ASTR A110: OBSERVATIONAL ASTRONOMY

Item	Value
Curriculum Committee Approval Date	12/02/2020
Top Code	191100 - Astronomy
Units	2 Total Units
Hours	72 Total Hours (Lecture Hours 18; 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), • Pass/No Pass (B)

Course Description

An introduction to the methods and techniques of observational astronomy, telescope principles, and operations as applied to public viewing of astronomical phenomena. This course is designed for students to operate the telescopes and assist the public in observing objects in the night sky. May include field trips to nearby observatories, planetaria, and public science facilities. ADVISORY: ASTR A100 or ASTR A100H. Transfer Credit: CSU; UC.

Course Level Student Learning Outcome(s)

1. Successfully plan and execute an astronomy outreach event involving telescope observations.

Course Objectives

- 1. Describe and understand the celestial sphere and coordinate systems.
- 2. Read and interpret star charts and atlases.
- 3. Plan and execute an observing run suitable for public events.
- 4. Choose the appropriate equipment for a particular astronomical event.
- 5. Set up and operate telescopes and related equipment (binoculars, cameras, etc.).
- 6. Identify objects in the current night sky.
- 7. Explain astronomical concepts to the public in an engaging and age-appropriate way.

Lecture Content

Stars and constellations Visibility and the magnitude system The celestial sphere and coordinate systems Time Seasons Moon phases Planets and solar system phenomena Motions of the Earth Fundamentals of optics Public outreach best practices

Lab Content

Identifying objects in the current night sky Stars and constellations Solar system objects (the Moon, Sun, planets, comets, satellites, etc.) Deep-sky objects Eclipses Equipment setup, calibration, usage Binoculars Dobsonian/Newtonian telescopes Computerized catadioptric telescopes Solar telescopes and solar filters Cameras Accessories (eyepieces, filters, etc.) Planning observing runs Using star charts and atlases Determining visibility of objects Planning logistics of outreach events Selecting an appropriate location Determining audience size and needed equipment Ensuring accessibility and safety Marketing Developing outreach skills Audience awareness, age-appropriateness of content Connecting with the public through demonstrations and audience-driven QA Preparing and distributing educational materials to the public

Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- Lab (04)
- DE Live Online Lab (04S)

Instructional Techniques

Lectures covering vital astronomical methods and techniques Collaborative group work, including hands-on/eye-on usage of equipment Practical experience running a public observing event.

Reading Assignments

Readings from textbook (0.5 hour per week)

Writing Assignments

Preparing written plans and educational materials for outreach events (1 hour per week)

Out-of-class Assignments

Homework assignments to practice concepts (0.5 hour per week)

Demonstration of Critical Thinking

Through the planning and execution of public outreach events, students are required to apply the concepts in the class in a real-world setting. Since the sky is constantly changing, students cannot simply memorize a one-size-fits-all procedure; they must adapt and be situationally aware to optimize the success of the event.

Required Writing, Problem Solving, Skills Demonstration

For each outreach event, students will prepare a written plan and educational materials (e.g., handouts and visual aids). Quizzes and problem sets covering computational topics (e.g., magnitudes, coordinates, optics). Lab practicum testing students ability to use telescopes and identify objects in the sky.

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 Davis, D., Consolmagno, G.. Turn Left at Orion, 5 ed. Cambridge University Press, 2018 Rationale: Guide to viewing objects with telescopes. 2. Required Dickinson, T., Dyer, A.. The Backyard Astronomers Guide, 3 ed. Firefly Books, 2008 Rationale: Comprehensive book covering all aspects of the course, including practical tips and tricks. most recent edition, ideal text.