



**Department of Astronomy**

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Recent prerequisite changes by the Physics Department have added eight credit hours to the course load of astronomy majors. The Astronomy Department is concerned about this additional burden on our majors and seeks to remove one required course (Physics 664; four credit hours). In addition, based on a study of retention and time to graduate, we propose to add two credits of undergraduate seminar (Astronomy 295) as a requirement of the astronomy major. This recently-approved course is primarily intended for first-year students and aims to improve retention, time to graduate, and inform students about contemporary research. Below is the detailed rationale for these changes. The net result of this proposal would be a two credit hour decrease in the astronomy major program. We note that combined with the (already approved) changes in Physics, there will be a six credit hour increase in the astronomy major relative to two years ago. If this proposal is not approved, the net increase is eight hours. The detailed rationale for these changes is as follows:

### **1. Removal of Physics 664 (Theoretical Mechanics)**

Last year the Physics Department added Physics 416 (Methods of Experimental Physics) as a prerequisite for Physics 555 (Fields and Waves I), 621 (Statistical Physics I), and 631 (Quantum Physics I) for students who first enroll in Autumn 2008 or afterwards. CSE 202 (Intro to C++ Programming) was made a prerequisite for Physics 416 at the same time. Physics 555, 621, and 631 are required for the astronomy major, while Physics 416 and CSE 202 were not, so this adds eight credit hours (four per course) to the astronomy major. The motivation for this change is that the Physics Department plans to incorporate more programming into their curriculum. While the Astronomy Department is enthusiastic about the additional programming skills that students will gain from these new prerequisites, and we presently plan to incorporate more programming into our upper level courses as well, we are also concerned that the addition of eight credit hours will overburden our majors and specifically impact their time to graduation. We therefore propose to remove Physics 664 (Theoretical Mechanics, four credit hours) as a requirement. We note that this change will only impact the astronomy majors who do not have a double major with physics, which is approximately half of the astronomy majors. While Physics 664 contains important knowledge, the affected students are generally not those on our "graduate school track" (we strongly encourage students interested in

graduate study to double major with physics). We would continue to recommend Physics 664 to students who only major in astronomy.

## **2. Addition of Astronomy 295 (Undergraduate Seminar)**

We propose to add two instances of Astronomy 295 (Undergraduate Seminar), a one credit hour survey course with no prerequisites and graded pass/fail, as requirements of the astronomy major. This survey course was developed to improve retention, stimulate interest in research, and improve the typical time to graduation. The course is intended for first-year astronomy majors. The content of the course is largely an overview of contemporary astronomy research, although the first several weeks are devoted to the recommended major curriculum, careers options, and undergraduate research opportunities. At present students are strongly encouraged to take this course during their first year (offered Autumn and Winter Quarters), which maximizes the positive impact on their four-year course schedule and also provides them with a palpable link to the Astronomy Department faculty (otherwise astronomy majors do not normally take their first astronomy courses until at least the second year). The addition of this course as a requirement should therefore improve our retention as well. Because Astronomy 295 is only one credit hour per quarter and is primarily informational, we do not expect (and have not observed) any impact on the number of courses students take concurrently and therefore expect no impact on time to graduate. In fact we expect a net positive impact due to the emphasis on development of a detailed, four-year course plan during the first year.

The net impact of these two proposed changes is the reduction of two credit hours. Four credit hours are removed with the proposed elimination of the Physics 664 requirement, while two credit hours are added with the proposed addition of two instances of Astronomy 295. In the larger context of the changes in physics requirements last year, an astronomy major is presently required to take eight more credit hours than one entering the University two years ago. This proposal will decrease this to six hours, two of which are primarily informational and graded pass/fail.

Please contact me with any questions about these proposed changes.

Sincerely,

Paul Martini  
Assistant Professor and  
Director of Undergraduate Studies  
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cc: Ron Severtis  
Dave Andereck

## TRANSMITTAL HISTORY FOR REVISION TO THE ASTRONOMY MAJOR

Social, Behavioral, Biological, Mathematical & Physical Sciences CCI Subcommittee  
Excerpt from Unapproved Minutes  
Tuesday, June 9, 2009

