



Astronomy

College of Natural Sciences and Mathematics

Minor

PROGRAM DESCRIPTION

Astronomy has played an important role in the development of modern science. Recent advances in technology and space exploration have made possible many remarkable new discoveries in astronomy. For both these reasons, the study of astronomy is an excellent way for the liberal arts student to gain an appreciation of scientific knowledge and methods, and is especially recommended for students who are preparing for a teaching career. Those interested in graduate study in astronomy or astrophysics, or who wish to prepare for a career in this field, should obtain information about these possibilities from advisors in the Department of Physics and Astronomy.

Special Features

- Observation sessions are held in our facility on the roof of Amador Hall with a 14-inch Schmidt-Cassegrain instrument.
- Portable 8-inch and 5-inch Schmidt-Cassegrain telescopes, as well as an 8-inch Newtonian reflector and a 4-inch refractor, are also available for use in courses.
- Mounting attachments for astrophotography are available, and darkroom facilities in the Department of Physics and Astronomy can be used for developing and printing.
- Occasional off-campus sessions make use of observatory and planetarium facilities at neighboring institutions.

Faculty

Hossein Partovi, Gary Shoemaker, Christopher Taylor

Contact Information

Gary Shoemaker, Department Chair
 Rachel Lyman, Administrative Support Coordinator
 Sequoia Hall 230
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Requirements • Minor

Units required for Minor: 18

Courses in parentheses are prerequisites.

A. Required Courses (12 units)

- (3) ASTR 4 Introduction to Astronomy (one year high school geometry or instructor permission)
- (1) ASTR 6 Astronomical Observation Laboratory (ASTR 4; may be taken concurrently)
- (3) ASTR 131+ The Solar System and Space Exploration
- (3) ASTR 132+ Stars, Galaxies and Cosmology
- (2) ASTR 199* Special Problems

B. Elective Courses (6 units)

- (4) CHEM 142 Introduction to Physical Chemistry (CHEM 1B, CHEM 24, PHYS 5A, PHYS 5B, MATH 31)
- (3) CSC 25 Introduction to C Programming
- (3) GEOG 107 Remote Sensing (GEOG 103; Passing score on ELM recommended)
- (3) GEOG 113 Climate (Knowledge of general world distribution of climatic elements as given in an introductory physical geography course.)
- (3) GEOG 116 Global Climate Change (GEOG 1 or instructor permission)
- (3) GEOL 114 Volcanology (GEOL 10 or instructor permission)
- (3) GEOL 170* Geology of the Planets (An introductory Geology course or instructor permission)
- (3) PHIL 125 Philosophy of Science
- (3) PHSC 107* History of the Physical Sciences (Cross-listed with HIST 107)
- (3) PHYS 136 Electrodynamics of Waves, Radiation, and Materials (PHYS 135)
- (3) PHYS 145 Optics (MATH 45, PHYS 11A, PHYS 11B, PHYS 11C)
- (3) PHYS 162 Computational Physics (two semesters of calculus; PHYS 5A and PHYS 5B or two of the following: PHYS 11A, PHYS 11B or PHYS 11C. Ability to program in a language such as BASIC, PASCAL, FORTRAN or C)
- (4) STAT 50 Introduction to Probability and Statistics (MATH 26A, MATH 30, or appropriate high school based AP credit)
- (3) STAT 115A Introduction to Probability Theory (MATH 31; STAT 1 or STAT 50 recommended)

*Substitutions of up to 4 units of Physics and Physical Science courses are possible; consult a Department of Physics and Astronomy advisor.

+ Prerequisites: ASTR 4, passing score on WPE.

Lower Division Courses

ASTR 4. Introduction to Astronomy. Description and explanations of astronomical phenomena and measurements. Structure and evolution of planetary and stellar systems. Occasional observation periods. **Prerequisite:** One year of high school geometry or instructor permission. **Units:** 3.0.

ASTR 6. Astronomical Observation Laboratory. Study and use of various telescopes; field observation of planets, stars, meteors, asteroids, the moon and sun; laboratory activities relevant to astronomy. Lab three hours. **Prerequisite:** ASTR 4, may be taken concurrently. **Units:** 1.0.

Upper Division Courses

ASTR 131. The Solar System and Space Exploration. Planets and satellites, including their composition, structure, and atmospheres, with emphasis on modern techniques and observations. Solar surface phenomena and their influence on planets through the solar wind. Comets, meteorites, and their implications for the origin and evolution of planets. Physical effects governing feasible forms of space exploration and colonization. **Prerequisite:** ASTR 4, passing score on the WPE. **Units:** 3.0.

ASTR 132. Stars, Galaxies and Cosmology. Types and evolution of stars; structure and evolution of galaxies; overall structure of the universe; current developments in astronomy. **Prerequisite:** ASTR 4, passing score on the WPE. **Units:** 3.0.

ASTR 199. Special Problems. Individual projects or directed reading. **Note:** Open only to students competent to assume individual work on approval of the instructor. Up to 2 units may be taken for a grade. **Graded:** Graded (CR/NC Available). **Units:** 1.0-2.0.