

A 002: DESCRIPTIVE ASTRONOMY

Originator

aelshafie

Justification / Rationale

Replace Math 040 with Math 049

Effective Term

Fall 2023

Credit Status

Credit - Degree Applicable

Subject

A - Astronomy

Course Number

002

Full Course Title

Descriptive Astronomy

Short Title

DESCRIP ASTRONOMY

Discipline**Disciplines List**

Physics/ Astronomy

Modality

Face-to-Face

100% Online

Hybrid

Catalog Description

This course is an introductory survey of planetary, stellar and galactic astronomy designed for students not majoring in science. This course reviews research techniques, current knowledge and theory about the planets, stars, galaxies and the age and origin of the universe.

Schedule Description

This course is an introductory survey of planetary, stellar and galactic astronomy designed for students not majoring in science. Advisory: ENG 061 & MATH 049 IGETC: 5A, 5C

Lecture Units

3

Lecture Semester Hours

54

Lab Units

1

Lab Semester Hours

54

In-class Hours

108

Out-of-class Hours

108

Total Course Units

4

Total Semester Hours

216

Prerequisite Course(s)

Advisory: ENG 061 & MATH 049

Required Text and Other Instructional Materials**Resource Type**

Book

Author

Bennett, J., Donahue, M., et. al.

Title

Essential Cosmic Perspective

Edition

9

Publisher

Addison-Wesley

Year

2019

College Level

Yes

Flesch-Kincaid Level

12

ISBN #

978-0134874364

Resource Type

Manual

Author

Monson, B. and Shull, P.

Title

Exploring the Universe with Voyager 4: 24 Astronomy Projects for Windows and Macintosh

Publisher

Kendall Hunt Publishing; 3 edition (December 12, 2017)

Year

2017

Resource Type

Book

Open Educational Resource

Yes

Author

Andrew Fraknoi, Sidney C. Wolff, David Morrison

Title

Astronomy

Edition

2nd

Publisher

Openstax

Year

2022

College Level

Yes

ISBN #

978-1-951693-50-3

Class Size Maximum

28

Entrance Skills

Exhibit ability to use expanded vocabulary and practice using contextual cues and resources.

Requisite Course Objectives

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

ENG 061-Recognize features of style such as purpose, audience and tone integrate these elements into academic and professional writing.

ENG 061-Demonstrate the ability to read and respond in writing beyond the literal interpretation of the text.

Entrance Skills

Engage in collaborative review sessions to understand difficult concepts and produce effective essays.

Requisite Course Objectives

ENG 061-Use theses to organize paragraphs into coherent analyses.

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

ENG 061-Recognize features of style such as purpose, audience and tone integrate these elements into academic and professional writing.

ENG 061-Demonstrate the ability to use research skills including library resources such as books, periodicals, electronic databases and online resources such as the internet.

ENG 061-Demonstrate the ability to read and respond in writing beyond the literal interpretation of the text.

Entrance Skills

Comprehend that the key characteristic of a linear model is its constant rate of change.

Requisite Course Objectives

MATH 049-Create and comprehend a linear model in the form of a table, graph, or equation from a verbal description, using the rule of 4.

Entrance Skills

Interpret slope as a rate of change.

Requisite Course Objectives

MATH 049-Interpret slope as a rate of change, in preparation for generalizing the rate of change to the derivative in the Calculus course.

Entrance Skills

Recognize when a table, graph, or equation is linear.

Requisite Course Objectives

MATH 049-Create and comprehend a linear model in the form of a table, graph, or equation from a verbal description, using the rule of 4.

Entrance Skills

Demonstrate an understanding of the main idea, details, relationships, and patterns of organization.

Requisite Course Objectives

ENG 071-Demonstrate understanding of main idea, details, relationships, and patterns of organization.

Course Content

1. A Modern View of the Universe
2. Discovering the Universe for Yourself
3. The Science of Astronomy
4. Making Sense of the Universe: Understanding Motion, Energy, and Gravity
5. Light: The Cosmic Messenger
6. Formation of the Solar System
7. Earth and the Terrestrial Worlds
8. Jovian Planet System
9. Asteroids, Comets, and Dwarf Planets: Their Nature, Orbits, and Impacts
10. Our Star
11. Surveying the Stars
12. Star Stuff and The Bizarre Stellar Graveyard
13. Our Galaxy and A Universe of Galaxies
14. The Birth of the Universe
15. Dark Matter, Dark Energy, and the Fate of the Universe.

