

Course Outline of Record

1. Course Code: A-001L
2.
  - a. Long Course Title: Descriptive Astronomy Lab
  - b. Short Course Title: DESCRPTV ASTRONOMY LB
3.
  - a. Catalog Course Description:  
This is an introductory laboratory course featuring the practical use of the telescope, an introduction to the geography of the sky, and applications of astronomical methods involving projects performed by the student.
  - b. Class Schedule Course Description:  
This is an introductory laboratory course featuring the practical use of the telescope, an introduction to the geography of the sky, and applications of astronomical methods.
  - c. Semester Cycle (if applicable): N/A
  - d. Name of Approved Program(s):
    - COD GE Pattern
4. Total Units: 1.00      Total Semester Hrs: 54.00  
 Lecture Units: 0      Semester Lecture Hrs: 0  
 Lab Units: 1      Semester Lab Hrs: 54.00  
 Class Size Maximum: 28      Allow Audit: No  
 Repeatability No Repeats Allowed  
 Justification 0
5. Prerequisite or Corequisite Courses or Advisories:  
*Course with requisite(s) and/or advisory is required to complete Content Review Matrix (CCForm1-A)*  
 Prerequisite: A 001 or concurrent enrollment  
 Advisory: MATH 040 and  
 Advisory: ENG 061
6. Textbooks, Required Reading or Software: (List in APA or MLA format.)  
 a. Shull, P. and Monson, B. . Exploring the Universe with Voyager 4: 24 Astronomy Projects for Windows and Macintosh. Kendall Hunt Publishing; 2 edition (August 15, 2014) , 08-15-2014.
7. Entrance Skills: *Before entering the course students must be able:*

**Advisory Skills:**

---

a.

Demonstrate the ability to think critically and express ideas using various patterns of development.

- ENG 061 - Demonstrate the ability to think critically and express ideas using various patterns of development.

b. Solve linear and quadratic equations and inequalities.

- MATH 040 - Solve quadratic equations by factoring, completing the square, taking square roots or the quadratic formula.
- MATH 040 - Solve quadratic inequalities.

c. Recognize equation of lines, quadratic functions, selected conics and graph the corresponding solution set as well as when given the solution set formulate the Algebraic equation.

- MATH 040 - Recognize when a table, graph, or equation is linear.
- MATH 040 - Recognize when a table, graph, or equation is quadratic.

d. Create equations that model real world situations given in application (word) problems.

- MATH 040 - Create a linear model in the form of a table, graph, or equation.

## A 001L-Descriptive Astronomy Lab

- MATH 040 - Create a quadratic model with a table, graph, or equation and solve maximum and minimum problems.

### e. Factor simple quadratic polynomials.

- MATH 040 - Solve quadratic equations by factoring, completing the square, taking square roots or the quadratic formula.

### f. Solve equations involving roots and radicals.

- MATH 040 - Comprehend and manipulate rational exponents and Nth roots.
- MATH 040 - Solve root equations.

### **Corequisite Skills:**

---

### g.

Demonstrate an understanding of the basic techniques of astronomical observation and the utilization and structure of astronomy's basic resource are raw material: electromagnetic radiation, including light.

- A 001 - Demonstrate an understanding of the basic techniques of astronomical observation and the utilization and structure of astronomy's basic resource are raw material: electromagnetic radiation, including light.

### h.

Analyze the history of the development of our classifications of the knowledge of the physical structure and motions of the earth, satellites and other members of the solar system.

- A 001 - Analyze the history of the development of our classifications of the knowledge of the physical structure and motions of the earth, satellites and other members of the solar system.

### i.

Define the structure and functions of the sun, not only as the principal member of the solar system but also as a typical star.

- A 001 - Define the structure and functions of the sun, not only as the principal member of the solar system but also as a typical star.

### j.

Explain how astronomers classify stars, clusters and nebulae.

- A 001 - Explain how astronomers classify stars, clusters and nebulae.

