UNIVERSITY FACULTY SENATE FORMS

Academic Program Approval

This form is a routing document for the approval of new and revised academic programs. Proposing department should complete this form. For more information, call the Faculty Senate Office at 831-2921.

Submitted by: Norbert Mulders_____phone number x3517___

Action: Revision of the Ph.D. in Physics
(Example: add major/minor/concentration, delete major/minor/concentration, revise major/minor/concentration, academic unit name change, request for permanent status, policy change, etc.)

Effective term_06F_____
(use format 04F, 05W)

Current degree Ph.D. in Physics _____
(Example: BA, BACH, BACJ, HBA, EDD, MA, MBA, etc.)

Proposed change leads to the degree of: Ph.D. in Physics _____
(Example: BA, BACH, BACJ, HBA, EDD, MA, MBA, etc.)

Proposed name: _____
Proposed new name for revised or new major / minor / concentration / academic unit (if applicable)

Revising or Deleting:

Undergraduate major / Concentration:_____
(Example: Applied Music – Instrumental degree BMAS)

Undergraduate minor:_____
(Example: African Studies, Business Administration, English, Leadership, etc.)

Graduate Program Policy statement change:____ See attached statement_____
(Attach your Graduate Program Policy Statement)

Graduate Program of Study:_ Ph.D. in Physics _____
(Example: Animal Science: MS Animal Science: PHD Economics: MA Economics: PHD)

Graduate minor / concentration:_____

List program changes for curriculum revisions:

1) Bringing forward the PhD candidacy exam while reducing its scope, while at the same time introducing an oral/research component. Students must pass the written part of the exam within 3 semesters rather than the current 7 semesters.
2) To ensure that all students have competence at the PhD level in the core material, students have to pass a set of required courses with a B or better. Previously, this material was covered in the PHD qualifying exam.

List new courses required for the new or revised curriculum:
(Be aware that approval of the curriculum is dependent upon these courses successfully passing through the Course Challenge list. If there are no new courses enter "None")

None

Other affected units:
(List other departments affected by this new or revised curriculum. Attach permission from the affected units. If no other unit is affected, enter "None")

None

Rationale:
(Explain your reasons for creating, revising, or deleting the curriculum or program.)

At one time, the M.S. degree was the main research degree of the physics and astronomy program at UD, with only few students following up with a Ph.D. This has not been the case for a long time. Most students enter the graduate program, with or without a master's degree, with the intention to obtain a Ph.D. Therefore, it is important to have a mechanism in place that early on determines if the student has the capabilities to eventually obtain a Ph.D. or should be advised to leave the program, possibly after having obtained an MS degree. In the current situation, with a Ph.D. qualifying exam that can be take as late as at the end of the 7^{th} semester in the program, and only after extensive course work, this determination is made far too late. The proposed revision introduces a Ph.D. candidacy exam which is reduced in scope, but which students will have to pass at the latest by the end of their third semester. To ensure that all students have competence at the PhD level in the core material, students have to pass a set of required courses with a B or better. (Previously, this material was covered in the PHD qualifying exam.)

It should be noted that this would bring our graduate program in line with current practice in most other physics or astronomy graduate programs

Program Requirements:
(Show the new or revised curriculum as it should appear in the Course Catalog. If this is a revision, be sure to indicate the changes being made to the present curriculum.)

proposed requirements:
REQUIREMENTS FOR THE PH.D. DEGREE

Students may enter the Ph.D. program after successfully completing an M.S. degree program, at the University of Delaware or elsewhere, or may be admitted directly to the Ph.D. program directly after a Bachelors degree. To obtain a Ph.D., students will normally follow the course intensive *regular track*. Students entering the program with an M.S. degree in Physics or Astronomy that are particularly well prepared may choose to follow the less coursework intensive *fast track*.

Course requirements

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. Of these 18 credits at the 800 level, 15 credits must come from the following group of 6 courses. These courses have to be passed with a grade of B or better.

PHYS 809, PHYS 810, PHYS 811,
PHYS 812, PHYS 813, PHYS 815.

Students following the *fast track* must meet the following course requirements to remain on that track:
- Taking at least 12 credits of PHYS classroom courses at the 800-level within their first year.

Ph.D. Candidacy Examination

The written part of the candidacy exam: All students in the Ph.D. program must attempt the written part of the Ph.D. candidacy exam at the latest at the end of their second semester in the program. Students must pass all four parts of the exam separately, but will have one opportunity, at the end of their third semester, to retake those parts they failed. No student may take the exam more than twice.

If a student on the fast track has not passed the written part of the exam after two semesters, the Graduate Review Committee will promptly review the student's progress and issue a determination whether the student should remain on the fast track or should shift to the regular track.

The written part of the examination is given twice per year. It is an exam covering four subjects, mechanics, electricity and magnetism, statistical mechanics and thermodynamics, and quantum mechanics (coinciding with the course content of PHYS 620, Classical Mechanics, PHYS 603/604, Electricity and Magnetism, PHYS 616, Thermodynamics and Statistical Mechanics, and PHYS 610, Quantum Mechanics). Passing anyone of the four sections of the exam requires a score of at least 65%.

The oral candidacy examination: Within 18 months after passing the written part of the Ph.D. candidacy exam, a Ph.D. candidate shall make an oral presentation on the proposed dissertation research to a committee consisting of the members of the Ph.D. dissertation committee and two additional members appointed by the director of the graduate program. This committee shall examine the students in matters regarding the proposed research program. A student who fails the examination has one opportunity to retake the exam. This has to take place within 6 month of the original examination.

Ph.D. Dissertation: 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.

Current version (from the course catalog):

rospective Ph.D. candidates are frequently chosen from among those who have successfully completed a master's degree program either at Delaware or elsewhere. However, a physics graduate student may bypass the M.S. degree by:

I. Taking and passing the Ph.D. qualifying examination within two years of entering graduate work (two and one-half years for students admitted in January), and
2. Taking and passing, with a grade of B (3.000) or better, 30 credits of course work within the first five semesters after entering graduate work. At least 21 of these credit hours must be from among PHYS 607/8, and 800-level physics courses.

A student entering the department with a master's degree must either:

I. Take at least 12 credit hours of course work during the first year, including 6 at the 800 level, and take the qualifying exam within one year, and pass it within two years;

OR

2. Satisfy the bypass option mentioned above.

All Ph.D. students must take a minimum of 12 credit hours of classroom course work beyond the core curriculum. These courses must be at or above the 600 level and be in physics or physics-related areas.

The qualifying examination, which is based on a core of graduate-level courses, is given twice per year, in late August and in early February. The Ph.D. candidate must pass this examination within three and a half years after arriving at Delaware. Most students take the examination for the first time at the end of their second year.

Upon successful completion of a research program, the candidate is required to pass a final oral examination that includes the defense of the dissertation and discussion of relevant material. Progress of a student through the graduate program is reviewed regularly by a departmental review committee.

ROUTING AND AUTHORIZATION: (Please do not remove supporting documentation.)

Department Chairperson _____ Date _____

Dean of College _____ Date _____

Chairperson, College Curriculum Committee _____ Date _____

Chairperson, Senate Com. on UG or GR Studies _____ Date _____

Chairperson, Senate Coordinating Com. _____ Date _____

Secretary, Faculty Senate _____ Date _____

Date of Senate Resolution _____ Date to be Effective _____

Registrar _____ Program Code _____ Date _____

Vice Provost for Academic Programs & Planning _____ Date _____

Provost _____ Date _____

Board of Trustee Notification _____ Date _____

Revised 11/03/04 /khs