THE UNIVERSITY OF NORTH CAROLINA ASHEVILLE
FACULTY SENATE

Senate Document Number SD6522S
Date of Senate Approval 4/28/2022

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Statement of Faculty Senate Action:

APC Document 60 (ASTR): **Change the prerequisite for ASTR 321;**
Add ASTR 499 to the curriculum;
Change the requirements for the Astronomy Minor

Effective Date: Fall 2022

1. **Delete:** On page 267, the prerequisites for ASTR 321:

321 **Astrophysics (3)**
Physical processes applied to astronomical phenomena, including star formation, stellar structure and evolution, and compact stellar remnants. The interstellar medium, from which stars form, will also be examined. Prerequisites: ASTR 103 and PHYS 221. Pre- or corequisite: PHYS 222 or 231. Even years Spring.

Add: On page 267, in place of deleted entry:

321 **Astrophysics (3)**
Physical processes applied to astronomical phenomena, including star formation, stellar structure and evolution, and compact stellar remnants. The interstellar medium, from which stars form, will also be examined. Prerequisites: ASTR 102 and PHYS 221. Pre- or corequisite: PHYS 222 or 231. Even years Spring.

2. **Add:** On page 267, add **ASTR 499** to the list of Astronomy classes:

499 **Undergraduate Research in Astronomy (1-6)**
Independent research under the supervision of a faculty mentor. An IP grade may be awarded at the discretion of the instructor. May be repeated for a total of 6 hours of credit. Prerequisites: ASTR 102, 320, and permission of instructor. See department chair.

3. **Delete:** On page 265, the entry under Minor in Astronomy:

At least 18 hours in Astronomy: ASTR 102, 103, 112, 113, 320; and 2 courses from ASTR 301, 321, 420 and 430. Note that ASTR 321 and 430 have prerequisites of PHYS 221 and either PHYS 231 or 222.

Add: On page 265, in place of deleted entry:

At least 18 hours in Astronomy: ASTR 102, 112, 320; one course from ASTR 103 or 321; one course from ASTR 113 or 499; and two courses from ASTR 301, 420, and 430. Note that ASTR 321 and 430 have prerequisites of PHYS 221 and either PHYS 231 or 222, and MATH 191, 192, and possibly 291 are prerequisites to the PHYS courses.

Impact Statement: The most significant impact of the changes is improving the experience of physical science majors who are minoring in Astronomy. Currently, all Astronomy minors are required to complete ASTR 103, and ASTR 321 is an option that can be taken from a list of four courses. These classes both focus on stellar astrophysics but with dramatically different levels of mathematical rigor. The proposed changes will encourage students with a strong physics and math background to take only ASTR 321, which is the more appropriate option given their academic preparation.

Similarly, upper-level students with a strong science background may also receive greater benefit from pursuing an independent research project in ASTR 499 rather than taking a second introductory-level lab (ASTR 113). For this reason we would like to codify the option to replace ASTR 113 with ASTR 499 if the student receives consent from the instructor and has already completed ASTR 320. See Appendix A for a comparison of the requirements for the "old" and the "new" minor.

No major impact on staffing resources is expected, as students will be able to fulfill the proposed requirements of the minor without changes to current offerings. The majority of students who take ASTR 103 are general ed students, so this change will not make a significant reduction in ASTR 103/113 enrollment. (For example, only 10 of the 102 students in ASTR 103 are likely Astronomy minors). Beyond that, even if we were losing some SCH from 103 we have to gain it back in one of the other ASTR classes since this only applies to astronomy minors and they have to take a certain amount of ASTR CHs. While we are requesting the addition of a new independent research course in Astronomy (ASTR 499), this change is only a formality. The same opportunity for research course credit has previously been available to students in the Department of Physics and Astronomy under the coding of PHYS 499. No change in instructor contact hours is required to add this course option.

Rationale: We have seen a tripling of enrollment in the Astronomy Minor since its restructuring in 2017. The new curriculum is popular with students both within and outside of the Physics Major, but over the past few years some residual structural flaws have emerged, regarding how the minor curriculum is serving the physical science majors. The changes we request in the requirements for the minor would formalize some exceptions that we have already been permitting after recognizing that the physical science majors are not always sufficiently challenged by the introductory level coursework in the minor. These changes will encourage students with a strong math and science preparation to choose a path through the minor that is more appropriate and satisfying. The prerequisite for ASTR 321 is changing to account for the removal of ASTR 103 as required for the minor.

Appendix A: Astronomy Minor Requirements Comparison

Old requirements				
Course name	**Number**	**Pre and coreqs**	**Credit hours**	**Offered**
Required courses:				
Intro. to Astronomy: The Solar System	ASTR 102	none	3	Fall
Intro. to Astronomy: Stars and Galaxies	ASTR 103	none	3	Spring
Astronomy Lab I	ASTR 112	Pre- or coreq: ASTR 102 or 103	1	Fall
Astronomy Lab II	ASTR 113	Pre- or coreq: ASTR 102 or 103	1	Spring
Observational Astronomy I	ASTR 320	Prereq: ASTR 112 or 113	4	Fall
Choose 2 of 4:				
Indigenous Perspectives on the Sky	ASTR 301	none	4	Odd fall
Astrophysics	ASTR 321	Prereqs: ASTR 103, PHYS 221; Pre- or coreq: PHYS 222 or 231	3	Even spring
Observational Astronomy II	ASTR 420	Prereq: ASTR 320	3	Odd spring
Black Holes and Cosmology	ASTR 430	Prereqs: ASTR 103, PHYS 221; Pre- or coreq: PHYS 222 or 231	3	Even fall

New requirements				
Course name	**Number**	**Pre and coreqs**	**Credit hours**	**Offered**
Required courses:				
Intro. to Astronomy: The Solar System	ASTR 102	none	3	Fall
Astronomy Lab I	ASTR 112	Pre- or coreq: ASTR 102 or 103	1	Fall
Observational Astronomy I	ASTR 320	Prereq: ASTR 112 or 113	4	Fall
Choose at least 1 of 2:				
Intro. to Astronomy: Stars and Galaxies	ASTR 103	none	3	Spring
Astrophysics	ASTR 321	Prereqs: ASTR 102, PHYS 221; Pre- or coreq: PHYS 222 or 231	3	Even spring

Choose at least 1 of 2:				
Astronomy Lab II	ASTR 113	Pre- or coreq: ASTR 102 or 103	1	Spring
Undergraduate Research in Astronomy	ASTR 499	Prereqs: ASTR 102, 320 and consent of instructor	1	Spring, Fall

Choose at least 2 of 3:				
Indigenous Perspectives on the Sky	ASTR 301	none	4	Odd fall
Observational Astronomy II	ASTR 420	Prereq: ASTR 320	3	Odd spring
Black Holes and Cosmology	ASTR 430	Prereqs: ASTR 103 or ASTR 321, PHYS 221; Pre- or coreq: PHYS 222 or 231	3	Even fall