

Requirements for the Ph.D.

Students are required to complete the following requirements: complete the departmental diagnostic exam prior to the start of classes, satisfactorily pass the departmental core courses and electives for qualification, complete five advanced graduate courses, a PhD candidacy examination, teaching requirement, and a final defense of the thesis as described below.

1. Diagnostic Exam

Entering students must take an entrance diagnostic exam on Undergraduate Physics. The exam will cover mechanics, electricity & magnetism, quantum mechanics, statistical mechanics & math methods. Students who are found to have serious weaknesses in preparation will be directed to enroll in appropriate undergraduate upper division courses.

2. Core Courses and Electives for Qualification

Physics students are required to take 7 core courses (PHYS 200A Theoretical Mechanics I, PHYS 201 Mathematical Methods in Physics, PHYS 203A&B Advanced Classical Electrodynamics I & II, PHYS 210A Equilibrium Statistical Mechanics, PHYS 212A&B Quantum Mechanics I & II) with a grade of B or better and two elective courses with a grade of B+ or better. Elective courses may also count toward the department's Advanced Graduate Course requirement.

Students are expected to complete these courses by the end of their 1st year with the requisite grades but will be given up to two years to complete. A department Qualification Committee will review all students and recommend corrective measures for students who do not meet the course grade standards. Students who do not qualify after two years may be asked to leave the program.

Biophysics PhD students will be expected to complete these courses by the end of their 2nd year with the requisite grades but will be given an additional year if necessary.

3. Advanced Graduate Courses

Physics Ph.D. students are required to take five advanced graduate courses (with a grade of C or better) from at least three of the groups listed below no later than the end of the third year in the program. A 3.0 in four of the five courses is required. (In lieu of the course requirement, students may petition to take an oral examination covering three areas of physics.)

- **Group 1 (Plasma):** Phys 218A, 218B, 218C (Plasma); Phys 235 (Nonlinear Plasma Th)
- **Group 2 (Cond. Matter):** Phys 211A, 211B (Solid State); Phys 219 (Cond. Matt. Lab.); Phys 230 (Adv Solid State); Phys 232 (Electronic Materials)
- **Group 3 (Particle Phys/High Energy):** Phys 214 (Elem Part); Phys 215A, 215B, 215C (Part & Fields); Phys 222A (Exp Tech Phys)

- **Group 4 (Math):** Phys 210B (Nonequil Stat Mech); Phys 221A (Adv Mech); Phys 243 (Stoch Meth); Math 210A, 210B, 210C (Math Phys); Math 259A, 259B, 259C (Geom Phys)
- **Group 5 (Bio):** Phys 273 (Biological Info); Phys 274 (QBio Stoch Pop Gene); Phys 275 (Fund of Biol Phys); Phys 276 (Quan Molec Bio); Phys 277 (Phys of Cell); Phys 278 (Biophys Neurons)
- **Group 6 (Astro):** Phys 223 (Stel Str); Phys 224 (Instrstel Med); Phys 226 (Galaxies and Galactic Dynamics); Phys 227 (Cosmology); Phys 228 (High Energy Astrophysics and Compact Objects); Phys 238 (Observ. Astro Lab)
- **Group 7 (General):** Phys 217 (Renorm Field Th); Phys 220 (Group Th); Phys 225A, 225B (Relativ);
- **Group 8 (Computational):** Phys 241, 242 (Comp Phys); Phys 244 (Parallel Comp)

Note: Biophysics students select five courses from Biology, Biochemistry, Chemistry, or Physics in consultation with their adviser. At least three of these courses must be graduate courses. Physics courses are to be selected from Groups 1-8 listed above.

4. Instruction in Physics Teaching

Students must complete at least one quarter of Teaching Assistantship, either in a lecture course or a laboratory course.

5. Qualifying Examination and Advancement to Candidacy

In order to be advanced to candidacy, students must have met the departmental requirements and obtained a faculty research supervisor. At the time of application for advancement to candidacy, a doctoral committee responsible for the remainder of the student's graduate program is appointed by the Dean of Graduate Studies & Research. The committee conducts the Ph.D. qualifying examination during which students must demonstrate the ability to engage in thesis research. Usually this involves the presentation of a plan for the thesis research project. The committee may ask questions directly or indirectly related to the project and questions on general physics which it determines to be relevant. Upon successful completion of this examination, students are advanced to candidacy and are awarded the C.Phil. Degree.

6. Thesis Defense

When students have completed their theses, they are asked to present and defend them before their doctoral committees.