DATE: October 28, 2008
TO: Gregg Horowitz, Chair, Committee on Educational Programs (CEP)
FROM: David A. Weintraub, Director of Undergraduate Studies and
Robert Scherrer, Chair
Department of Physics and Astronomy
SUBJECT: revision of rules for the Physics major

The faculty of the Department of Physics and Astronomy propose the following changes in the rules for the major in physics:

1. drop first-semester calculus-based physics with lab (116a + 118a or 121a) as a requirement.
   • Note that first-semester physics will remain as a pre-requisite (either as AP/IB credit or when taken as a course at VU) for second-semester physics;
   • This proposed change is consistent with the already accepted policy regarding the first semester(s) of work in many other majors, including Chemistry and many of the foreign languages.

2. increase the advanced electives requirement from 6 credit hours to 9 credit hours, with a cap of 6 of these 9 hours that can earned from any combination of directed study (289), independent study (291), and/or Honors research (296).
   • This proposed change is intended to encourage our students to take an additional advanced elective and to ensure that all majors take at least one advanced elective in addition to research hours.

The new requirements for the major in Physics will be:
1. the second-semester course in introductory, calculus-based physics (116b+118b or 121b)
2. a 19-hour core sequence, which consists of five courses covering the major subdisciplines of physics at an intermediate level (Physics 223, 225 or 225W, 226 or 226W, 227a, 229a) and one semester each of the astronomy and physics seminars (Astronomy 250, Physics 250); and
3. 9 hours of electives in physics and/or astronomy, of which up to 6 hours may be earned from any combination of work done in directed study, independent study, and Honors research (296) courses offered by the Department of Physics & Astronomy.

The total hours for the revised major in Physics will be either 32 or 33, depending on the student's choice for requirement (1). We believe this will strength the major and make our graduating physics majors even more prepared and competitive when applying to graduate and professional programs.

We have carefully reviewed the academic records of the 37 physics majors in the classes of 2007, 2008, and 2009. Of these, 32 would have graduated or will graduate having completed the proposed new requirements. Each of the other five would have needed one additional course to complete the proposed new requirements. Thus, the real impact of this proposed change will be to require about one out of each seven majors to either take one more course or drop the physics major. In discussing the five students in question, the faculty believe that all of them would have taken the additional course (rather than drop the major), had this requirement been in effect.
Other information requested by the CEP:

The complete catalog text of the affected section of the catalog (*Majors in the Department of Physics and Astronomy*), with deletions and additions noted: attached.

Impact of the program on staffing, space, computing facilities, and the library: none.

New costs: none.

Other departments and programs affected: none.
Majors in the Department of Physics and Astronomy

The department major provides a thorough grounding in the core areas of physics. It is suitable either as a preparation for careers in science and engineering, or as a springboard for applying technical knowledge in such fields as business, medicine, law, public policy, and education. The major in the Department of Physics and Astronomy consists of (1) the first semester (Physics 116a and 118a or 121a) and - the second semester (Physics 116b and 118b or 121b) in introductory, calculus-based physics; exceptionally well-qualified students should discuss their first-year program with the director of undergraduate studies; (2) a 19-hour core sequence, which consists of five courses covering the major subdisciplines of physics at an intermediate level and one semester each of the astronomy and physics seminars (Astronomy 250, Physics 250); and (3) 6 hours of electives in physics or astronomy, with at most 6 of these 9 hours earned from any combination of directed study (289), independent study (291), and/or Honors research (296). The core intermediate-level courses are: quantum physics and applications (Physics 225 or 225W; Physics 226 or 226W); thermal and statistical physics (Physics 223); intermediate mechanics (Physics 227a); and electricity and magnetism (Physics 229a). The total hours for the major in Physics is either 32 or 33, depending on the student's choice for requirement (1). Exceptionally well-qualified students should discuss their first-year program with the director of undergraduate studies for appropriate advising.

The electives required by the major may be satisfied by any combination of courses offered by the department that are at the 200 level or above, with the exception of the seminar courses Physics 250 and Astronomy 250 (one hour of each is already required for the major). Other courses may count as an elective, such as courses offered by the engineering school (or other departments and schools) that are particularly relevant, such as a course in health physics, optics, or materials science. Such exceptions must be approved by the department’s Undergraduate Program Committee. Other courses, such as 100-level courses in the physics department or additional hours of the Physics or Astronomy seminar (250) will be considered with sufficient justification. The purpose of the above policy is to allow relevant courses to count without having to specify them in advance, since it is expected that the relevant courses offered by other departments and schools will change and it is not practical to attempt to maintain a list of approved electives. Majors should seek approval of an elective from their advisor prior to their taking the course and, if applicable, from the Department's Undergraduate Program Committee.

Students with specific educational or professional objectives in the sciences or engineering may wish to augment the major by taking additional courses to prepare for graduate study or employment in physics, astronomy and astrophysics, applied physics, or medical physics.
Dear Kass,

At its meeting this morning (November 11, 2008), the Committee on Educational Programs voted unanimously to approve a proposal for revised majors in Physics and Astronomy (see attachment). The proposal is now ready to be sent on to Faculty Council for its consideration.

In order not to clutter your inbox, and because the merits of the proposed revision were patent to CEP, I haven't sent you the email exchanges I had with Professor Weintraub in the process of his formulating the proposal. If you want to see them I will be happy to send them along to you, and in any case I will be at the FC meeting and available to discuss the proposal in person.

Best,

Gregg

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