Lab Content

Students will:

1. Be introduced to Stellarium Astronomy software
2. Learn different types of celestial coordinates
3. Understand the motion of the Sun and learn about the zodiacal constellations
4. Differentiate between phases of the Moon and Planets
5. Learn about seasons and sun's daily motion from different latitudes
6. Understand planetary alignments and predict conjunctions
7. Learn about lunar and solar Eclipse
8. Study the orbital motion of the Galilean Moons of Jupiter
9. Learn about the stellar magnitude and light pollution
10. Learn about the proper motion of stars
11. Observe the relationship between stellar temperature and magnitude
12. Learn about binary stars
13. Learn about the Milkyway and the structure of our universe
14. Apply Hubble law and learn about the expansion of the universe

Course Objectives

	Objectives
Objective 1	Demonstrate basic understanding and appreciation of the origin, organization and development of astronomy since the ancient Sumerians, Babylonians, Egyptians and Greeks, as well as an appreciation of the role great minds have had in this process.
Objective 2	Recall some of the basic considerations in the history and philosophy of science and the rationale of the scientific method as related specifically to astronomy.

Objective 3	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.
Objective 4	Describe the operation, construction and historical development of the tools of the astronomer.
Objective 5	Define modern knowledge of the structure of the atom and how this relates to modern astronomy.
Objective 6	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.
Objective 7	Define the structure and functions of the sun, not only as the principal member of the solar system but also as a typical star.
Objective 8	Explain how astronomers classify stars, clusters and nebulae.
Objective 9	Identify the role that modern developments in radio astronomy, the gas and radiation laws have had in the advance of our knowledge about the physical universe.
Objective 10	Recall the highlights in the evolution of man's knowledge regarding the galaxies and the size and evolution of the observable universe.

Student Learning Outcomes

Upon satisfactory completion of this course, students will be able to:	
Outcome 1	Describe the nebular theory for solar system formation.
Outcome 2	Describe how a terrestrial planet's size affects its level of geological activity and the strength of its magnetic field.
Outcome 3	Identify the physical characteristics of the major Jovian moons.
Outcome 4	Distinguish between comets, asteroids, meteors, meteorites, stars and white dwarfs.
Outcome 5	Determine the lookback time to a galaxy from its distance in light years and estimate its maximum age at the time it emitted the light we are now observing.
Outcome 6	Describe the evidence indicating the presence of black holes and the expansion of the universe.

Methods of Instruction

Method	Please provide a description or examples of how each instructional method will be used in this course.
Collaborative/Team	Students work collaboratively on a topic. Present their findings to the rest of the class about a certain topic.
Technology-based instruction	Real-time quizzes are used. Students need to use their laptops, phones or tablet to respond to these types of questions.
Discussion	Students are asked to work in groups to answer a discussion question. Each group shares their answer. A discussion between groups and the instructor takes place to clarify misconceptions.
Lecture	PowerPoint presentations are used during the lecture to communicate ideas, description of materials with the help of visual images.
Laboratory	a. laboratories which consist of "Hands-on" work with students working in small teams. b. Hands-on use of computer simulation programs to explore astronomical concepts and phenomena.
Individualized Study	Students are required to read about the topic of instruction using the suggested textbook.

Methods of Evaluation

Method	Please provide a description or examples of how each evaluation method will be used in this course.	Type of Assignment
Reading reports	Students are expected to read each weekly chapter and advised through the semester to summarize their learning in a couple of pages. This will enhance students independent study outside class.	Out of Class Only
Student participation/contribution	During the semester, students are going to work in groups to share their findings and their summary about each chapter.	In and Out of Class

Tests/Quizzes/Examinations	Multiple exams take place during the semester to best evaluate student understanding of the material. Three exams takes place during the semester.	In and Out of Class
Group activity participation/observation	Students are asked to work in groups to research a topic and present their findings to the rest of the class. A discussion between students takes place and instructor clarify misconceptions.	In and Out of Class
Laboratory projects	Students are required to do laboratory projects during the semester which is hands on experience and application of their class learning.	In and Out of Class
Computational/problem-solving evaluations	Students are required to do weekly homework. Question in the homework vary between multiple choice, essay, and interactive tutorials.	Out of Class Only

Assignments

Other In-class Assignments

1. Viewing slide shows and taking notes.
2. Answering quizzes during the lecture such as essay and multiple choice questions.
3. Participation in classroom activities involving the collection, compilation and interpretation and discussion of information, including the composition of written or oral reports.

Other Out-of-class Assignments

1. Do all reading assignments.
2. Complete assigned homework assignments.
3. Participate in group discussions.

Grade Methods

Letter Grade Only

Distance Education Checklist

Include the percentage of online and on-campus instruction you anticipate.

Online %

50

On-campus %

50

Lab Courses

How will the lab component of your course be differentiated from the lecture component of the course?

The lab component has its own activities which involve students answering a lab manual. The lab homework will have its own assignment with its own grades.

From the COR list, what activities are specified as lab, and how will those be monitored by the instructor?

