COURSE OUTLINE OF RECORD

Number: ASTR G100L  TITLE: Introduction to Astronomy Lab

ORIGINATOR: James Almy  EFF TERM: Fall 2019
FORMERLY KNOWN AS: formerly known as
Elementary Astronomy Laboratory
CROSS LISTED COURSE:

SEMESTER UNITS: 1.0
HRS LEC: 0.0  HRS LAB: 54.0  HRS OTHER: 0.0
CONTACT HRS TOTAL: 54.0
STUDY NON-CONTACT HRS RECOMMENDED: 0.0

CATALOG DESCRIPTION:
This course provides an introduction to the concepts and models used by astronomers to elucidate the natures of planets, stars, and galaxies. The practical application of methods involving the analysis of electromagnetic radiation will be emphasized. Successful completion of this course and Introduction to Astronomy (ASTR G100) satisfies the general education natural science requirement.

JUSTIFICATION FOR COURSE:
An online addendum is being added to the course so that it can be offered online. A regular update of the content of the COR is also being performed.

PREREQUISITES:
- ASTR C100: Introduction to Astronomy with a minimum grade of C or better
- ASTR A100: Introduction to Astronomy with a minimum grade of C or better
- ASTR G100: Introduction to Astronomy with a minimum grade of C or better

COREQUISITES:
- ASTR G100: Introduction to Astronomy

ADVISORIES:
- MATH G030: Intermediate Algebra
- MATH G040: Accelerated Elementary and Intermediate Algebra

ASSIGNED DISCIPLINES:
- Astronomy
- Physics/Astronomy

MATERIAL FEE: Yes [ ] No [X] Amount: $0.00
CREDIT STATUS: Noncredit [ ] Credit - Degree Applicable [X] Credit - Not Degree Applicable [ ]
GRADING POLICY: Pass/No Pass [X] Standard Letter [X] Not Graded [ ] Satisfactory Progress [ ]
OPEN ENTRY/OPEN EXIT: Yes [ ] No [X]
TRANSFER STATUS: CSU Transferable[ ] UC/CSU Transferable[X] Not Transferable[ ]
BASIC SKILLS STATUS: Yes [ ] No [X] LEVELS BELOW TRANSFER: Not Applicable
CALIFORNIA CLASSIFICATION CODES: Y - Not Applicable
NON CREDIT COURSE CATEGORY: Y - Not applicable, Credit Course
OCCUPATIONAL (SAM) CODE: E
REPEATABLE ACCORDING TO STATE GUIDELINES: No [X]  Yes [  ] NUMBER REPEATS:
REQUIRED FOR DEGREE OR CERTIFICATE: No [  ] Yes [X]
Liberal Arts: Emphasis in Science(Associate in Arts)

GE AND TRANSFER REQUIREMENTS MET:
IGETC Area 5: Physical and Biological Sciences
  5C: Laboratory Activity
CSU GE Area B: Scientific Inquiry and Quantitative Reasoning
  B3 - Laboratory Sciences

COURSE LEVEL STUDENT LEARNING OUTCOME(S) Supported by this course:

1. Demonstrate understanding of the modern techniques for acquiring astronomical data, with an emphasis on spectroscopy.
2. Correlate the morphological characteristics of galaxies.
3. Solve mathematical problems concerning the analysis of planetary, stellar, and galactic data.
4. Interpret data obtained from observations of the Sun.

COURSE OBJECTIVES:
1. Give a basic explanation of the properties of light, matter, and spectra.
2. Detail the workings of a telescope.
3. Explain how to observe the Sun and gather data from these observations.
4. Describe the composition of the Sun and the processes by which it generates light.
5. Explain the Doppler effect and its influence on the light emitted by stars.
6. Detail the motions of the bodies in our solar system.
7. List the important properties of stars, how these properties are measured, and how stars are classified according to their properties.
8. Explain the life-cycles of both low- and high-mass stars.
9. Describe the evolution and properties of the Milky Way.
10. Explain the properties of galaxies other than the Milky Way.
11. Classify galaxies according to their properties.
12. Explain the evidence supporting the Big Bang theory.

COURSE CONTENT:

LECTURE CONTENT:
Not applicable

LABORATORY CONTENT:

A. Electromagnetic Radiation
   1. General considerations
   2. Spectral lines - atomic emission (element identification)
   3. Photometry of stars
   4. Doppler shift studies
B. The Solar System
   1. Determination of the astronomical unit
   2. Determination of the masses and atmospheres of planets
   3. The composition of the sun
   4. The orbital velocity of the earth
   5. Solar observations
C. Stars
   1. Spectral classifications of stars
   2. Analysis of proper motions
   3. Determination of selected physical stellar properties
   4. Variable stars
   5. Pulsars and the Crab nebula

D. Galaxies
   1. Properties of the Milky Way
   2. Galaxy classifications
   3. Evaluation of the Hubble constant
   4. The quasar puzzle

METHODS OF INSTRUCTION:

A. Lab:
B. Online:
C. Independent Study:
D. Hybrid:

INSTRUCTIONAL TECHNIQUES:

COURSE ASSIGNMENTS:
   Reading Assignments
   The laboratory manual and instructor-prepared handouts.
   Out-of-class Assignments
   Not applicable
   Writing Assignments
   Provide written interpretations of astronomical data.

METHODS OF STUDENT EVALUATION:

Final Exam
Written Assignments
Report
Projects (ind/group)
Problem Solving Exercises
Skills Demonstration

   Demonstration of Critical Thinking:
   Analysis of astronomical data and demonstration of how such data are correlated and used to deduce mathematical relationships. Application of astronomical models to unusual or novel situations.

   Required Writing, Problem Solving, Skills Demonstration:
   Demonstrate techniques commonly used for the acquisition and analysis of astronomical data. Evaluate possible sources of error in astronomical data collection and analysis.

TEXTS, READINGS, AND RESOURCES:

TextBooks:

This is a legacy text. This is the most recent version of the lab manual.

Manuals:
1. Lee, K.. The Nebraska Astronomy Applet Project: Online Labs for Introductory Level Astronomy (OER Laboratory Manual), University of Nebraska, 11-28-2018

Other:
1. Selected Sky and Telescope Laboratory Exercises
2. Instructor prepared exercises

LIBRARY:

Adequate library resources include: Non-Print Materials

Comments:

Attachments:

Attached Files