

ASTR 0002 - INTRODUCTION TO PLANETARY SYSTEMS

Catalog Description

Advisory: Completion of ENGL N with grade of "C" or better

Hours: 54 lecture

Description: General principles and fundamental facts of astronomy associated with planetary systems. Includes historical developments of planetary astronomy, basic principles of planetary system observations and analysis, and general concepts for interpreting the night sky with charts and almanacs. Particular detail given to the formation, evolution, and current condition of the Sun and Solar System, as well as current knowledge of other planetary systems. (CSU, UC)

Course Student Learning Outcomes

- CSLO #1: Demonstrate knowledge and skill in Observational Astronomy, showing correlation between the observable sky to events in the cosmos.
- CSLO #2: Analyze basic science and core physics, to discover how they apply to astronomy.
- CSLO #3: Apply concepts from planetary astronomy to investigate the types of different planetary classes and other objects in the solar system.
- CSLO #4: Explain the basic concepts of solar physics - the sun's method of energy production, its anatomy, solar phenomena, and life history.

Effective Term

Spring 2021

Course Type

Credit - Degree-applicable

Contact Hours

54

Outside of Class Hours

108

Total Student Learning Hours

162

Course Objectives

- Overview of Astronomy; Scales of the Universe
- Terminology, Seasons and the Motions of the Moon
- Historical Developments in Planetary Astronomy
- Physical Principles Relevant to the Science of Planetary Systems
- Telescopes, Observatories, and Spacecraft
- Overview of the Solar System and its Formation
- The Geology and Atmospheres of the Terrestrial Planets
- The Jovian Giants and Their Satellites
- Meteors, Asteroids, Comets, and Dwarf Planets
- Planets around other stars
- The Sun

XII. Life on other Planetary Objects

General Education Information

- Approved College Associate Degree GE Applicability
 - AA/AS - Physical Sciences
- CSU GE Applicability (Recommended-requires CSU approval)
 - CSUGE - B1 Physical Science
- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)
 - IGETC - 5A Physical Science

Articulation Information

- CSU Transferable
- UC Transferable

Methods of Evaluation

- Classroom Discussions
 - Example: 1. Students are to write down or submit key lecture elements during the weekly lecture, graded on participation of the student. Example: The weight of an object is not its mass
- Objective Examinations
 - Example: 1. Standard midterm and final exams consisting of a variety of tasks and question formats, evaluating all levels of performance according to Bloom's taxonomy (knowledge, understanding, application, analysis, synthesis, and evaluation). Example exam question: Give 3 characteristics that distinguish terrestrial planets from Jovian planets.
- Problem Solving Examinations
 - Example: 1. Homework exercises to evaluate student comprehension of weekly lectures and assigned reading. Example exercise question: Name two physical characteristics of a planet that determine its surface gravity.

Repeatable

No

Methods of Instruction

- Lecture/Discussion
- Distance Learning

Lecture:

1. Students are taught Newton's Three Laws of Motion and then asked to predict the motion of a rolling ball across a spinning table used to simulate the Coriolis effect. A demonstration follows with student participation and further assessment is made based on their prediction and actual outcome. (Objective 3)
2. Students are asked to provide the times and dates of certain visible celestial events using charts, almanacs, and/or software, the use of which is based on their reading of provided directions. (Objective 2)

Distance Learning

1. The Students will watch a video made by the Instructor to help students complete Third Hours (Objectives 2,11,12 & 13)

Typical Out of Class Assignments

Reading Assignments

1. Reading from assigned text on a weekly basis. Example: Read chapter on the geology of the inner planets. This will prepare them for the week's lecture and online homework assignment. 2. Reading from supplemental handouts (included in required student handbook) on a regular basis. Example: Read "Using the Skygazer's Almanac" handout. This prepares them for the Third Hours which use the supplementary handouts.

Writing, Problem Solving or Performance

1. Weekly online homework exercises in a multiple-choice, matching, ranking and short-answer format and directed at problem solving skills. Example question: An exoplanet is found to have an orbital period of 1 year around a 2-solar mass star. What is the planet's average distance from the star? 2. Two midterm-level exams, a sky quiz, and a final exam to demonstrate acquisition of critical thinking skills and astronomical knowledge. Example demonstration: A student uses a planisphere and the Skygazer's Almanac to determine what constellation Jupiter occupies when it rises at midnight in 2018.

Other (Term projects, research papers, portfolios, etc.)

1. In-class peer-led assignments on a weekly basis. Example group task: Students gather and plot distance/period data of the Solar System planets and verify Kepler's 3rd Law.

Required Materials

- Cosmic Perspective - The Solar System
 - Author: Bennett et al.
 - Publisher: Pearson
 - Publication Date: 2019
 - Text Edition: 9th
 - Classic Textbook?: No
 - OER Link:
 - OER:

Other materials and-or supplies required of students that contribute to the cost of the course.

1. "Sierra College Astronomy 002 Student Handbook", updated each semester with supplemental reading materials and course assignments
2. Star Maps SC-001 (Equatorial Region) and SC-002 (North Circumpolar Region), both epoch 2000
3. "Skygazer's Almanac" for the most current year
4. A planisphere