

ACADEMIC CREDIT FOR RESEARCH EXPERIENCE: GUIDELINES

DEPARTMENT OF ASTRONOMY

The Astronomy department encourages undergraduate students to become involved in research. Our faculty adhere to the principle that the best way to learn science is by doing research, and observational, theoretical, or laboratory research is a strongly encouraged supplement to undergraduate studies in the department. Directed research, independent study, honors thesis, and senior capstone experiences allow students to work with a researcher for academic credit as a means of educating students about what astronomers do at the observatory, how scientists do research, and how students can participate in research themselves.

Students are responsible for identifying an UA researcher to work with and contacting him/her to arrange the research experience. Students are welcome to work with researchers in various departments, but will only be granted academic credit applicable to the Astronomy major for research experience that is related to astronomy or astrophysics. All Astronomy primary and joint faculty (a list can be found at <http://www.as.arizona.edu> under "Faculty") are approved supervisors for Astronomy course credit; work with other researchers can be approved by the student's Astronomy faculty advisor, based on the description of research provided on the Approval for Undergraduate Research form. For assistance in finding a research project of interest, students should contact their Astronomy faculty advisor.

An **ideal research project** will provide students with an introduction to scientific methodology and should require both observational/theoretical data analysis and intellectual aspects of question-driven research. Students should not serve as simply a pair of hands for another researcher. Specific criteria for the research experience, such as the following examples, are determined by the project advisor:

- ◆ attendance at group meetings
- ◆ maintenance of a research notebook
- ◆ conference presentations
- ◆ observational or analysis techniques to be learned
- ◆ content, length, and format of the thesis
- ◆ writing a summary of the research performed

Such **criteria should be listed on the approval form** so there is an understanding of the grading process for the student. Students are expected to work a total of 48 hours for every 1 unit of credit (approximately 3 hours per week per credit during a regular 16-week semester). Any questions regarding the requirements for the research experience can be directed to Prof. John Biegging, Lead Faculty Advisor, at (520) 621-4878 or jbiegging@as.arizona.edu.

Which Course Number Should A Student Register For?

The project advisor and the student should work together to decide the course number most appropriate for the research experience. The chart on the next page of this handout can be used to determine which course number should be selected for students interested in obtaining academic credit.

How Does the Instructor Report the Student's Grade?

At the end of the semester, instructors must use WebRoster (<http://webroster.arizona.edu/>) to report their students' grades. Questions regarding grading may be directed to Michelle Cournoyer in the Astronomy Department Main Office at mcournoyer@as.arizona.edu or (520) 621-2289.

AVAILABLE COURSE NUMBERS FOR UNDERGRADUATE RESEARCH EXPERIENCE IN ASTRONOMY

Course Number	Course Title	Grading System	Info
ASTR 199, 299, 399, 499	Independent Study	S, P, C, D, E	Academic credit for working on a research project, variable from 1-5 units each semester. Students may register for Independent Study an unlimited number of times.
ASTR 392, 492	Directed Research	A, B, C, D, E	Academic credit for working on a research project, variable from 1-6 units each semester. Students may register for a maximum of 12 directed research units (392 and 492).
ASTR 199H, 299H, 399H, 499H	Honors Independent Study	A, B, C, D, E	Honors academic credit for working on a research project, variable from 1-5 units each semester. Students may register for Honors Independent Study an unlimited number of times.
ASTR 498H	Senior Honors Thesis	A, B, C, D, E	Honors academic credit for writing a thesis, usually based on research work. The requirements for the thesis itself are determined by the research supervisor. Students should check with the Honors College for any additional requirements for the thesis (Dr. Laura Berry, 621-6901). Students normally register for ASTR 498H in the first semester of their senior year (3 units), and register again for ASTR 498H (3 units) in the final semester. ASTR 498H can be repeated for up to a total of 9 units. The Senior Honors Thesis may fulfill the Writing Emphasis requirements for the ASTR major; see an advisor for details.
ASTR 498	Senior Capstone	A, B, C, D, E	Academic credit for a cumulative senior project (usually a thesis or manuscript based on lab work) in the lab, varying from 1-5 units each semester. Senior Capstone may be repeated for a total of 10 units of credit. The Senior Capstone may fulfill the Writing Emphasis requirements for the ASTR major; see an advisor for details.