ASTRONOMY

Natural and Applied Sciences Division

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Program Description:

The major in astronomy provides a study of the universe at large and the physical processes that govern it. Astronomy is the oldest science and uses many of the tools of modern technology. A B.S. Degree qualifies one to work at a planetarium, enter a teacher credential program, assist at an observatory, and work in positions requiring a general technical knowledge. An M.S. Degree broadens the opportunities to include community college instructor, major observatory telescope operator, some space science positions, and many more positions in technical fields.

A Ph.D. Degree qualifies one to do sponsored research, either theoretical or observational, at a major observatory or university. This advanced degree also opens up opportunities to work as an astronaut, space engineer, space scientist, and scientific computer programmer.

University level astronomy curricula generally stress very strong initial preparation in mathematics, physics and computer programming. Many recommend that those planning on an advanced degree obtain their B.S. in physics or mathematics. While most astronomy courses are taken at the upper division or graduate level, students will find lower division astronomy courses helpful in exploring the major. The terms "astronomy" and "astrophysics" are interchangeable. Transfer students must also complete the admission and general education requirements of the intended transfer institution.

High School Preparation: Four years of college preparatory mathematics and one year of physics. Cabrillo offers courses which can substitute for this preparation; however, the major will then require more than two years to complete.

Model Program for Astronomy

The following Model Program fulfills requirements for the A.S. Degree in Astronomy at Cabrillo College. Specific lower division major preparation at four-year public institutions in California can be found at www.assist.org. Please see a counselor for advisement for transfer to any four-year institution.

A.S. Degree: Astronomy

A.S. General Education **21 Units**

Core Courses (37 Units)

ASTRO 3	Solar System Astronomy	3
ASTRO 4	Stars, Galaxies, and the Origin of the Universe	3
ASTRO 8A	Observational Astronomy	1
MATH 5A	Analytic Geometry and Calculus I	5
MATH 5B	Analytic Geometry and Calculus II	5
MATH 5C	Analytic Geometry and Calculus III	5
PHYS 4A	Physics for Scientists and Engineers	5
PHYS 4B	Physics for Scientists and Engineers	5
PHYS 4C	Physics for Scientists and Engineers	5

Approved Electives (2 units)

ASTRO 9A	Astrophotography	1
ASTRO 28A-Z	Special Topics in Field Astronomy	1
CHEM 1A	General Chemistry I	5
CIS 90	Introduction to UNIX/Linux	3
CS 19	C++ Programming	4
MATH 7	Introduction to Differential Equations	3
MATH 12	Elementary Statistics	5
or		
MATH 12H	Honors Elementary Statistics	5
Total Units		**60**

Astronomy Courses

ASTRO 3
Solar System Astronomy

3 units; 3 hours Lecture

Recommended Preparation: MATH 154; Eligibility for ENGL 100 and READ 100.

Presents a survey of the sun, planets, asteroids, comets, and the growing list of new solar systems around other stars for non-science majors. Additional topics include principles of scientific reasoning, applications to the structure and evolution of planetary systems, and methods astronomers use to discover and study other solar systems.

Transfer Credit: Transfers to CSU, UC.

ASTRO 4
Stars, Galaxies, and the Origin of the Universe

3 units; 3 hours Lecture

Recommended Preparation: MATH 154; Eligibility for ENGL 100 and READ 100.

Surveys the lives of stars and galaxies, and the relationship of life to the origin of universes, for non-science majors. Describes how astronomers use science to arrive at our current ideas on the evolution of stars and galaxies. Investigates how the nature of life relates to the origin of our universe and possible parallel universes. Includes optional star party at Cabrillo Observatory.

Transfer Credit: Transfers to CSU, UC.

ASTRO 8A
Observational Astronomy

1 unit; 1 hour Lecture, 2 hours Laboratory

Recommended Preparation: MATH 154; Eligibility for ENGL 100 and READ 100.

Hybrid Requisite: Completion of or concurrent enrollment in the following courses: ASTRO 3 or ASTRO 4

Involves observatory lab projects on stars, planets, the moon, galaxies, and in-class labs and demos on cloudy nights. Sometimes offered as a field course involving camping at dark-sky locations.

Transfer Credit: Transfers to CSU, UC.

ASTRO 9A
Astrophotography

1 unit; 1 hour Lecture, 2 hours Laboratory

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Covers photographic theory and practice at Cabrillo Observatory using telescopes, cameras, and dark room to develop, print, and mount photographs taken both on film and digitally. Clear nights usually spent at Cabrillo Observatory, cloudy nights in the photo lab. Students choose from a variety of projects and experiments. Includes optional weekend camping trip for deep-sky work.

Transfer Credit: Transfers to CSU.

ASTRO 9B
Astrophotography

1 unit; 1 hour Lecture, 2 hours Laboratory

Prerequisite: ASTRO 9A.

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Similar to ASTRO 9A, but includes more advanced projects as well as prime focus photography, advanced techniques, and opportunities for digital imaging and processing.

Transfer Credit: Transfers to CSU.

ASTRO 9C
Astrophotography

1 unit; 1 hour Lecture, 2 hours Laboratory

Prerequisite: ASTRO 9B.

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Similar to Astro 9A and 9B but includes more creative and advanced projects: experimental testing, advanced composition, CCD imaging and digital processing. Includes weekend camping trip for dark-sky work.

Transfer Credit: Transfers to CSU.

ASTRO 27
Field Astronomy at the Pinnacles

1 unit; 1 hour Lecture, 0.5 hour Laboratory

Corequisite: GEOL 27.

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

An intensive one weekend field lecture class in general astronomy, using direct visual and telescope observations in explaining planetary geology, solar system, star and galaxy formation, and evolution, and the origin of the universe. Includes car-camping at Pinnacles National Monument.

Transfer Credit: Transfers to CSU.

ASTRO 28A-Z
Special Topics in Field Astronomy

1 unit; 1 hour Lecture, 0.5 hour Laboratory

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Repeatability: May be taken a total of 4 times.

Presents a weekend field lecture/lab experience of descriptive astronomy in dark sky locations in park lands and camping areas. Emphasis on direct observations to explore how the universe works. Car camping is required. Similar to ASTRO 27 but each section is designed around a unique astronomical event and/or location: e.g. meteor shower, lunar occultation, professional observatory tour, comet appearance.

Transfer Credit: Transfers to CSU.

ASTRO 30
Advanced Field Astronomy

2 units; 1.65 hours Lecture, 1 hour Laboratory

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Presents an in-depth field course including evening observing projects, daytime geology excursions, and campfire lectures conducted at a remote dark-sky location. Involves camping on either two weekends or over a 5-day period. Lectures on planetary geology, solar studies, and survey astronomy. Evening telescope observing sessions. Each night will focus on one branch of astronomy. Car-camping required.

Transfer Credit: Transfers to CSU.