

ASTRONOMY

College of Natural Sciences and Mathematics

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. The minor in astronomy, in combination with a major in a physical science, can help prepare students for graduate study in astronomy or astrophysics, or for a career in this field. More information about these possibilities is available from advisors in the Department of Physics and Astronomy.

Degree Program

Minor in Astronomy (<https://catalog.csus.edu/colleges/natural-sciences-mathematics/physics-astronomy-physical-science/astronomy/minor-in-astronomy/>)

Special Features

- Observation sessions are held in our facility on the roof of Amador Hall with a 14-inch Schmidt-Cassegrain instrument.
- Portable 10-inch Schmidt-Cassegrain telescopes, a solar telescope and a radio telescope are also available for use in courses and student projects.
- A modern computing facility is used for digital image analysis and data reduction, providing access to all major astronomical analysis software.
- 120 seat digital planetarium used as a classroom, and which provides public outreach opportunities for astronomy students and faculty.

Contact Information

Christopher Taylor, Department Chair
 Heidi Yamazaki, Administrative Support Coordinator
 Sequoia Hall 230
 (916) 278-6518
 Department of Physics and Astronomy Website (<http://www.csus.edu/physics/>)

Faculty

BARNIOL DURAN, RODOLFO
 MARGONINER, VERA
 PETTITT, ALEXANDER
 TAYLOR, CHRISTOPHER

ASTR 4A. Introduction to the Solar System. 3 Units

Prerequisite(s): One year of high school geometry or instructor permission.

General Education Area/Graduation Requirement: Physical Science (5-A)

Term Typically Offered: Spring only

Description and explanations of astronomical phenomena and measurements related to the Solar System and exoplanets. Structure and evolution of planetary systems. Formation of solar systems and planets. Occasional observation periods.

ASTR 4B. Introduction to Stars, Galaxies, and Cosmology. 3 Units

Prerequisite(s): One year high school geometry or instructor permission.

General Education Area/Graduation Requirement: Physical Science (5-A)

Term Typically Offered: Fall, Spring

Description and explanations of astronomical phenomena related to stars, galaxies, and cosmology. Structure and evolution of stellar and galactic systems. Occasional observation periods.

ASTR 4C. Introduction to Astrobiology. 3 Units

Prerequisite(s): One year high school geometry or instructor permission.

General Education Area/Graduation Requirement: Physical Science (5-A)

Term Typically Offered: Fall only

Nature and history of scientific inquiry into life outside the Earth. Definitions of life. Habitability of planets and moons in our Solar System and of extrasolar planets. Likelihood of intelligent life outside Earth and rationale for the Search for Extra-Terrestrial Intelligence.

ASTR 6. Astronomical Observation Laboratory. 1 Unit

Prerequisite(s): ASTR 4A, ASTR 4B, or ASTR 4C with C- or better; may be taken concurrently.

General Education Area/Graduation Requirement: Laboratory (5-C), Physical Science (5-A)

Term Typically Offered: Fall, Spring, Summer

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.

ASTR 131. The Solar System and Space Exploration. 3 Units

Prerequisite(s): ASTR 4A or ASTR 4B or 4C or PHYS 11A or CHEM 1A; Junior standing; a WPJ Portfolio score OR ENGL 109M or ENGL 109W

General Education Area/Graduation Requirement: Writing Intensive Graduation Requirement (WI), Physical Science (5-A)

Term Typically Offered: Fall only

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.

Note: This course is approved as a Writing Intensive course.

ASTR 132. Stars, Galaxies and Cosmology. ✎ 3 Units

Prerequisite(s): ASTR 4A or ASTR 4B or 4C or PHYS 11A or CHEM 1A; Junior standing; a WPJ Portfolio score OR ENGL 109M or ENGL 109W.

General Education Area/Graduation Requirement: Writing Intensive Graduation Requirement (WI), Physical Science (5-A)

Term Typically Offered: Spring only

Types and evolution of stars; structure and evolution of galaxies; overall structure of the universe; current developments in astronomy.

Note: This course is approved as a Writing Intensive course.

ASTR 150. Dark Matter and Dark Energy. 3 Units

Prerequisite(s): PHYS 106

Corequisite(s): PHYS 110

Term Typically Offered: Spring only – odd years

Introduction to historical, observational and theoretical principles of dark matter and dark energy in the Universe. Topics will include dark matter in galaxies (rotation curves, stellar motions), dark matter in clusters (virial theorem, x-ray observations), MACHOs and WIMPs as dark matter candidates, as well as the discovery of dark energy through supernovae observations, and additional probes of dark energy. Dark matter and dark energy will be discussed in the cosmological context of the Big Bang theory.

ASTR 180. Through Space and Time in the Planetarium. 3 Units

Prerequisite(s): Completion of GE Area B1 and B4.

General Education Area/Graduation Requirement: Physical Science (5-A)

Term Typically Offered: Fall, Spring

An exploration of the heavens through space and time using the planetarium as an investigative tool. This course covers the historical, observational and theoretical principles of astronomy. Topics include the nature of science, structure of the universe, the sky view, orbital motions, precession, constellations, lunar phases and eclipses. The course will also explore the observational evidence for modern and ancient world views.

ASTR 199. Special Problems. 1 - 2 Units

Term Typically Offered: Fall, Spring

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.

Credit/No Credit