

Course discipline/number/title: PHYS/ESCI 1134: Stellar Astronomy

A. CATALOG DESCRIPTION

1. Credits: 3
2. Hours/Week: 2 Lecture, 2 Lab
3. Prerequisites (Course discipline/number): None
4. Other requirements: NOTE: ESCI 1134 and PHYS 1134 are cross-listed. Students may take one or the other for credit, but will not receive credit for both.
5. MnTC Goals (if any): Goal 3/Natural Sciences

B. COURSE DESCRIPTION: This course is an introduction to stellar astronomy for the non-science major. The course covers topics that include light and spectra, the sun, stars, galaxies, supernovae, black holes and the Big Bang. In addition, students will be introduced to the stunning beauty of the universe as revealed in images, written works and direct experience through the telescope. Laboratory exercises introduce students to the methods astronomers use to study the universe. Lab work is supplemented by astronomical observing sessions using RCTC telescopes. NOTE: ESCI 1134 and PHYS 1134 are cross-listed. Students may take one or the other for credit but will not receive credit for both.

C. DATE LAST REVISED (Month, year): February, 2025

D. OUTLINE OF MAJOR CONTENT AREAS:

1. Radiation and spectra
2. The Sun
3. Analyzing Starlight
4. Stars and their life cycles
5. Measuring the distances to stars and galaxies
6. Black holes
7. Galaxies
8. The Big Bang

E. LEARNING OUTCOMES (GENERAL): The student will be able to:

1. Use spectra of stars and galaxies to determine the properties and characteristics of those objects.
2. Illustrate the life cycle of stars of different masses.
3. Classify galaxies according to type.
4. Measure the distances to stars and galaxies.
5. Defend the Big Bang theory using scientific evidence.
6. Explain and illustrate the power source of stars.
7. Describe the structure of stars including our Sun.

F. LEARNING OUTCOMES (MNTC):

Goal 3/Natural Sciences: The student will be able to:

1. Demonstrate understanding of scientific theories.
2. Evaluate societal issues from a natural science perspective, ask questions about the evidence presented, and make informed judgments about science-related topics and policies.
3. Formulate and test hypotheses by performing laboratory, simulation, or field experiments in at least two of the natural science disciplines. One of these experimental components should develop, in greater depth, students' laboratory experience in the collection of data, its statistical and graphical analysis, and an appreciation of its sources of error and uncertainty.

G. METHODS FOR EVALUATION OF STUDENT LEARNING: Methods may include but are not limited to:

1. Exams
2. Lab exercises
3. Quizzes
4. Homework
5. Observing projects

- H. RCTC CORE OUTCOME(S). This course contributes to meeting the following RCTC Core Outcomes(s):
Critical Thinking. Students will think systematically and explore information thoroughly before accepting or formulating a position or conclusion.
- I. SPECIAL INFORMATION (if any):
Included in the initial lab session is a discussion on general safety hazards and safety equipment. During the pre-lab instruction of labs involving hazardous materials or equipment, students are given information pertaining to the use, safety precautions, and disposal of these materials or equipment. The instructor directs all students to wear the necessary protective equipment while working with any hazardous chemicals. Safety Data Sheets for chemicals used are available online.