

# Astronomy

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## Program Description

The Astronomy program introduces students to the physical properties and processes that govern celestial bodies in the Universe. Students may take astronomy courses to satisfy their natural sciences requirements or to transfer with a major in astronomy / astrophysics or double major in astronomy and physics to the university. Transfer level astronomy curricula stress very strong preparation in physics and mathematics. While most astronomy courses will be taken at the upper division or graduate level, exposure to lower division astronomy courses will assist in exploring the major. Students planning to transfer may need to complete additional coursework and /or select specific electives required by the transfer institution and should consult with a counselor to identify required courses at their target university. Students who pursue a B.S. degree in astronomy will be qualified to enter a teaching credential program, operate a planetarium, and assist at an observatory. With an M.S. degree, students can teach astronomy or physics at a community college, be a telescope operator at a major observatory, or work in industry. A Ph.D. qualifies students for a career in research at a university, space agency, or observatory.

## Associate in Science Degree

The Associate in Science Degree in Astronomy can be obtained by completing the 39-unit major and general education requirements. All courses for the major must be completed with a minimum grade of C, or a grade of P if the course is taken on a Pass/No Pass basis.

## Program Outcomes

Students who complete the Astronomy Associate Degree will be able to:

1. Explain and discuss basic astronomical phenomena including, but not limited to: gravitation, the seasons, the phases of the Moon, eclipses.
2. Apply the laws of physics to explain the properties of planets, stars, galaxies, and the Universe.
3. Explain and discuss the impact and history of scientific theories and their importance in the advancement of astronomy.
4. Demonstrate proficiency in applying scientific procedures for making observations and measurements typical of modern astronomical research.

REQUIRED COURSES.....	Units
ASTR 010 General Astronomy .....	3
ASTR 020 Astronomy Laboratory.....	1
MATH 020 Analytic Geometry and Calculus I.....	5
MATH 021 Analytic Geometry and Calculus II.....	5
MATH 022 Analytic Geometry and Calculus III .....	4
PHYS 006 Physics for Science and Engineering .....	5
PHYS 007 Physics for Science and Engineering .....	5
PHYS 008 Physics for Science and Engineering .....	5
6 units from List A: .....	6
<b>Total Units .....</b>	<b>39</b>

List A: (select 6 units) .....	Units
ASTR 030 The Solar System.....	3
ASTR 040 Stars, Galaxies, and Cosmology .....	3
ASTR 045 Introduction to Astrobiology and the search for Life in the Universe.....	3
ASTR 050 Astronomical Optics .....	1
CHEM 001 General Chemistry.....	5
CIS 022 Introduction to Programming.....	3

**CSU General Education or IGETC Pattern units .... 37-39**  
**Total Degree Units CSU GE or IGETC ..... 67-69**

**Solano General Education..... 21**  
**Electives (as needed to reach 60 units)..... 0**  
**Total Degree Units Solano GE..... 60**

*\* 9 units may be double counted toward both the major area of emphasis and CSU General Education or IGETC Pattern. Consult with a counselor for more information on completing this degree.*

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## **ASTR 010 General Astronomy**

**3.0 Units**

*Course Advisory: Eligibility for ENGL 001; SCC minimum Math standard.*

*General Education: Option A: Area A; Option B: Area 5A; Option C: Area B1*

*Transferable to UC/CSU*

*Hours: 48-54 lecture.*

An introductory study of the universe, including the properties and evolution of galaxies, stars, pulsars, black holes, quasars, the sun, planets and life in the universe. Field trip may be required.

## **ASTR 020 Astronomy Laboratory**

**1.0 Unit**

*Prerequisite: ASTR 010, 030, or 040 (courses may be taken concurrently).*

*General Education: Option B: Area 5C; Option C: Area B3*

*Transferable to UC/CSU*

*Hours: 48-54 lab.*

A familiarization with the sky, telescopes, and other astronomical equipment by completing experiments in Physics related to Astronomy. Topics will cover the moon, planets, stars, galaxies, and cosmology. Field trips may be required.

## **ASTR 030 The Solar System**

**3.0 Units**

*Course Advisory: Eligibility for ENGL 001; SCC minimum Math standard.*

*General Education: Option A: Area A; Option B: Area 5A; Option C: Area B1*

*Transferable to UC/CSU*

*Hours: 48-54 lecture.*

An introductory study of solar system astronomy, the physics related to that astronomy, the planets and their moons, the sun, solar system debris, and the possibility of extraterrestrial life. Field trips may be required.

## **ASTR 040 Stars, Galaxies, and Cosmology**

**3.0 Units**

*Course Advisory: Eligibility for ENGL 001; SCC minimum Math standard.*

*General Education: Option A: Area A; Option B: Area 5A; Option C: Area B1*

*Transferable to UC/CSU*

*Hours: 48-54 lecture.*

An introductory study of stars, galaxies, the universe, and the physics related to these topics. Including an examination of the facts relating to the sun, stellar lifetimes, supernovae, black holes, and cosmology. Field trip may be required.

## **ASTR 045**

**3.0 Units**

### **Introduction to Astrobiology and the Search for Life in the Universe**

*Course Advisory: Eligibility for ENGL 001 and SCC minimum Math standard.*

*Transferable to UC/CSU*

*Hours: 48-54 lecture.*

An exploration of the possibility of life beyond the Earth. Topics include the origin and evolution of life on Earth, the formation of Earth and other planets in the solar system, the likelihood of life existing on other planets or moons within our solar system, attempts to locate life within our solar system and attempts to communicate with intelligent life in other parts of the galaxy.

## **ASTR 050 Astronomical Optics**

**1.0 Unit**

*Course Advisory: A minimum grade of B in ASTR 030 or ASTR 040; A minimum grade of C in MATH 104.*

*Transferable to CSU*

*Hours: 48-54 lab.*

An introduction to principles of astronomical optics. The student will apply these principles to the design, fabrication, and use of a telescope, which will be tested under the night sky. Primary mirrors will be ground, smoothed, polished, and figured by hand. Optics and optical testing theories will be presented. Students will design and build a custom optical tube assembly and telescope mount. A field trip to test the finished telescope will be required.