

ASTR 10L: ASTRONOMY LABORATORY

Foothill College Course Outline of Record

Heading	Value
Units:	1
Hours:	3 laboratory per week (36 total per quarter)
Corequisite:	Completion of or concurrent enrollment in ASTR 10A, 10B or 10BH.
Degree & Credit Status:	Degree-Applicable Credit Course
Foothill GE:	Area III: Natural Sciences
Transferable:	CSU/UC
Grade Type:	Letter Grade (Request for Pass/No Pass)
Repeatability:	Not Repeatable

Student Learning Outcomes

- After successful completion of ASTR 10L, students will be able to discuss the reason for everyday astronomical phenomena, such as the phases of the Moon and the seasons.
- After successful completion of ASTR 10L, students will be able to explain the motions of the Earth and objects in the sky.

Description

A hands-on approach to the scientific method, using astronomical data and equipment. Divided into small lab groups, students will do experiments and observing projects about a range of astronomical topics, including the phases of the Moon, the reasons for the seasons, the rotation, revolution, and sphericity of the Earth, and the scale and composition of astronomical objects. Students will carry out naked-eye observations of the sky, visit the Foothill observatory, and use a portable telescope to communicate about astronomy with other students and the public.

Course Objectives

The student will be able to:

- Make astronomical measurements
- Summarize and look for patterns in images and data
- Use astronomical observations to select among physical models
- Communicate about astronomical phenomena to a general audience

Course Content

- Make astronomical measurements
 - Make angular position measurements of objects on the sky
 - Sketch and describe objects seen through a telescope
 - Compare the brightness of different wavelengths in spectra
- Summarize and look for patterns in images and data
 - Describe daily and yearly repeating motions of objects on the sky
 - Plot temperature measurements across location and time on Earth
 - Measure the apparent motion of the moon and its changing phases
 - Describe repeating apparent motions of planets
 - Plot the number and position of sunspots
- Use astronomical observations to select among physical models

- Compare "top-down view" models of the Earth-moon and solar systems with observations of positions on the sky
- Compare temperatures across Earth with multiple hypotheses of the seasons in order to determine the specific ways that the Earth's tilt leads to seasons
- Use images of the sun to infer properties such as its rotation speed and the speed of coronal mass ejections
- Use types of light emitted by objects to infer properties and ongoing processes
- Use continuous spectra to compare the temperature of objects
- Use line spectra to determine the composition of objects
- Communicate about astronomical phenomena to a general audience
 - Use step-by-step descriptions and analogies to explain the sun and sunspots to the public
 - Make color images from multi-band observations of astronomical objects
 - Describe objects and processes shown in astronomical images in an audience appropriate manner

Lab Content

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Special Facilities and/or Equipment

- Celestial globes.
- A room with good audio-visual facilities that can be darkened.
- Equipment to show short videos.
- Computers with internet access.
- Software from a number of astronomical sources and an internet connection.
- Demonstration equipment.
- Telescope.

Method(s) of Evaluation

Weekly written laboratory assignments.

Method(s) of Instruction

- A. Lecture
- B. Discussion
- C. Cooperative learning exercises
- D. Astronomical observations
- E. Demonstration
- F. Use of astronomical simulations

Representative Text(s) and Other Materials

Fraknoi, A., D. Morrison, and S. Wolff. [OpenStax Astronomy](#). OpenStax at Rice University, 2016.

Additional handouts from the instructor.

Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments

Each week, students will read a detailed handout (plus materials from the web, as appropriate) and complete a detailed written laboratory report, with their data and analysis.

Discipline(s)

Physics/Astronomy