ASTRONOMY AND ASTROPHYSICS (ASTR)

ASTR Courses

**ASTR 101. Introduction to the Solar System. 4 units**
GE Area B3
Term Typically Offered: F,W,SP,SU
Descriptive astronomical properties of the Earth, Moon, other planets and their satellites. Comets, asteroids and other members of the Solar System. Theories of the formation of the Solar System. Opportunities for telescope observations. Intended for non-engineering and non-science majors. Not open to students who have completed or are taking ASTR 301 or ASTR 302. 4 lectures. Fulfills GE Area B3.

**ASTR 102. Introduction to Stars and Galaxies. 4 units**
GE Area B3
Term Typically Offered: F, W, SP
Descriptive astronomical properties of the Sun, stars, galaxies and interstellar material. Expanding universe and cosmological models. Opportunities for telescope observations. Not open to students who have completed or are taking ASTR 112, ASTR 301, ASTR 302, or PHYS 132. 4 lectures. Fulfills GE Area B3.

**ASTR 200. Special Problems for Undergraduates. 1-2 units**
Term Typically Offered: F, W, SP
Prerequisite: Consent of department chair.
Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

**ASTR 270. Selected Topics. 1-4 units**
Term Typically Offered: TBD
Prerequisite: Open to undergraduate students and consent of instructor.
Directed group study of selected topics. The Schedule of Classes will list title selected. Total credit limited to 8 units. 1 to 4 lectures.

**ASTR 301. Planetary Systems. 3 units**
Term Typically Offered: W
Prerequisite: PHYS 132 or PHYS 122 and MATH 141 or MATH 161.
Quantitative and descriptive properties of planetary systems, including our solar system. Physics of planets and their formation, moons, comets, and interplanetary media. Extrasolar planets and astrobiology. 3 lectures.

**ASTR 302. Stars and Galaxies. 3 units**
Term Typically Offered: SP
Prerequisite: PHYS 122 or PHYS 132; and MATH 141 or MATH 161.
Quantitative and descriptive properties of stars, galaxies and interstellar material; including stellar structure and evolution, and structure and evolution of galaxies. 3 lectures.

**ASTR 324. Longitude, Navigation, and Timekeeping. 4 units**
GE Area F
Term Typically Offered: W
Prerequisite: Junior standing and completion of GE Area B, MATH 119 or equivalent.
The state of navigation prior to 1800 and the world wide problem of determining longitude at sea. Emphasis on historical and modern-day scientific solutions to the longitude problem and navigation technology, time and timekeeping, celestial navigation, and awareness of technological solutions to societal problems. 4 lectures. Fulfills GE Area F.

**ASTR 326. Cosmology. 3 units**
Term Typically Offered: F
Prerequisite: PHYS 211 (may be taken concurrently).
Introduction to the basic ideas of modern observational cosmology from the Big Bang to the ultimate fate of the universe. Topics include: special and general relativity, curvature of space, dark matter, dark energy, cosmic microwave background, type Ia supernovae. 3 lectures.

**ASTR 400. Special Problems for Advanced Undergraduates. 1-2 units**
Term Typically Offered: F, W, SP
Prerequisite: Consent of department chair.
Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

**ASTR 404. Research Experience for Advanced Undergraduates. 1-2 units**
CR/NC
Term Typically Offered: F, W, SP
Prerequisite: Consent of department chair.
Individual investigations, research, studies, or surveys of selected problems. Credit/No Credit grading only. Total credit limited to 4 units, with a maximum of 2 units per quarter.

**ASTR 444. Observational Astronomy. 4 units**
Term Typically Offered: F
Prerequisite: ASTR 302.
Introduction to observational astronomy. Coordinate systems, telescopes and observational instruments (CCDs, filters, spectrographs), observational methods and techniques, data reduction and analysis. Laboratory activities include use of a telescope, CCD camera for data acquisition, data reduction and analysis, and presentation of results. 3 lectures, 1 laboratory.

**ASTR 470. Selected Advanced Topics. 1-4 units**
Term Typically Offered: TBD
Prerequisite: Consent of instructor.
Directed group study of selected topics for advanced students. The Schedule of Classes will list title selected. Total credit limited to 8 units. 1 to 4 lectures.

**ASTR 471. Selected Advanced Laboratory. 1-2 units**
Term Typically Offered: TBD
Prerequisite: Consent of instructor.
Directed group laboratory study of selected topics for advanced students. The Schedule of Classes will list title selected. Total credit limited to 8 units. 1 to 2 laboratories.