From the COR list, the following is assigned as a lab topic which will include lab activities. The instructor will monitor students performance on the lab activities through each week lab assignment. Students will:

- Be introduced to Stellarium Astronomy software
- Learn different types of celestial coordinates
- Understand the motion of the Sun and learn about the zodiacal constellations
- Differentiate between phases of the Moon and Planets
- Learn about seasons and sun's daily motion from different latitudes
- Understand planetary alignments and predict conjunctions
- Learn about lunar and solar Eclipse
- Study the orbital motion of the Galilean Moons of Jupiter
- Learn about the stellar magnitude and light pollution
- Learn about the proper motion of stars
- Observe the relationship between stellar temperature and magnitude
- Learn about binary stars

Learn about the Milkyway and the structure of our universe
Apply Hubble law and learn about the expansion of the universe

How will you assess the online delivery of lab activities?

The lab questions will require students to perform certain commands on the open-source software and answer lab assignment questions on Canvas.

Instructional Materials and Resources**If you use any other technologies in addition to the college LMS, what other technologies will you use and how are you ensuring student data security?**

Neither LMS nor other technologies will be used other than Canvas

If used, explain how specific materials and resources outside the LMS will be used to enhance student learning.

N/A

Effective Student/Faculty Contact**Which of the following methods of regular, timely, and effective student/faculty contact will be used in this course?****Within Course Management System:**

Discussion forums with substantive instructor participation
Online quizzes and examinations
Private messages
Regular virtual office hours
Timely feedback and return of student work as specified in the syllabus
Video or audio feedback
Weekly announcements

External to Course Management System:

Direct e-mail
Posted audio/video (including YouTube, 3cm mediasolutions, etc.)
Telephone contact/voicemail

For hybrid courses:

Orientation, study, and/or review sessions
Scheduled Face-to-Face group or individual meetings

Briefly discuss how the selected strategies above will be used to maintain Regular Effective Contact in the course.

One of my main goals is to maintain effective contact and engagement with students. I am planning to achieve this by addressing three main ways: A) Learner to Resources B) Learner to Learner C) Faculty to Learner

A) Learner to Resources: Students are required to read the chapter before taking a pre-chapter quiz. They will have access to lecture and video material to comprehend each chapter goals and outcome. When they are done with their learning resources, they will take the post-chapter quiz, do their homework, lab assignment and post their learning summary in a discussion forum.

B) Learner to Learner: At the beginning of the semester, students are going to introduce themselves and students are going to make groups based on majors or interests.

Students are going to submit their summarized learning for each chapter and view other students summary, comment on them in discussion forums.

Students are going to be interacting with each other on group project and study sessions.

C) Faculty to Learner: At the beginning of the semester, an orientation session will take place. In this session, a discussion of the syllabus will take place as well as communicating class expectations. Announcements will be used throughout the course. I am going to hold regular virtual office hours and virtual group office hours. I am going to post feedback on student and group work.

If interacting with students outside the LMS, explain how additional interactions with students outside the LMS will enhance student learning.

Some of the videos will be posted on 3cm mediasolutions. I am planning to use zoom for virtual group discussions.

Other Information**Comparable Transfer Course Information**

University System

CSU

Campus

CSU San Bernardino

Course Number

ASTR 2300

Course Title

Introduction to Astronomy for Scientists

Catalog Year

2021-2022

University System

UC

Campus

UC Riverside

Course Number

PHYS 20

Course Title

Exploring the Universe: An Adventure in Astronomy

Catalog Year

2022-2023

COD GE

C1 - Natural Sciences

CSU GE

B1 - Physical Science

B3 - Laboratory Activity

IGETC GE

5A - Physical Science

5C - Science Laboratory

MIS Course Data**CIP Code**

40.0201 - Astronomy.

TOP Code

191100 - Astronomy

SAM Code

E - Non-Occupational

Basic Skills Status

Not Basic Skills

Prior College Level

Not applicable

Cooperative Work Experience

Not a Coop Course

Course Classification Status

Credit Course

Approved Special Class

Not special class

Noncredit Category

Not Applicable, Credit Course

Funding Agency Category

Not Applicable

Program Status

Program Applicable

Transfer Status

Transferable to both UC and CSU

General Education Status

Y = Not applicable

Support Course Status

N = Course is not a support course

Allow Audit

No

Repeatability

No

Materials Fee

No

Additional Fees?

No

Approvals**Curriculum Committee Approval Date**

11/01/2022

Academic Senate Approval Date

11/10/2022

Board of Trustees Approval Date

12/16/2022

Chancellor's Office Approval Date

12/22/2022

Course Control Number

CCC000635121

Programs referencing this course

Liberal Arts: Math and Science AA Degree (<http://catalog.collegeofthedesert.eduundefined/?key=29>)