Changes when approved will be effective at the start of the next academic year unless special circumstances and a specific request is made.

Department\*

Department\* 

Program Type:\* 

Provide a brief summary of the proposed program changes and describe the rationale for the change(s):

The  proposed changes affect Ph.D. students on our regular track (i.e., those entering UD without MS degree). It requires that they take 5 core courses (which must be passed with grade B- or better), 1 skill course (involving either computational or experimental lab practice), new PHYS 600: Research and Presentation Skills course and 2 advanced courses from their intended field of research. The proposed change both aligns our program program with those at peer instituions around the US and makes some original requirements (such as skill course and PHYS600) which will be of great value for new Ph.D.s entering academic or industrial job market.

List new courses required for the revised curriculum. How do they support the overall program objectives of the major/ minor/ concentrations)?

Please see pages 3 and 4 of the attached Graduate Program Handbook. All changes in the revised Handbook are marked in red font, while the remaining text in black font is the same as in our previous Handbook. We have introduce 5 new courses into the Catalog in the previous two years:

PHYS 600: Research and Presentation Skills

PHYS 646: Instrumentation for Scientists

PHYS 814: Advanced Quantum Mechanics

PHYS 834: High Energy and Particle Astrophysics

PHYS 835: Laboratory, Space and Astrophysical Plasmas

where PHYS 600 is mandatory and students can choose one or two among the other 4 courses, depending on the route they select (such as theory vs. experiment or high energy vs. low energy physics).

No other units are affected by those changes, but they may benefit from new courses offered  (such as students in Chemistry, Materials Science and Engineering and Chemical Engineering might beneift from taking PHYS600, PHYS646 and PHYS815 if they plan to work on novel materials recently).

Requirements for the PhD Degree

Description

Students may enter the PhD program after successfully completing an MS degree program, at the University of Delaware or elsewhere, or may be admitted directly to the PhD program directly after a Bachelors degree. To obtain a PhD, students will normally follow the course intensive regular track. Students entering the program with at least a U.S. Master of Science degree, or its equivalent, in Physics or a closely related field that are particularly well prepared may choose to follow the less coursework intensive fast track.

Course Requirements

Description

Students on the regular track must satisfy the following course requirement:

Taking and passing, with an average grade of 3.0 or better, 30 credits of course work within the first five semesters after entering graduate school. At least 18 of these credits must be from among 800-level PHYS courses excluding PHYS 868. Of these 18 credits at the 800 level, 12 credits (i.e., 4 courses) must come from the following group of 6 courses. These courses have to be passed with a grade of B- or better.

Courses

PHYS 809 Electrodynamics I (3cr.)

PHYS 810 Electrodynamics II (3cr.)

PHYS 811 Quantum Mechanics I (3cr.)

PHYS 813 Quantum Statistical Mechanics (3cr.)

PHYS 815 Theory of Relativity (3cr.)

Students following the fast track must meet the following course requirements to remain on that track:

Description

In consultation with and with approval from the Graduate Program Director, the student will identify (4) 3credit, 800 level classroom PHYS courses to be taken in their first year in the graduate program. Each of these courses must be passed with a grade of B or better (not B-). Students may take additional courses.

Students must take the Written Candidacy Exam on entering and pass it then, or by the beginning of the second semester in the graduate program, to remain on the fast track.

PhD Candidacy Examination

Title

PhD Candidacy Examination

Description

The written part of the candidacy exam: All students in the Ph.D. program must pass the written part of the Ph.D. candidacy exam at the latest at the next offering of the exam after the end of their third semester in the graduate program.

If a student on the fast track has not passed the written part of the exam after one semester in the program, they will move to the regular track.

The exam will be given twice a year in late August and in late January. The exam will be graded as a whole and will consist of 4 sections, each with 4 problems. The sections of the exam and the textbook and associated material from which that section will be based are:

Classical mechanics - covering all the material except chapters 4 and 14 in S. T. Thornton and J. B. Marion, "Classical Dynamics of Particles and Systems," 5th edition;

Electricity and Magnetism - covering all material in D. J. Griffiths, "Introduction to Electrodynamics," 3rd edition;

Statistical Mechanics and Thermodynamics - covering chapters 1-9 in F. Reif, "Fundamentals of Statistical and Thermal Physics;"

Quantum Mechanics - covering chapters 1-8 in B. H. Brandsen and C. J. Joachain, "Quantum Mechanics," 2nd edition.

Special relativity problems, if any will only appear on the Electricity and Magnetism section of the exam.

The Oral Candidacy Examination (OCE)

Description

The purpose of the OCE is to show that the student has a clear research plan with a path to its completion, has a general understanding of the research topic and can put it in context in the broader field of research.

Before the later of a) 1 year after passing the written part of the candidacy exam and b) 2 years after being admitted to the program, a Ph.D. candidate must make an oral presentation to a committee consisting of the local members of the Ph.D. dissertation committee and two additional members appointed by the director of the graduate program. A member of the OCE committee other than the dissertation adviser of Ph.D. candidate will be appointed committee chair by the graduate program director. A student who fails the OCE has one opportunity to retake the exam. This has to take place within 6 month of the original examination.

Regulations for students who change adviser after passing the OCE

Description

Students who change dissertation adviser after having passed the OCE are required to give, within 6 months of changing adviser, a written progress report and an oral presentation to the Graduate Review Committee, who will make a funding recommendation based on their evaluation of the progress report and oral presentation.

PhD Thesis

Description

Upon successful completion of a research program, the PhD candidate will write a dissertation showing originality of thought and scholarship, properly expressed in English. The dissertation is defended in an oral examination administered by the student's dissertation committee.

PHYS - 600 - Research and Presentation Skills (1cr.)

PHYS - 601 - Introduction to Teaching Physics and Astronomy (1cr.)

PHYS - 624 - Introduction to Condensed Matter Physics (3cr.)

PHYS - 626 - Introduction to Atomic, Molecular and Optical Physics (3cr.)

PHYS - 633 - Introduction to Stellar Astrophysics (3cr.)

PHYS - 635 - Space Physics (3cr.)

PHYS - 644 - Elementary Particles and Big Bang Cosmology (3cr.)

PHYS - 646 - Instrumentation for Scientists (4cr.)

PHYS - 655 - Statistical Biophysics (3cr.)

PHYS - 660 - Computational Methods of Physics (3cr.)

PHYS - 806 - Atomic, Molecular and Optical Physics (3cr.)

PHYS - 809 - Electrodynamics I (3cr.)

PHYS - 810 - Electrodynamics II (3cr.)

PHYS - 811 - Quantum Mechanics I (3cr.)

PHYS - 812 - Quantum Mechanics II (3cr.)

PHYS - 813 - Quantum Statistical Mechanics (3cr.)

PHYS - 814 - Advanced quantum mechanics (3cr.)

PHYS - 815 - Theory of Relativity (3cr.)

PHYS - 822 - Quantum Field Theory (3cr.)

PHYS - 824 - Nanophysics and Nanotechnology (3cr.)

PHYS - 834 - High energy and particle astrophysics (3cr.)

PHYS - 835 - Laboratory, Space and Astrophysical Plasmas (3cr.)