## 8. Course Content and Scope:

### Lecture:

Laboratory content only.

Lab: *(if the "Lab Hours" is greater than zero this is required)*

1. The beginnings of astronomy, its aims, methods and basic tools
2. Planetary motions
3. Energy and the atom: the basis of astrophysics.
4. Natural and Artificial Satellites
5. Physical characteristics of the planets
6. Asteroids, meteoroids and comets
7. The age and origin of the solar system
8. The sun: a typical star
9. The stars: a general description
10. Deviant stars
11. The evolution of stars
12. Multiple stars and clusters of stars
13. Between the stars: the realm of the nebulae
14. Galaxies
15. The universe and relativity

# A 001L-Descriptive Astronomy Lab

## 9. Course Student Learning Outcomes:

1.  
Compare and contrast planets, stars, and other celestial bodies
2.  
Use astronomical tables and charts to locate stars and constellations.
3.  
Use quantitative analytical skills to evaluate and process numerical astronomical data.
4.  
Develop a skill in setting up a telescope and make an observation of a star or a planet.

## 10. Course Objectives: *Upon completion of this course, students will be able to:*

- a. Demonstrate the celestial sphere: its coordinates, motions, alt-azimuth, equatorial and ecliptic systems.
- b. Demonstrate the differences between latitude and longitude, declination and right ascension, hour angles, solar time and sidereal time.
- c. Identify, describe and illustrate by example methods of celestial navigation
- d. Identify and explain lunar phases and eclipse.
- e. Demonstrate how to operate an astronomical spectroscope.
- f. Explain the inverse square and radiation laws and demonstrate these laws by specific applications
- g. Identify the parts of both reflection and refraction telescopes and explain their functions.
- h. Set up, adjust and operate a small astronomical telescope including the making a recording of observations thereon.
- i. Demonstrate the scale of the solar system from observational data.
- j. Calculate the rates of planetary motion and sizes from data derived by direct observation.
- k. Locate the radiant of a meteor shower from data derived by direct observation.
- l. Identify the special problems in safety when observing the sun.
- m. Describe the sun spot cycle and solar rotation
- n. Demonstrate the parallax method in finding distance to stars.
- o. Identify and describe proper motion techniques and Doppler shifts in determining the motions of stars.
- p. Explain and demonstrate by example the technique of photometry and the magnitude scale.
- q. Demonstrate how the Hertzsprung-Russell Diagram is used in stellar and spectral classifications.
- r. Identify and critically assess the practical and theoretical values of classifications of galaxies and intergalactic distance indicators.
- s. Demonstrate how the Hubble law is used and tested.

## 11. Methods of Instruction: *(Integration: Elements should validate parallel course outline elements)*

- a. Collaborative/Team
- b. Demonstration, Repetition/Practice
- c. Discussion
- d. Individualized Study
- e. Laboratory
- f. Observation

## 12. Assignments: *(List samples of specific activities/assignments students are expected to complete both in and outside of class.)*

In Class Hours: 54.00

Outside Class Hours: 0

### a. In-class Assignments

- |  |
|--|
| 1. Complete all laboratory activities. |
|--|

# A 001L-Descriptive Astronomy Lab

2. Work in small groups.
3. Complete analysis of the activities and include in a final report.

## b. Out-of-class Assignments

none.

### 13. Methods of Evaluating Student Progress: *The student will demonstrate proficiency by:*

- Laboratory projects  
Students complete a series of laboratory projects working in small groups.
- Field/physical activity observations  
Students attend a minimum of one laboratory using a telescope.
- Computational/problem solving evaluations  
Laboratory activities require computational and problem solving.
- Group activity participation/observation  
Laboratory projects are always performed in small groups.
- Mid-term and final evaluations  
Final laboratory exam testing students understanding of the basic laboratory concepts.