### 3. Astronomy Major revision

#### Primary reviewers: Caroline & Doug

- A two-fold change to major; the issues are not related.
- Rationale for withdrawal of Physics 664 from major requirements: CSE 202 and Physics 416 were approved last year to be added as pre-reqs to certain Physics courses. These additions affected Astronomy major, which requires many Physics courses. Astronomy does not wish to eliminate the courses that the pre-requisite changes affected, but wishes to address this increase in credit hours.
- Request to drop one physics course from Astronomy Major requirement (Physics 664) to reduce impact of increase in credit hours. This course has a different focus than the other physics courses that carry the new pre-requisites, but is not as crucial to the major. Besides, many students take 664 anyway as double majors with physics, therefore the impact would be fairly low.
- Rationale for addition of Astron 295: This is a one-credit course required to be taken twice: Why take course two times? Retention? Will help students connect with faculty in Astronomy while they are taking many pre-reqs that are not in Astronomy and will help formalize degree planning process.
- **Please clarify why 295 is a 1-credit course to be taken twice (during recommended quarters) rather than a decimalized course (295.01 and 295.02); or 295 and 296? How can they ensure that the content will not be similar?**
- Explanation of 295 as retention based and advising based course that allows students exposure to many faculty early on
- Department is proposing to drop one 4-credit course, but two 4-credit pre-reqs were added beyond their control to required course. Also, adding two credits in the form of 295 better prepares students and helps with retention. This results in a net decrease in 2 credit hours required within the major, but an actual net 6 credit-hour increase for students if one adds back in the increase in pre-req credits.
- What are hours required in major? Currently 79 not including pre-reqs.
- **Please add to the proposal a table with 3 columns reflecting these credit hour comparisons 1) Before Physics changes to pre-reqs (pre-req hours and hours within major), 2) Current (pre-req hours and hours within major), and 3) proposed changes (pre-req hours and hours within major).** This will be very helpful for committees as proposal moves forward.

Motion- Approved with Contingencies in bold above Soundarajan, 2<sup>nd</sup> Breitenberger  
**UNANIMOUSLY APPROVED**

**Mathematical and Physical Sciences Curriculum Committee**  
**Excerpt from Approved Minutes**  
**Wednesday, May 27, 2009**

5. Astronomy Major Revision
  - Physics added 2 requirements last year that are prereqs for classes Astronomy majors had to take, adding 8 more credit hours to their schedules. 416 became a prereq for some upper level courses, making it a requirement. CSE 202 as well.
  - Looking at other required Astronomy classes, the Department chose to remove Physics 664, (thus 4 credits from the major) leaving only an addition of 4 credits from these original changes
  - About 50% of Astron majors will be affected, since 50% of other majors are also Physics majors and they will have to take 416 anyway.
  - Adding Astronomy 295 (2 credit hours) (see last week's minutes)
    - a. This can be used for 2<sup>nd</sup> year students as well who decide to become Astronomy majors- the bulk of the material is research seminar-based. There is some logistical information with scheduling and research opportunities.
  - This would allow students with 17 freshmen hours to drop a 5 hour class to maintain themselves at a full-time 12 hours
  - Offered late afternoon on Tuesdays to minimize student schedule conflicts
  - Total of these 2 changes equals a 2 hour credit reduction
    - a. **Because of changes that the Physics program made and the changes in Astronomy to mitigate them, the overall impact is a net increase of 6 credit hours**
  - **Add statement that dual majors will not be affected, and it will help Astronomy majors**
  - Pinsonneault, Craigmile- **UNANIMOUSLY APPROVED contingent upon the bolded items above**

**Mathematical and Physical Sciences Curriculum Committee**  
**Excerpt from Approved Minutes**  
**Wednesday, April 22, 2009**

3. Astronomy 295
  - Previously 294- professors rotate, coming in and talk about their research to freshmen, giving them a sense of Astronomy; take 2 quarters; professors enjoy doing so
  - Making this course a required course in the major will trigger a major revision
  - A relatively minor change, but could provide a rationale for including this in majors: does not affect time to graduation (by adding hours), and with positive feedback is a great addition to the program; no other changes
  - Change repeatable to 2
    - Perhaps keep at 4, but require 2 credits of the course
  - Interested in allowing non-majors to take as well

- Like a freshman seminar course; Physics does a 2<sup>nd</sup> year course similar to this; there is a research day, career things
- Allow them to take Physics first
- Not making it 2 course numbers because it probably won't make a big difference
- Will add this as a group studies form to get through for Autumn 2009 because of OAA deadlines
- Will contact Kate Hallihan in CAO and Dave Andereck to discuss possible major revision
- Provided with a major approval rationale, is the committee otherwise alright with this course? Yes, as a non-required course
- Could it be approved and placed as a prereq and not trigger revision?

Craigmile, Solomon- **UNANIMOUSLY APPROVED as a non-required course (CAO to uncheck the box)**