

# ASTR 116: STELLAR ASTRONOMY

## Citrus College Course Outline of Record

Heading	Value
Effective Term:	Fall 2022
Credits:	4
Total Contact Hours:	108
Lecture Hours :	54
Lab Hours:	54
Hours Arranged:	0
Outside of Class Hours:	108
Strongly Recommended:	ENGL 101.
District General Education:	B2. Natural Sciences - Physical Sciences, B3. Natural Sciences - Laboratory
Transferable to CSU:	Yes
Transferable to UC:	Yes - Approved
Grading Method:	Standard Letter, Pass/No Pass

## Catalog Course Description

The fundamental areas of stellar astronomy including the structure, classification and evolution of stars, galaxies and the universe, interstellar matter, and the theories of Newton and Einstein. Laboratory exercises include: energy and forces, light, optics, telescopes, stars and their classification, and galaxies. 54 lecture hours, 54 lab hours.

## Course Objectives

- have a perspective of the size and scale of objects in the universe
- carry out simple research projects
- solve astronomical problems with simulated and actual data
- identify and describe various bodies which make up the universe, such as stars and galaxies
- understand methods and tools of studying astronomy
- explain astronomical phenomena in simple terms
- connect the observed motions of objects in the sky to the actual movement of the Earth.
- make predictions on the behavior of simply physical systems based on the physics of forces, energy, and light.
- connect the formation and evolution of stars to physical processes energy conservation and nuclear fusion.
- connect the processes that shape galaxies to the effects these have on a galaxy's evolution.
- demonstrate a knowledge of astronomical techniques

## Major Course Content

1. The Size and Scale of the Universe
2. The Motions of the Earth and Sky
3. The Development of Modern Science
4. The Physics of Astronomy

- a. Energy, force, and matter
  - b. Light, telescopes, and detectors
  - c. Special and general relativity
5. Stars and Stellar Evolution
    - a. The sun as a star
    - b. Properties of stars
    - c. Stellar evolution
  6. Galaxies and Cosmology
    - a. The Milky Way and the interstellar medium
    - b. Properties of galaxies
    - c. Galaxy evolution
    - d. Cosmology

## Lab Content

1. Scale Models of the Universe
2. Motions of Objects in the Sky
3. Making and Testing Hypotheses
4. Measurement, Uncertainty, and Falling Bodies
5. Exploring the World in the Infrared
6. Introduction to Telescopes
7. Infrared Experiments
8. Photometry and Star Clusters
9. Finding the Center of the Milky Way Galaxy
10. Galaxies Colors and Galaxy Zoo
11. Galaxy Research Questions

## Suggested Reading Other Than Required Textbook

Popular astronomy Internet web sites produced by NASA and major observatories.

## Examples of Required Writing Assignments

Describe in a paragraph the steps in the evolution of a star. A blue main sequence star is in orbit around an unseen object of 10 solar masses. Describe in a few sentences what type of object the unseen companion could be and how you can tell.

## Examples of Outside Assignments

Given a data about a series of stars, predict which one is likely to have the longest main-sequence lifetime, then calculate to test this prediction.

## Instruction Type(s)

Lecture, Lab, Online Education Lecture, Online Education Lab

## IGETC Area 5: Physical and Biological Sciences

5A. Physical Science, 5C. Science Laboratory