Physics Department Degree Requirements
Graduate Field of Study Information - Physics

General Information

The Department of Physics offers two graduate degrees: Master of Science (MS) and Doctor of Philosophy (PhD). The MS degree is aimed at students pursuing careers in industry, state or federal government or science/physics education. The MS in Physics may be either a completely coursework-based degree or it may have a thesis component as described later. The PhD 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.

MS in Physics

MS in Physics requires a total of 30 credits. The students require a minimum GPA of 3.0 in all physics courses in the plan of study for matriculation with MS in physics. There are two tracks:

(i) MS without Thesis: The required courses (total 18 credits) are: Physics 5101 (Mathematical Methods in Physics I), 5201 (Classical Mechanics), 5301 (Electrodynamics I), 5401 (Quantum Mechanics I), 5402 (Quantum Mechanics II) and 5500 (Statistical Mechanics). The remaining 12 credits could be 5000 or higher level courses from Physics, Mathematics, Biology, Chemistry or School of Engineering.

(ii) MS with Thesis Research: The required courses (total 18 credits) are: Physics 5101, 5201, 5301, 5401, 5402 and 5500. In addition, students must take 9 credits of Thesis Research (e.g. GRAD 5950). The remaining 3 credits could be 5000 or higher level courses from Physics, Mathematics, Biology, Chemistry or School of Engineering

PhD in Physics

1. Required classes for the PhD degree: All PhD students must pass both PHYS 5302 (Electrodynamics II) and PHYS 5403 (Quantum Mechanics III). The rest of the credits necessary for a PhD (on the Plan of Study) are determined by the student's advisory committee. These credits could be 5000 or higher level courses from Physics, Mathematics, Biology, Chemistry or School of Engineering.

2. General Examination

Students are required to pass a General Examination (preliminary examination), which consists of four written exams on core physics subjects.

Classical Mechanics (recommended preparation: PHYS 5201)

Electrodynamics (recommended preparation: PHYS 5301)

Quantum Mechanics (recommended preparation: PHYS 5401 and PHYS 5402)

Statistical Mechanics (recommended preparation: PHYS 5500).

All PhD students are strongly encouraged to pass these exams as early as is consistent with their coursework preparation, and normally before the start of their third year. Students are permitted one more attempt beyond their second year, but all four written preliminary exams must be passed prior to the beginning of the sixth semester in the program. There is no penalty for a failed early attempt. A student moves to stipend level 3 when all four Prelims have been passed.

Beginning at the end of the Fall 2020 semester, the final examinations that are given at the end of the CM, SM and QMII core courses are to serve as both course final and prelim combined. For prelim purposes you would only need to take the final examination (which will serve as the prelim for that subject). While the prelim committee will assign grades for each prelim exam, each instructor will independently assign grades for the courses themselves.

Since each of our core courses only go out once a year, a prelim exam will also be offered in the off semester for any subject for which there is no course being offered that semester. Thus at the end of Fall 2020 there will be prelim course finals combined for CM, SM and QMII, and a separate prelim for EM. At the end of Spring 2021 there will be a prelim course final combined for EM, and separate prelims for CM, SM and QM. Also QMI will be taught that semester with only a course exam.

3. Dissertation Proposal: by the end of their third year, all PhD students must have an Advisory Committee and work on 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.

1. Progress Form: each year, each student must complete, in consultation with their faculty advisor, a Physics Graduate student progress form.

2. Plan of Study: to be completed for MS students no later than the beginning of the final semester, and for PhD students no later than when 18 credits of course-work have been completed. (These are also Graduate School requirements).

3. Colloquium and Seminars: All Physics Graduate Students are expected to attend the Departmental Colloquium, and to participate in the regular research seminars in the department.

4. A Safety exam 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.

5. There is no foreign language requirement for the Physics MS and PhD degrees.