PHYSICS (PHD)

The Department of Physics offers two graduate degrees: Master of Science (M.S.) and Doctor of Philosophy (Ph.D.). The M.S. degree is aimed at students pursuing careers in industry, state or federal government or science/physics education. The M.S. in Physics may be either a completely coursework based degree or it may have a thesis component as described later. The Ph.D. in Physics prepares students for research and teaching careers in physics and engineering disciplines, including research and leadership positions with non-profit organizations, industry, universities, private foundations, and state or federal government agencies.

Location

- Storrs Campus

Modality

- In Person

Requirements

Doctor of Philosophy in Physics Course Requirements

Per graduate school rules, for students who enter the program with a BS degree, the PhD plan of study requires 30 credits. For students who enter the program with MS degree, the PhD plan of study requires 15 credits.

Four courses from the core list (below), plus six others either from the core list or advanced (5000 or higher level) physics courses (including from other departments, such as Polymer Physics, Chemistry, School of Engineering) at the discretion of the major advisor. Students must obtain a grade of B or better in each of at least four of the core courses, by the end of their fifth semester. Exceptions may be made for students with an MS in Physics who have already taken equivalent courses (and obtained transfer credit for these courses) at other institutions, obtaining a grade of B or better. The Graduate Affairs committee makes these decisions, at the request of the advisor. First year students are required to take 2 semesters of the one-credit Graduate Seminar course (PHYS 5094 Physics Seminar). The students require a minimum GPA of 3.0 in all courses in the plan of study for matriculation with PhD in physics.

Course	Title	Credits
Core Courses		
PHYS 5101	Methods of Theoretical Physics	3
PHYS 5201	Theoretical Mechanics	3
PHYS 5301	Electrodynamics I	3
PHYS 5302	Electrodynamics II	3
PHYS 5350	Computational Physics	3
PHYS 5401	Quantum Mechanics I	3
PHYS 5402	Quantum Mechanics II	3
PHYS 5403	Quantum Mechanics III	3
PHYS 5500	Statistical Mechanics	3
PHYS 6730	General Relativity	3
Total Credits		**30**

General Examination

Oral examination, short (~30 minutes) oral presentation on a research topic chosen in consultation between the student and their advisory committee, followed by an oral exam probing the student's physics knowledge underlying their presentation. Students must satisfy the core coursework requirement before taking the Ph.D. General Examination (i.e. obtain a grade of B or better in four courses from the core course list). The general examination committee consists of the student's three-person advisory committee, plus two other faculty members from a different research field.

Dissertation Proposal

By the end of their third year, all Ph.D. students must have an Advisory Committee and must complete their Dissertation Proposal (details and form at the Graduate School website). The written proposal must be approved by the student's Advisory Committee, including an oral defense of the proposal before a committee composed of their Advisory Committee and two other faculty examiners.

Additional General Requirements

In addition, the following requirements apply to all students entering the Physics graduate program. Each year, each student must complete, in consultation with their faculty advisor, a Physics Graduate Student Progress Form. A Plan of Study must be completed by M.S. students no later than the beginning of the final semester, and for Ph.D. students no later than when 18 credits of course-work have been completed. All Physics graduate students are expected to attend the Departmental Colloquium, and to participate in the regular research seminars in the department. A Safety Examination is required of all graduate students; a Shop Course is required for use of the Physics Machine Shop, and Laser Safety Training for students using lasers. All beginning graduate students are required to attend the Computer Information Workshop and Orientation on Computer Use and Security. There is no foreign language requirement for the Physics M.S. and Ph.D. degrees.

Learning Objectives

1. Conduct original, independent research that advances knowledge in physics, including formulating research questions, designing and implementing advanced methodologies, analyzing data, and disseminating results through peer-reviewed publications and presentations.
2. Demonstrate comprehensive mastery of core and specialized areas of physics, integrating theoretical, computational, and experimental approaches to solve complex scientific problems at a level expected of professional researchers.
3. Apply advanced physics expertise to address complex scientific and technological challenges, including identifying relevant physical principles, developing quantitative models, and evaluating solutions with professional rigor and ethical responsibility.
4. Communicate physics knowledge effectively by presenting research findings to diverse audiences, writing clearly for scientific publications, and educating and mentoring students in academic or professional settings.