### 14. Methods of Evaluating: Additional Assessment Information:

### 15. Need/Purpose/Rationale -- *All courses must meet one or more CCC missions.*

IGETC Area 5: Physical and Biological Sciences (mark all that apply)

A: Physical Science, Lab only

CSU GE Area B: Physical and its Life Forms(mark all that apply)

B1 - Physical Science

B3 - Laboratory Sciences

PO-GE C1-Natural Sciences

Explain concepts and theories related to physical, chemical, and biological natural phenomena.

Apply the scientific process and its use and limitations in the solution of problems.

Draw a connection between natural sciences and their own lives.

Make critical judgments about the validity of scientific evidence and the applicability of scientific theories.

Demonstrate knowledge of the use of technology in scientific investigation and human endeavors, and the advantages and disadvantage of that technology.

Use college-level mathematical concepts and methods to understand, analyze, and explain issues in quantitative terms.

IO - Scientific Inquiry

Identify components of the scientific method.

Collect and analyze data. Skills of data collection include an understanding of the notion of hypothesis testing and specific methods of inquiry such as experimentation and systematic observation.

Predict outcomes utilizing scientific inquiry: using evidence and assertions determine which conclusions logically follow from a body of quantitative and qualitative data.

Analyze quantitative and qualitative information to make decisions, judgments, and pose questions.

Recognize the utility of the scientific method and its application to real life situations and natural phenomena.

### 16. Comparable Transfer Course

University System	Campus	Course Number	Course Title	Catalog Year
CSU	CSU San Bernardino	ASTR 103	Descriptive Astronomy	2012-2014

# A 001L-Descriptive Astronomy Lab

UC

UC Riverside

PHYS 020

Exploring the Universe: An Adventure in  
Astronomy

2012-2013

17. Special Materials and/or Equipment Required of Students:

---

18. Materials Fees:  Required Material?

**Material or Item**

**Cost Per Unit**

**Total Cost**

19. Provide Reasons for the Substantial Modifications or New Course:

Change English advisory

20. a. Cross-Listed Course (*Enter Course Code*): *N/A*  
 b. Replacement Course (*Enter original Course Code*): *N/A*

21. Grading Method (*choose one*): Letter Grade Only

22. MIS Course Data Elements

- a. Course Control Number [CB00]: CCC000285699  
 b. T.O.P. Code [CB03]: 191100.00 - Astronomy  
 c. Credit Status [CB04]: D - Credit - Degree Applicable  
 d. Course Transfer Status [CB05]: A = Transfer to UC, CSU  
 e. Basic Skills Status [CB08]: 2N = Not basic skills course  
 f. Vocational Status [CB09]: Not Occupational  
 g. Course Classification [CB11]: Y - Credit Course  
 h. Special Class Status [CB13]: N - Not Special  
 i. Course CAN Code [CB14]: *N/A*  
 j. Course Prior to College Level [CB21]: Y = Not Applicable  
 k. Course Noncredit Category [CB22]: Y - Not Applicable  
 l. Funding Agency Category [CB23]: Y = Not Applicable  
 m. Program Status [CB24]: 1 = Program Applicable

Name of Approved Program (*if program-applicable*): COD

*Attach listings of Degree and/or Certificate Programs showing this course as a required or a restricted elective.)*

23. Enrollment - Estimate Enrollment

First Year: 28

Third Year: 28

24. Resources - Faculty - Discipline and Other Qualifications:

- a. Sufficient Faculty Resources: Yes  
 b. If No, list number of FTE needed to offer this course: *N/A*

25. Additional Equipment and/or Supplies Needed and Source of Funding.

none.

26. Additional Construction or Modification of Existing Classroom Space Needed. (*Explain:*)

N/A

27. FOR NEW OR SUBSTANTIALLY MODIFIED COURSES

Library and/or Learning Resources Present in the Collection are Sufficient to Meet the Need of the Students Enrolled in the Course: Yes

28. Originator Ahmed Elshafie Origination Date 11/03/17