COURSE OUTLINE OF RECORD

Number: ASTR G100L
TITLE: Introduction to Astronomy Lab

ORIGINATOR: James Almy
EFF TERM: Fall 2019
FORMERLY KNOWN AS: Elementary Astronomy Laboratory
DATE OF OUTLINE/REVIEW: 05-04-2017
TOP NO: 1911.00

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
  or
• ASTR A100: Introduction to Astronomy with a minimum grade of C or better
  or
• ASTR G100: Introduction to Astronomy with a minimum grade of C or better

COREQUISITES:
• ASTR G100: Introduction to Astronomy

ADVISORIES:
• MATH G030: Intermediate Algebra
  or
• 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
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 (OEF 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