

October 14, 2016

Nicholas Siedentop
Curriculum Director
Office of Undergraduate Curricula
Campus Box 3504 | Chapel Hill, NC 27599-3504

Dear Mr. Siedentop:

The Department of Physics and Astronomy proposes to change the requirements of the Minor in Astronomy, the Physics BS Astrophysics Option, and the Physics BA Astronomy option. Currently, all of these programs require both ASTR 102 and ASTR 301. We propose to eliminate these requirements and instead require ASTR 202*, which is a new three-credit-hour course. This change will reduce the number of required credit hours for each program by one credit hour. The only pre/co-req for ASTR 202 is PHYS 119, which is already a required course for all three programs.

Justification:

ASTR 102 is a 3-credit-hour course that is accessible to students who have not taken any science or math courses apart from ASTR 101; it is primarily a conceptual course. ASTR 301 is a 1-credit-hour course that supplements the material taught in ASTR 102 with quantitative astrophysics. ASTR 301 serves as a capstone for the Astronomy Minor and as a bridge course to the 500-level ASTR courses that are required for the BA and BS.

The ASTR 102/301 curriculum demands that the conceptual and mathematical aspects of astrophysics be divided into two courses that many students take in different semesters; this separation is unnatural and makes it difficult for students to achieve a cohesive understanding of quantitative astrophysics. Furthermore, three credit hours are devoted to conceptual astronomy and only one credit hour is reserved for quantitative problem solving. This is a suboptimal allocation: one credit hour is not sufficient for all the material that is required to prepare students for the 500-level astrophysics courses. Meanwhile, ASTR 102 devotes considerable time to teaching rudimentary physics to non-science majors. As a result, ASTR majors and minors generally find ASTR 102 to be a relatively easy course, while ASTR 301 is a very challenging course with a workload that exceeds what is appropriate for a one-credit-hour course. When students take ASTR 301 after taking ASTR 102, it is usually taken on top of an already-full course load, and students struggle with the demands of ASTR 301. Each year, 2-4 students drop the astronomy minor because they cannot find time in their schedules to take ASTR 301.

Replacing ASTR 102 and ASTR 301 with ASTR 202 would allow us to integrate the conceptual and quantitative aspects of astrophysics in a single course. More time could be allocated for instruction in solving problems and computational data analysis, which would better prepare BA and BS students for advanced astrophysics coursework. Finally, students would not be forced

to incorporate a very demanding one-credit hour course into their schedule, as ASTR 202 would be a 3-credit-hour course that would replace ASTR 102.

Changes to requirements of other courses:

ASTR 501, 502, 503, 504 and 505 all currently have ASTR 301 as a prerequisite. This prerequisite would be changed to ASTR 301 or ASTR 202. *

ASTR 519 currently has ASTR 102 and PHYS 331 as prerequisites. ASTR 202 covers the necessary background contained in both these courses, so the ASTR 519 prerequisites should be changed to ASTR 202 or both ASTR 102 and PHYS 331. *

Sincerely,

A handwritten signature in blue ink, appearing to read "Iliadis", with a stylized flourish at the end.

Christian Iliadis
Professor and Department Chair
Department of Physics & Astronomy

*Pending approval, January 31, 2017 Curriculum Committee Report

Department of Physics and Astronomy

- Use this document to submit curriculum changes for the 2017-2018 academic year.

Physics Major, B.A.–Astronomy Option

Core Requirements

- PHYS 118 (gateway)
- PHYS 119, 201 or 401, 211 or 311, 281L, and 331
- Six additional credits chosen from ASTR (numbered above 300)
- Three additional credits chosen from ASTR (numbered above 300); PHYS 231, 295, 395, 585, 691H, 692H

Additional Requirements

- ASTR 101, 101L or 111L, [and ~~102, and 301~~202](#)
- MATH 231, 232, 233, and 383

Physics Major, B.S.–Astrophysics Option

Core Requirements

- ASTR 519
- PHYS 281L, 311, 321, 331 (with project on an astrophysics topic), 351, 358, 401, 412, 441, and 521
- PHYS 395 or 692H (optional for UNC–BEST students)
- One additional course chosen from ASTR (numbered above 300)
- One additional course chosen from ASTR (numbered above 300); ENGL 303; MATH 528, 529; PHYS 231

Additional Requirements

- ASTR ~~102 and 301~~202
- CHEM 101/101L (CHEM 102/102L are recommended but not required)

- MATH 231, 232, 233, and 383
- PHYS 118 and 119

As part of these course requirements, candidates for the B.S. degree must earn grades of C (not C-) or better in at least 18 credit hours of courses that are listed under Core Requirements.

It is strongly recommended that students planning to major in physics fulfill the Foundations requirement in English composition and rhetoric by enrolling in ENGL 105I Writing in the Natural Sciences.

Most students will find it advantageous to defer some of the General Education requirements to the junior and/or senior year(s).

Astronomy Minor

The minor in astronomy consists of ~~six~~ five courses:

- ASTR 101, 101L or 111L, and 102, ~~and 301~~ 202
- PHYS 118 and 119