Physics, PhD

Requirements

The Doctor of Philosophy program in physics requires a minimum of 72 s.h. of graduate credit. At least 39 s.h. must be earned at the University of Iowa to complete the residency requirement. For students interested in doing doctoral work in astronomy, the department offers an astronomy subprogram, including a dissertation, within the PhD program in physics. All students must maintain a program grade-point average of at least 3.00.

All students must earn at least 24 s.h. in departmental courses numbered 5000 or above. They may not count credit earned in PHYS:7990 Research: Physics, PHYS:7992 Individual Critical Study, ASTR:7991 Research: Astronomy, or seminars.

All students must take comprehensive examinations; participate in advanced seminars; do original research in experimental physics, theoretical physics, or astrophysics; and prepare and defend a written dissertation based on this work.

PhD students in physics without the astronomy subprogram must complete the following courses.

Course # | Title | Hours
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PHYS:4761- PHYS:4762 | Mathematical Methods of Physics I-II (students who pass a written examination are exempt from this requirement) | 6
PHYS:5710 | Classical Mechanics | 3
PHYS:5730 | Statistical Mechanics I | 3
PHYS:5741- PHYS:5742 | Quantum Mechanics I-II | 6
PHYS:5811- PHYS:5812 | Classical Electrodynamics I-II | 6

These courses freely use advanced mathematics (e.g., complex variables, tensor analysis). An introduction is provided in PHYS:4761 Mathematical Methods of Physics I and PHYS:4762 Mathematical Methods of Physics II. The selection of less advanced coursework depends on the adequacy of a student's preparation for graduate work; students' choice of more advanced and specialized courses depends on the direction in which their interests develop.

PhD students in physics with the astronomy subprogram must complete a total of six courses from the following.

Course # | Title | Hours
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PHYS:5710 | Classical Mechanics | 3
PHYS:5730 | Statistical Mechanics I | 3
PHYS:5741 | Quantum Mechanics I | 3
PHYS:5742 | Quantum Mechanics II | 3
PHYS:5811 | Classical Electrodynamics I | 3
PHYS:5812 | Classical Electrodynamics II | 3

After a student has chosen a research specialty, the student must submit a formal thesis proposal and defend the proposal in an oral comprehensive exam. The appropriate thesis advisor then becomes the candidate's general advisor and the chair of the comprehensive and final examination committee. The comprehensive exam must be taken before the beginning of the fourth year of graduate study.