# ASTR A100L: INTRODUCTION TO ASTRONOMY LABORATORY

| Item | Value |
|---|---|
| Curriculum Committee Approval Date | 10/06/2021 |
| Top Code | 191100 - Astronomy |
| Units | 1 Total Units |
| Hours | 54 Total Hours (Lab Hours 54) |
| Total Outside of Class Hours | 0 |
| Course Credit Status | Credit: Degree Applicable (D) |
| Material Fee | No |
| Basic Skills | Not Basic Skills (N) |
| Repeatable | No |
| Grading Policy | Standard Letter (S),<br>• Pass/No Pass (B) |
| Associate Arts Local General Education (GE) | • OC Physical/Biological Sci - AA (OB) |
| Associate Science Local General Education (GE) | • OCC Physical/Biological Sci-AS (OSB) |
| California General Education Transfer Curriculum (Cal-GETC) | • Cal-GETC 5C Laboratory Activity (5C) |
| Intersegmental General Education Transfer Curriculum (IGETC) | • IGETC 5C Laboratory Activity (5C) |
| California State University General Education Breadth (CSU GE-Breadth) | • CSU B3 Laboratory Activity (B3) |

## Course Description

A laboratory course designed for non-science majors. It will provide practical experience with the scientific method through outdoor astronomical observations and indoor analysis of experimental data. Enrollment Limitation: ASTR A100M; students who complete ASTR A100L may not enroll in or receive credit for ASTR A100M. PREREQUISITE: ASTR A100, ASTR A100H, ASTR A101, ASTR A102, ASTR A103 or ASTR A104, or concurrent enrollment. Transfer Credit: CSU; UC.

## Course Level Student Learning Outcome(s)

1. Develop a deeper understanding of astronomical concepts through hands-on experiments and planetarium-based exercises.
2. Demonstrate an ability to analyze and interpret data by reporting on the results of an observation or experiment.
3. Plan and carry out a telescope observation session to demonstrate an understanding of basic telescope operations, as well as knowledge of daily/seasonal motion of the sky and astronomical coordinate systems.

## Course Objectives

- 1. Participate in a suitable laboratory experience emphasizing astronomical equipment.
- 2. Develop skills that are useful in science and daily life, e.g. patience, perception, careful observation.
- 3. Record and analyze observational data.
- 4. Use appropriate methods to gather relevant information.
- 5. Recognize the limits of a measurement and sources of error.
- 6. Develop an understanding of the main concepts in the course and apply it in the laboratory setting.
- 7. Discuss the relation between the procedures in these labs and the astronomical concepts described in the corresponding lecture course.

## Lecture Content

This is a lab only course.

## Lab Content

Planetarium activities Constellation locations, boundaries and mythologies Recognizing and naming stars within constellations Constellations in other cultures and their folklore The celestial sphere Annual motion of the sky Seasons and precession Time and the calendar / Moon phases and eclipses  Magnitudes and colors of stars Outdoor activities  Learning how to use various types of telescopes Daytime: Observing the Sun, measuring altitude and diameter of Sun Nighttime: Observing planets, Moon, stars, deep-sky objects Classroom lab activities Human vision/introduction to optics Basic binocular and telescope optics The Moon The Sun Physical features of planets Spectroscopy The HR diagram

## Method(s) of Instruction

- Lab (04)

## Instructional Techniques

Students work individually and in groups on activites in the planetarium under the dome, in the classroom, and outdoors. Instructors use demonstrations to explain concepts and provide guidance to students prior to using the equipment.

## Reading Assignments

In-class readings from textbook and planetarium lab manual

## Writing Assignments

In-class lab exercises (including calculations and/or written solutions) related to topics covered in class.

## Out-of-class Assignments

N/A

## Demonstration of Critical Thinking

Students will be evaluated on their lab exercises (in-class, planetarium, outdoor), quizzes, exams, and presentations.

## Required Writing, Problem Solving, Skills Demonstration

Students will be asked to set up and dismantle the equipment used in lab (telescopes, etc.).

## Eligible Disciplines

Physics/Astronomy: Masters degree in physics, astronomy, or astrophysics OR bachelors degree in physics or astronomy AND masters degree in engineering, mathematics, meteorology, or geophysics OR the equivalent. Masters degree required.

## Textbooks Resources

1. Required Reynolds, M. Bakich, M.. Exploring the Universe: A Laboratory Guide for Astronomy, ed. Morton Publishing, 2015

## Manuals Resources

1. Contopoulos, N., Fang, J., Asbell, J.. Project Orion: Astronomy Lab Manual, A Student Primer on the Night Sky, Contopoulos, N., Fang, J., Asbell, J. , 08-26-2019

## Other Resources

1. Star charts