

PHYSICS (PH.D.)

Doctor of Philosophy. Major in Physics.

General Ph.D. requirements apply. Correspondence concerning the student's specific goals is encouraged in the preliminary planning of the Ph.D. program.

Specific departmental course requirements are:

Code	Title	Hours
PHYS 501	Seminar (Must enroll each semester)	2
PHYS 521	Advanced Mechanics	3
PHYS 533	Statistical Mechanics	3
PHYS 541	Electromagnetic Theory I	3
PHYS 542	Electromagnetic TheoryII	3
PHYS 550	Quantum Mechanics I	3
PHYS 551	Quantum Mechanics II	3
PHYS 571	Mathematical Methods of Physics	3
At least nine additional credits of Physics courses at the 500 level ¹		9
At least six credits of upper-division or graduate course work outside of physics		6
At least 30 credits of PHYS 600 (Doctoral Research and Dissertation)		30
Additional 10 credits chosen from approved courses		10
Total Hours		78

1

Can include at most three credits of PHYS 599 Research.

The nature and number of the six credits of upper-division or graduate course work outside of physics will depend upon the professional goals of the individual student. In planning a program, the student should consult with the departmental Academic Standards Committee and the major professor for approval of any particular choice of non-physics coursework. The Ph.D. degree in physics is primarily a recognition of ability and accomplishment in research. The purpose of the coursework is to provide the factual and theoretical background for research. Successful completion of coursework is not in itself considered as completion of the major requirement for the degree.

All Ph.D. graduate students are required to enroll in PHYS 501 each semester while in residence.

No formal foreign language requirement exists for Ph.D. candidates; however, in individual cases, depending on the research topic, a reading knowledge in one foreign language may be required by the major professor.

A two-part preliminary examination is required. Part I is taken after the student has completed the courses required for the Ph.D. degree. Full-time students must take this exam no later than 2 years after entering the Ph.D. program. Students who have earned a master's degree in physics or wish to transfer credits to satisfy any of the departmental requirements (PHYS 521, PHYS 533, PHYS 541, PHYS 542, PHYS 550, PHYS 551, or MATH 571) may be required by the Academic Standards Committee to take the exam earlier. The examination is written and covers all of general graduate-level physics as defined by the required courses for a Ph.D. degree. Typically, it will be administered on two different days, with a time limit of approximately five hours for each day. The results of the examination will be evaluated by the physics faculty. If the preliminary

examination, Part I, is failed, it may be repeated only once; the repeat examination must be taken within a period of not less than three months nor more than 14 months following the first attempt.

Part II of the preliminary examination is set by the major professor of the Ph.D. student for a date within the second semester after Part I has been passed. The student is required to explain the goals of their planned Ph.D. research to the thesis committee and show a general familiarity with the fields relevant for the research. Part II is oral and typically lasts for one hour. The exam is to be announced to the physics faculty at least one week in advance. All members of the physics faculty are permitted to attend and ask questions. The student's committee certifies to the College of Graduate Studies the results of the preliminary examinations. Upon passing, the student is advanced to candidacy for the Ph.D. degree. If Part II is failed, it may be repeated only once; the repeat examination must be taken within a period of not less than three months nor more than one year following the first attempt.

A final defense of the Ph.D. thesis is scheduled upon completion of the dissertation. The candidate is required to defend their work and show a superior knowledge of the field in which the thesis research has been performed. The defense is oral and typically lasts for one hour. The exam is to be announced to the physics faculty at least one week in advance. All members of the physics faculty are permitted to attend and ask questions. A recommendation of a majority of the student's graduate committee is necessary to pass the defense. If the defense is failed, it may be repeated only once; the repeat defense must be taken within a period of not less than three months nor more than one year following the first attempt.

1. Students can compete on the national and international level. This means that they have the knowledge and tools to present their work, as well as develop new ideas independent of their advisor. They should be able to articulate their work in written and oral forms, as well as defend their research protocols, data analysis, and conclusions.
2. Students gain a broad and comprehensive knowledge of physics, and in-depth knowledge of a specific discipline, such as astronomy, biophysics, computational physics, nuclear physics theory, or condensed matter physics.
3. Students communicate scientific principles, including own results, to knowledgeable, but not necessarily expert, audience.