours
Major		
Hours chosen from:		6
PHY 388M	Graduate Colloquy (must be taken the first two years of study, taken twice)	
Core Courses		12
PHY 385K	Classical Mechanics	
PHY 385L	Statistical Mechanics	
PHY 387K	Electromagnetic Theory I	
	or PHY 387L Electromagnetic Theory II	
PHY 389K	Quantum Mechanics I	
	or PHY 389L Quantum Mechanics II	
Sequence 1:		
Experimental senior thesis or internship completed by the student as an undergraduate and approved by the graduate advisor and the chair of the Graduate Studies Committee,		
Sequence 2:		
Participation in an experimental program		
Sequence 3:		
PHY 380N	Experimental Physics	
Fulfill the oral qualifying examination requirement		
Additional Coursework		12
Graduate Natural Sciences Requirements		
Graduate University Requirements		
Total Hours		30

Additional Requirements and Policies

- During the first two years of graduate study, the student must take four of the listed core courses.
- The student must earn an official grade of at least *B-* in each course and a grade point average of at least 3.0 across the four courses.

- A well-prepared student may seek to fulfill the core course requirement by earning satisfactory grades on the final examinations together with a one hour supplemental exam for as many of these courses as they want rather than by registering for them; in this case, the student does not receive graduate credit for these courses, but the grade is counted toward the required core-course average for the purposes of qualifying.

The Colloquium Requirement

During the first two years of study, the student must complete two semesters of Physics Colloquium PHY 388M

The Oral Qualifying Examination

After satisfying the first two requirements above, and within 27 months of entering the program, the student must take an oral qualifying examination. The examination consists of a presentation before a committee of four physics faculty members, one of whom is a member of the Graduate Studies Subcommittee (GSSC). The presentation is open to all interested parties. It is followed by a question period restricted to the student and the committee. The questions during this session are directed toward clarifying the presentation and helping the committee determine whether the student has a solid grasp of the basic material needed for research in their specialization. The student passes the examination by obtaining a positive vote from at least three of the four faculty members on the oral qualifying committee.

Each Program of Work for the doctoral degree must include at least four advanced courses in physics (with a letter grade of at least B-); a list of acceptable courses is maintained by the GSSC. In order to provide greater flexibility particularly for multidisciplinary degrees, one of the four advanced courses may be selected from courses outside of the department, such a course must be approved by the Graduate Advisor. A dissertation is required of every candidate, followed by a final oral examination covering the dissertation and the general field of the dissertation.