

**College of San Mateo**  
**Official Course Outline**

1. **COURSE ID:** ASTR 125    **TITLE:** Stars, Galaxies, and Cosmology  
**Units:** 3.0 units    **Hours/Semester:** 48.0-54.0 Lecture hours; and 96.0-108.0 Homework hours  
**Method of Grading:** Letter Grade Only
  
2. **COURSE DESIGNATION:**  
**Degree Credit**  
**Transfer credit:** CSU; UC  
**AA/AS Degree Requirements:**  
    CSM - GENERAL EDUCATION REQUIREMENTS: E5a. Natural Science  
**CSU GE:**  
    CSU GE Area B: SCIENTIFIC INQUIRY AND QUANTITATIVE REASONING: B1 - Physical Science  
**IGETC:**  
    IGETC Area 5: PHYSICAL AND BIOLOGICAL SCIENCES: A: Physical Science
  
3. **COURSE DESCRIPTIONS:**  
**Catalog Description:**  
    Study the sun, other stars, Milky Way galaxy, other galaxies and their evolution, black holes, quasars, dark matter, and the foundations of cosmology. Students will become familiar with the basic tenets of general relativity and its application to black holes. The concept regarding stars as the primary producers of energy in the universe as well as the chemicals necessary for life, is emphasized. Focus is on conceptual understanding of stars, galaxies, and the rudiments of cosmology.
  
4. **STUDENT LEARNING OUTCOME(S) (SLO'S):**  
    Upon successful completion of this course, a student will meet the following outcomes:
  1. Discriminate between normal and active galaxies.
  2. Recognize the importance of the proton-proton chain in the production of the sun's energy.
  3. Evaluate the different methods for determining stellar distances.
  4. Assess the significance of the H-R diagram as related to stellar classification.
  5. Assess the role of dark energy in determining the eventual fate of the universe.
  
5. **SPECIFIC INSTRUCTIONAL OBJECTIVES:**  
    Upon successful completion of this course, a student will be able to:
  1. Understand the fundamentals of stellar spectroscopy, the process of stellar birth and death, formation of black holes and the morphology of the various types of galaxies.
  2. Understand the effects that dark matter and dark energy have on the structure and evolution of our universe.
  
6. **COURSE CONTENT:**  
**Lecture Content:**
  - The proton-proton chain as the source of the sun's energy production
  - Dark matter, dark energy and the fate of the universe
  - Quasars and other active galaxies
  - Mystery of gamma ray bursts
  - Galaxies and the foundations of modern cosmology
  - Our galaxy
  - Galaxy evolution
  - Star birth
  - Surveying the stars
  - Bizarre stellar graveyard
  - The beginning of time
  - Life in the universe
  
7. **REPRESENTATIVE METHODS OF INSTRUCTION:**  
    Typical methods of instruction may include:
  - A. Other (Specify): The usage of CSM's GOTO HYBRID star projector is one of the principal methods of instruction. Students will be able to see the effect on the sky, of one's change in latitude as one travels

northward or southward from San Mateo. The students will be able to visualize the movement of the sun, stars, and galaxies by means of the star projector. Concepts such as the various types of star clusters and galaxies and the different types of nebulae are easily displayed. Flights through our galaxy and to other galaxies will also be easily shown on the planetarium dome.

#### 8. REPRESENTATIVE ASSIGNMENTS

Representative assignments in this course may include, but are not limited to the following:

**Writing Assignments:**

Weekly written problem-solving worksheets.

**Reading Assignments:**

Weekly reading assignments from textbook.

#### 9. REPRESENTATIVE METHODS OF EVALUATION

Representative methods of evaluation may include:

A. Exams/Tests

B. Exams – There will be three closed book midterm exams and a closed book non-comprehensive final exam.

#### 10. REPRESENTATIVE TEXT(S):

Possible textbooks include:

A. Bennett, Donohue, Schneider, and Voit. *Stars, Galaxies, and Cosmology*, 7th ed. Pearson and Addison-Wesley, 2014

**Origination Date:** September 2020

**Curriculum Committee Approval Date:** October 2020

**Effective Term:** Fall 2021

**Course Originator:** Darryl Stanford