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_3517_____

Department: _Phyisics and Astronomy_____email address_mulders@udel.edu

Action: __revise BS physics: Astronomy concentration_____
(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_____08F_____
(use format 04F, 05)

Current degree_____**BS Physics**_____
(Example: BA, BACH, BACJ, HBA, EDD, MA, MBA, etc.)

Proposed change leads to the degree of: _____ **BS 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:_____
(**Must attach** your Graduate Program Policy Statement)

Graduate Program of Study:_____
(Example: Animal Science: MS Animal Science: PHD Economics: MA Economics: PHD)

Graduate minor / concentration:_____

Note: all graduate studies proposals must include an electronic copy of the Graduate Program Policy Document, highlighting the changes made to the original policy document.

List new courses required for the new or revised curriculum. How do they support the overall program objectives of the major/minor/concentrations)?
(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")
PHYS 211, Oscillations and Waves. This course fill a major gap in the introductory physics sequence that has gradually developed with the shift of emphasis in PHYS 310 to Modern Physics.

Explain, when appropriate, how this new/revised curriculum supports the 10 goals of undergraduate education: http://www.ugs.udel.edu/gened/

Identify other units affected by the proposed changes:
(Attach permission from the affected units. If no other unit is affected, enter "None")
NONE

Describe the rationale for the proposed program change(s):
(Explain your reasons for creating, revising, or deleting the curriculum or program.)
1) Students who do poorly in the introductory physics sequence nearly uniformly under perform in the higher level courses. Imposing a C- minimum requirement is intended to make sure that students first master the basics before they continue with more advanced material that builds on the introductory material.
2) Over time, a large gap has developed in our introductory physics sequence. This mainly affects the physics majors (the engineering majors for whom the missing material is also of importance, typically encounter this material in courses in their own major). To fill the gap we are introducing a third course, PHYS 211, which deals mainly with oscillations and waves, and is intended as a stepping stone towards courses as quantum mechanics, optics and classical mechanics.

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 current curriculum and **include a side-by-side comparison** of the credit distribution before and after the proposed change.)

See attached document.

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

Department Chairperson George Hadjipanayis Date 11/1/07

Dean of College _____ Date _____

Chairperson, College Curriculum Committee _____ Date 31st NOV. 2007

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 5/02/06 /khs

Current version

DEGREE: BACHELOR OF SCIENCE MAJOR: PHYSICS CONCENTRATION: ASTRONOMY/ASTROPHYSICS

CURRICULUM CREDITS

UNIVERSITY REQUIREMENTS

ENGL 110 Critical Reading and Writing (minimum grade C-). 3

First Year Experience (see page 68). 0-4

Discovery Learning Experience (see page 68). 3

Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender-related course content (see pages 68-70) 3

COLLEGE REQUIREMENTS

Writing: (minimum grade C-). 3

A second writing course involving significant writing experience including two papers with a combined minimum of 3,000 words to be submitted for extended faculty critique of both composition and content. This course must be taken after completion of 60 credit hours. Appropriate writing courses are normally designated in the semester's Registration Booklet. (See list of courses approved for second writing requirement, pages 93-95.)

BREADTH REQUIREMENTS (See pages 95-100)

A total of eighteen credits from Groups A, B and C is required with a minimum of six credits in each group. 18

The six credits from each group could be from the same area.

Group A: Understanding and appreciation of the creative arts and humanities.

Group B: The study of culture and institutions over time.

Group C: Empirically based study of human beings and their environment.

MAJOR REQUIREMENTS

Ordinarily, no more than four credits from among PHYS 201 and 207 may be counted toward graduation requirements; similarly no more than four from among PHYS 202, 208. Students interested in majoring in Physics who have taken an introductory sequence other than PHYS 207/208 should consult with a member of the Physics faculty to consider the need for additional introductory courses, for which some additional credit toward graduation may be given with permission of the Physics chair.

PHYS 169 Perspectives: Physics & Astronomy. 1

PHYS 207/208 Fundamentals of Physics I and II. 8

PHYS 309 20th/21st Century Physics. 3

PHYS 313 Physical Optics. 4

PHYS 333 Fundamentals of Astrophysics. 3

PHYS 419 Classical Mechanics I . . . . . .

PHYS 424 Quantum Mechanics. 3

PHYS 449 Introduction to Research. 3

PHYS 460 Computational Methods of Physics 3

PHYS 469 Observational Astronomy. 3

PHYS 632 Astrophysics. 3

PHYS 633 Stellar Astrophysics. 3

PHYS 645 Electronics for Scientists. 3

MATH 241/242/243 Analytic Geometry and Calculus A, B and C 12

Additional Credits of Physics or Math at or above the 300 level 12

One of the following. 6

MATH 302/349 Ordinary Differential Equations and Elementary Linear Algebra
MATH 341/342 Differential Equations with Linear Algebra

One of the following. 3-4

PHYS144 Concepts of the Universe /PHYS145 Blacks Holes and Cosmic Evolution/
PHYS133 Introduction to Astronomy

Foreign Language or Computer Science: 0-12

Completion of the intermediate-level course (107 or 112) in a given foreign language. Number of credits needed and initial placement will depend on number of years of high school study of foreign language. Students with four or more years of high school work in a single foreign language may attempt to fulfill the requirement in that language by taking an exemption examination.

or

Completion of the following Computer Science sequence:

CISC 105 General Computer Science. 3

CISC 181 Introduction to Computer Science 3

CISC 220 Data Structures. 3

Additional credits of Computer Science at or above the 260 level 3

ELECTIVES
After required courses are completed, sufficient elective credits must be taken to meet the minimum credit requirement for the degree.

CREDITS TO TOTAL A MINIMUM OF. 124

Proposed version

DEGREE: BACHELOR OF SCIENCE MAJOR: PHYSICS CONCENTRATION: ASTRONOMY/ASTROPHYSICS

CURRICULUM CREDITS

UNIVERSITY REQUIREMENTS

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All 200-level PHYS courses used to satisfy prerequisites or graduation requirements must be passed with a minimum grade of C-.

PHYS 169 Perspectives: Physics & Astronomy. 1

PHYS 207/208 Fundamentals of Physics I and II. 8

PHYS 211 Oscillations and Waves. 3

PHYS 309 20th/21st Century Physics. 3

PHYS 313 Physical Optics. 4

PHYS 333 Fundamentals of Astrophysics. 3

PHYS 419 Classical Mechanics I . . . . . .

PHYS 424 Quantum Mechanics. 3

PHYS 449 Introduction to Research. 3

PHYS 460 Computational Methods of Physics 3

PHYS 469 Observational Astronomy. 3

PHYS 632 Astrophysics. 3

PHYS 633 Stellar Astrophysics. 3

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Additional credits of Computer Science at or above the 260 level 3

ELECTIVES

After required courses are completed, sufficient elective credits must be taken to meet the minimum credit requirement for the degree.

CREDITS TO TOTAL A MINIMUM OF. 124