A 003: PLANETARY ASTRONOMY

Originator

dredman

Justification / Rationale

The Automotive Faculty are reviewing and/or updating this course to assure compliance with local, State, and Federal regulations; support consistency within the curriculum; practice relevance in regard to automotive industry and community; and to make improvements that will strengthen the learning environment this course creates thus benefiting the learners.

Effective Term

Fall 2022

Credit Status

Credit - Degree Applicable

Subject

A - Astronomy

Course Number

003

Full Course Title

Planetary Astronomy

Short Title

PLANET ASTRO

Discipline

Disciplines List
Physics/ Astronomy

Modality

Face-to-Face
100% Online
Hybrid

Catalog Description

This course is an introduction to the current solar system. A comparative study will be made of the planets and their satellites, dwarf planets, asteroids and comets. An overview of the formation, evolution and structure of the solar nebula will be presented. Highlights from previous, current and future interplanetary missions will be incorporated and interpretation of mission results and analysis will be discussed.

Schedule Description

This course is an introduction to the current solar system. A comparative study will be made of the planets and their satellites, dwarf planets, asteroids, and interplanetary debris. 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
Jeffrey O. Bennett, Megan O. Donahue, Nicholas Schneider, Mark Voit

Title
Essential Cosmic Perspective, The, 8th Edition

Publisher
Pearson

Year
2017

College Level
Yes

Flesch-Kincaid Level
12

ISBN #
978-0134446431

Resource Type
Book

Author
Gunter Faure, Teresa M. Mensing

Title
Introduction to Planetary Science: The Geological Perspective

Publisher
Springer.

Year
2007

College Level
Yes

Flesch-Kincaid Level
16.5

ISBN #
978-1402052330

Resource Type
Manual

Author
Shull, P. and Monson, B.

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

Publisher
Kendall Hunt Publishing; 2 edition (August 15, 2014)

Year
2014-08-15

Resource Type
Book

Open Educational Resource
Yes

Author
Andrew Fraknoi, David Morrison, Sidney C. Wolff

Title
Astronomy

Edition
1st

Publisher
XanEdu Publishing Inc

Year
2016

College Level
Yes

ISBN #
978-1506698038

For Text greater than five years old, list rationale:
Introduction to Planetary Science: The Geological Perspective is the only book that can be used in this level of class and there is no alternative.

Class Size Maximum
28

Entrance Skills
Solve linear and quadratic equations and inequalities.

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.
MATH 049-Solve quadratic equations by factoring, completing the square, taking square roots, and the quadratic formula.

Entrance Skills

Be able to recognize equation of lines, quadratic functions, selected conics, and graph the corresponding solution set as well as when given the solution set to formulate the Algebraic equation.

Requisite Course Objectives

MATH 049-Solve quadratic equations by factoring, completing the square, taking square roots, and the quadratic formula.
MATH 049-Solve quadratic inequalities. Also solve inequalities of higher degree polynomials graphically in preparation for the the first and second derivative tests in Calculus. Solve rational inequalities.

Entrance Skills

Understand and utilize functional notation.

Requisite Course Objectives

MATH 049-Describe the definition of functions and related terminology such as domain and range. Represent and interpret single-variate functions as equations, graphs, verbal descriptions of the dependent variable in terms of the independent variable, and function notation.

Entrance Skills

Solve systems of linear equations.

Requisite Course Objectives

MATH 049-Solve 2x2 and 3x3 systems of linear equations as a lead into generalizing to nxn systems in the Linear Algebra course.

Entrance Skills

Creating equations that model real-world situations given in application (word) problems.

Requisite Course Objectives

MATH 049-Read and comprehend an application problem, define variables appropriately and create a mathematical model that can be used to analyze the problem.

Entrance Skills

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

Requisite Course Objectives

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.

Entrance Skills

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

Requisite Course Objectives

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

Course Content

1. A Modern View of the Universe
2. Discovering the Universe for Yourself
3. The Science of Astronomy
4. Light and Matter: Reading Messages from the Cosmos
5. The Sun and formation of the Solar System
6. The Earth
7. The Moon
8. Mercury: Too Hot for Comfort

9. Venus; Planetary Evolution Gone Bad
10. Mars; The Red Planet
11. Jupiter and the Galilean Satellites
12. Saturn and its Satellites
13. Uranus and Neptune
14. Dwarf Planets: Their Nature and Orbits
15. Comets
16. Asteroids, Meteorites, Meteor and Impact Craters

