



# ASTRONOMY

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.

Observing sessions are held in our observing facility located on the roof of the Psychology Building, with its 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. Off-campus sessions are held occasionally making use of observatory and planetarium facilities at neighboring institutions.

The minor in Astronomy is recommended as a broadening accompaniment to any other major, especially for students who are preparing for teaching. Those interested in graduate study in astronomy or astrophysics, or wishing to prepare for a career in this field, should obtain information about these possibilities from advisors in the Department of Physics and Astronomy.

## FACULTY

Charles Newcomb, *Department Chair*

Donald Hall; James Klavetter; James Phelps; Gary Shoemaker

Rachel Brault, *Department Secretary*

Department Office, Science 230, 278-6518

e-mail: physics@csus.edu

## MINOR REQUIREMENTS

Total units required for Minor: 18

Specific course requirements are:

- |     |           |  |
|-----|-----------|--|
| (3) | ASTR 4    | Introduction to Astronomy (one year high school geometry)        |
| (1) | ASTR 6    | Astronomical Observation Lab (ASTR 4; may be taken concurrently) |
| (3) | ASTR 131+ | Solar System & Space Exploration                                 |
| (3) | ASTR 132+ | Stars, Galaxies & Cosmology                                      |
| (2) | ASTR 199* | Special Problems   |
| (3) | PHSC 107* | History of the Physical Sciences                                 |
| (3) | GEOL 170* | Geology of the Planets   |

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

+Prerequisites: ASTR 4, passing score on the WPE.

## LOWER DIVISION COURSES

**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 permission of instructor. 3 units.

**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. 1 unit.

## UPPER DIVISION COURSES

**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. **Prerequisites:** ASTR 4, passing score on the WPE. 3 units.

**132. Stars, Galaxies and Cosmology.** Types and evolution of stars; structure and evolution of galaxies; overall structure of the universe; current developments in astronomy. **Prerequisites:** ASTR 4, passing score on the WPE. 3 units.

**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 grade. 1-2 units.