

# ASTR 0010 - ELEMENTARY ASTRONOMY

## Catalog Description

Advisory: Completion of ENGL N with grade of "C" or better  
Hours: 54 lecture

Description: General principles and the fundamental facts of astronomy. Includes historical developments of astronomy, the formation, evolution and current condition of sun and solar system, stellar structure and evolution, deep sky objects (star clusters, nebulae, galaxies), structure of universe, and cosmology. Not open to students who have successfully completed both ASTR 2 and ASTR 5. (CSU, UC)

## Course Student Learning Outcomes

- CSLO #1: Analyze basic science and core physics, to discover how they apply to astronomy.
- CSLO #2: Apply concepts from planetary astronomy to investigate the types of different planetary classes and other objects in the solar system.
- CSLO #3: Relate core concepts in basic science to stellar astronomy, assessing the various factors that are important to stellar evolution.
- CSLO #4: Synthesize information from various sources (classroom instruction, online resources, etc.) to produce a coherent understanding of galactic/extragalactic astronomy.

## Effective Term

Summer 2021

## Course Type

Credit - Degree-applicable

## Contact Hours

54

## Outside of Class Hours

108

## Total Student Learning Hours

162

## Course Objectives

Through tests, charts, assigned tasks, classroom discussions, etc., the student will:

1. Discuss a variety of historical developments that have led to important discoveries in astronomy
2. Identify 20-30 celestial objects and provide descriptive information about each
3. Compare and contrast the physical properties of planets and minor bodies in the Solar System
4. Discuss the physical principles behind the interior structure and appearance of the Sun
5. Identify the cause and scientific methods used to determine a variety of observations peculiar to the Earth (e.g., the length and variation of the seasons and the day, the tides)

6. Apply physical principles (mechanics, light, heat) to the natural behavior of celestial bodies
7. Describe the formation, structure, and evolution of planets, stars, star clusters, nebulae, galaxies, and the universe
8. Use a star chart, and a "Stargazer's Almanac" to determine the time and date of a variety of celestial events
9. Solve problems involving spatial relationships with regard to parts and motion of the celestial sphere
10. Use application software to retrieve and evaluate information and data of astronomical significance

## General Education Information

- Approved College Associate Degree GE Applicability
  - AA/AS - Physical Sciences
- CSU GE Applicability (Recommended-requires CSU approval)
  - CSUGE - B1 Physical Science
- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)
  - IGETC - 5A Physical Science

## Articulation Information

- CSU Transferable
- UC Transferable

## Methods of Evaluation

- Objective Examinations
  - Example: Standard mid-term and final exams consisting of a variety of tasks and question formats, evaluating all levels of performance according to Bloom's taxonomy (knowledge, understanding, application, analysis, synthesis, and evaluation). Example question: Which star has a higher surface temperature - A5III or K3II?).
- Problem Solving Examinations
  - Example: Homework exercises to evaluate student comprehension of weekly lectures and assigned reading. Example exercise: A "light year" is a measure of distance. True or False?
- Skill Demonstrations
  - Example: Both weekly homework and midterm/final exams will show student ability to use various devices (star charts, planisphere, almanac, computer software). Example: According to the Almanac, when will the planet Mars rise on May 10th.

## Repeatable

No

## Methods of Instruction

- Lecture/Discussion
- Distance Learning

Lecture:

1. Students are taught by instructor the use of the star charts to identify constellations and stars. Students will then use the charts to identify constellations and stars. (Objective 2)

Distance Learning

1. Students are asked to provide the times and dates of certain visible celestial events using the almanacs and/or software, the use of which

is based on their reading of provided directions and/or instructor guidance. (Objective 8)

2. Students will access images from the Discussions area to help them solve problems. (Objective 12)

## **Typical Out of Class Assignments**

### **Reading Assignments**

1. Reading from assigned text on a weekly basis. Example: Read the Chapter on the Terrestrial Planets. Be prepared to discuss in class.
2. Reading from supplemental handouts Example: Read the "Using the Sky Gazers Almanac" handout. Discussion in class to follow.

### **Writing, Problem Solving or Performance**

1. Weekly online homework exercises in a multiple-choice, matching, ranking and short-answer format and directed at problem solving skills. Example question: A binary star system has an orbital period of 5 years and a combined mass of 1 solar mass. What is the orbital distance between these stars?
2. Two midterm-level exams, Star Quiz, Deep Sky Object Quiz and Final Exam to demonstrate acquisition of critical thinking skills and astronomical knowledge. Example demonstration: Use Planetarium software to determine what time M31 is on the meridian on October 1st.

### **Other (Term projects, research papers, portfolios, etc.)**

1. In-class hands-on assignments on a weekly basis (Example group task: Students work as a team to identify the "21 stars to know" by finding and highlighting them on an SC001 and SC002 star chart).

### **Required Materials**

- Understanding the Universe
  - Author: Palen et. al.
  - Publisher: Norton
  - Publication Date: 2018
  - Text Edition: 3rd
  - Classic Textbook?: No
  - OER Link:
  - OER:

### **Other materials and-or supplies required of students that contribute to the cost of the course.**

1. Access to the "Starry Night College Edition" planetarium software program
2. Star Maps SC-001 (Equatorial Region) and SC-002 (North Circumpolar Region).
3. "Skygazer's Almanac" for the most current year.
4. Planisphere for 30-40 North Latitude