Lab Content

Students will

1. Be introduced to Voyager 4/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. Explore the apparent reverse motion of planets
6. Learn about seasons and sun's daily motion from different latitudes
7. Understand planetary alignments and predict conjunctions
8. Learn about lunar and solar Eclipse
9. Study the orbital motion of the Galilean Moons of Jupiter
10. Study the rendezvous of Giotto space mission with comet Halley
11. Learn how to maneuver a space mission
12. Apply mission design concepts to find lunch date for a space mission to Mars
13. Study solar sunspots and the reason behind their existence
14. Observe the Galilean moons of Jupiter

Course Objectives

	Objectives
Objective 1	Demonstrate knowledge of terminology, basic facts, and concepts pertaining to the origin, structure, and evolution of the solar system.
Objective 2	Differentiate basic characteristics and physical properties of the Terrestrial and Jovian planets.
Objective 3	Compare and contrast chemical and physical processes occurring in the interiors and atmospheres of the Terrestrial and Jovian planets.
Objective 4	List conditions necessary for planetary systems and life forms to exist in the solar system.
Objective 5	Describe the greenhouse process and ozone depletion as it applies to earth and other planets.
Objective 6	Differentiate between comets, asteroids and meteors.

Student Learning Outcomes

	Upon satisfactory completion of this course, students will be able to:
Outcome 1	Discover the basic processes which shape our planet and compare them to other planets, which come together in current planetary explorations.
Outcome 2	Describe ways in which our own models for the origin and evolution of the solar system explain characteristics of newly discovered systems.
Outcome 3	Compare the active geological evolution occurring on Earth and on other worlds with their own unique landscapes, rings and moons.
Outcome 4	Interpret recent and close-up images of the simplest, most primitive bodies: comets, asteroids and meteors.

Methods of Instruction

Method	Please provide a description or examples of how each instructional method will be used in this course.
Discussion	Students were asked to work in groups to answer a discussion question. Each group shares its answer. A discussion between groups and the instructor takes place to clarify misconceptions.

Demonstration, Repetition/Practice	In-class demos are used to clarify ideas and for visualization of hard concepts.
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.
Self-exploration	At the end of each lecture, students are encouraged to research the topic of instruction
Lecture	Powerpoint presentations are used during the lecture to communicate ideas, descriptions 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
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 take place during the semester.	In and Out of Class
Presentations/student demonstration observations	Students are required to work collaboratively among their group, research a topic and present their findings to the rest of the class.	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
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
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 the instructor clarifies misconceptions.	In and Out of Class

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's lab assignment.
Students will:
Be introduced to Voyager 4/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
Explore the apparent reverse motion of 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
Study the rendezvous of Giotto space mission with comet Halley
Learn how to maneuver a space mission
Apply mission design concepts to find lunch date for a space mission to Mars
Study solar sunspots and the reason behind their existence
Observe the Galilean moons of Jupiter

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?

Stellarium and Voyager are two planetarium software are used in this class for the lab. Also, Mastering Astronomy by Pearson could be used. No student data is needed for the lab software. Students are required to register and create an account on Pearson to connect students to faculty.

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

For the lab, Stellarium and Voyager have planetarium features and planetary and star catalogs that do not exist in our LMS. As far as Pearson, it has a HW system that could be used along with the ebook.

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, 3cmediasolutions, 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.

This modification is for 100% and for a hybrid.
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's 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' summaries, comment on them in discussion forums.
Students are going to be interacting with each other on group projects 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. Virtual office hours will be held regularly. Participation in online discussions and providing 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.

Stellarium and Voyager are two planetarium software are used in this class for the lab. They allow students to simulate the night sky, observe the motion of planets, learn about planetary physical and important key characteristics to meet course goals and objectives. Mastering Astronomy by Pearson on the other side has an ebook and HW system that could enhance students learning by observing simulations and answering relevant questions.

Other Information

Provide any other relevant information that will help the Curriculum Committee assess the viability of offering this course in an online or hybrid modality.

N/A

Comparable Transfer Course Information

University System

UC

Campus

UC Santa Cruz

Course Number

ASTR 3

Course Title

Introductory Astronomy: Planetary Systems

Catalog Year

2020

University System

CSU

Campus

CSU Sacramento

Course Number

ASTR 4A

Course Title
Introduction to the Solar System

Catalog Year
2020-2021

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
3/17/2022

Academic Senate Approval Date
3/24/2022

Board of Trustees Approval Date
4/22/2022

Chancellor's Office Approval Date
5/27/2022

Course Control Number
CCC000631822

Programs referencing this course
Liberal Arts: Math and Science AA Degree (http://catalog.collegeofthedesert.eduundefined/?key=29)