ASTRO110 : Astronomy Of The Solar System

General Information

Author:	• Jennifer Krestow
Course Code (CB01) :	ASTRO110
Course Title (CB02) :	Astronomy Of The Solar System
Department:	ASTRO
Proposal Start:	Spring 2025
TOP Code (CB03) :	(1911.00) Astronomy
CIP Code:	(40.0201) Astronomy.
SAM Code (CB09) :	Non-Occupational
Distance Education Approved:	No
Will this course be taught asynchronously?:	No
Course Control Number (CB00) :	CCC000338987
Curriculum Committee Approval Date:	06/12/2024
Board of Trustees Approval Date:	07/16/2024
Last Cyclical Review Date:	06/12/2024
Course Description and Course Note:	ASTRO 110 is a survey of the Sun, planets, moons, and other objects that make up the solar system with a consideration towards applying this knowledge to new findings in astronomy such as exoplanets. Topics may include the history of astronomy, the practice of modern science, solar system formation, planetary geology, planetary atmospheres, the physics of astronomy (gravity, light, conservation laws, etc.), telescopes and observational methods, exoplanets, and the search for life in the universe.
Justification:	Mandatory Revision
Academic Career:	• Credit
Mode of Delivery:	
Author:	
Course Family:	

Academic Senate Discipline

Primary Discipline:	• Physics/Astronomy
Alternate Discipline:	No value
Alternate Discipline:	No value

Course Development

Basic Skill Status (CB08)

Course is not a basic skills course.

☐ Allow Students to Gain Credit by Exam/Challenge

Course Special Class Status (CB13)

Course is not a special class.

Pre-Collegiate Level (CB21)

Not applicable.

Grading Basis

- Grade with Pass / No-Pass Option

Course Support Course Status (CB26)

Course is not a support course

General Education and C-ID

General Education Status (CB25)

Not Applicable

Transferability

Transferable to both UC and CSU

Transferability Status

Approved

IGETC Area	Area	Status	Approval Date	Comparable Course
5A-Physical Science	Physical Science	Approved	08/18/1997	No Comparable Course defined.

CSU GE-Breadth Area	Area	Status	Approval Date	Comparable Course
B1-Physical Science	Physical Science	Approved	08/18/1997	No Comparable Course defined.

Units and Hours

Summary

Minimum Credit Units (CB07)	3
Maximum Credit Units (CB06)	3
Total Course In-Class (Contact) Hours	54
Total Course Out-of-Class Hours	108
Total Student Learning Hours	162

Credit / Non-Credit Options

Course Type (CB04)

Credit - Degree Applicable

Noncredit Course Category (CB22)

Credit Course.

Noncredit Special Characteristics

No Value

Course Classification Code (CB11)

Credit Course.

☐ Variable Credit Course

Funding Agency Category (CB23)

Not Applicable.

☐ Cooperative Work Experience Education Status (CB10)

Weekly Student Hours

	In Class	Out of Class
Lecture Hours	3	6
Laboratory Hours	0	0
Studio Hours	0	0

Course Student Hours

Course Duration (Weeks)	18
Hours per unit divisor	54
Course In-Class (Contact) Hours	
Lecture	54
Laboratory	0
Studio	0
Total	54
Course Out-of-Class Hours	
Lecture	108
Laboratory	0
Studio	0
Total	108

Time Commitment Notes for Students

No value

Units and Hours - Weekly Specialty Hours

Activity Name	Type	In Class	Out of Class
No Value	No Value	No Value	No Value

Pre-requisites, Co-requisites, Anti-requisites and Advisories

Advisory

ENGL101 - Introduction to College Reading and Composition

Objectives

- Read, analyze, and evaluate a variety of primarily non-fiction readings for content, context, and rhetorical merit with consideration of tone, audience, and purpose.
- Apply a variety of rhetorical strategies in writing unified, well-organized essays directed by a well-reasoned thesis statement with persuasive support.
- Develop varied and flexible strategies for generating, drafting, and revising essays.
- Analyze stylistic choices in their own writing and the writing of others.
- Write timed, in-class essays exhibiting acceptable college-level control of mechanics, organization, development, and coherence.
- Integrate the ideas of others through paraphrasing, summarizing, and quoting without plagiarism.
- Find, evaluate, analyze, and interpret primary and secondary sources, incorporating them into written essays using appropriate documentation format.
- Proofread and edit essays for presentation so they exhibit no disruptive errors in English grammar, usage, or punctuation.

Entry Standards

Entry Standards

Course Limitations

Cross Listed or Equivalent Course

Specifications

Methods of Instruction

Methods of Instruction	Lecture
Methods of Instruction	Discussion
Methods of Instruction	Demonstrations
Methods of Instruction	Multimedia

Out of Class Assignments

- Reading assignments
- Web project (e.g. find the photo titled the Hubble Extreme Deep Field on the Hubble Space Telescope website and write a short summary of how the photo was taken, what it shows, and what we've learned from it)
- Problem sets and short response questions
- Recognition of physical laws given actual astronomical data

Methods of Evaluation	Rationale
Exam/Quiz/Test	In-class and/or online quizzes
Exam/Quiz/Test	Two or more 1.5-hour examinations
Exam/Quiz/Test	One final exam
Activity (answering journal prompt, group activity)	In-class exercises

Textbook Rationale

No Value

Textbooks

Author	Title	Publisher	Date	ISBN

Bennett, Jeffrey, O, et al.	The Cosmic Perspective: The Solar System. 9th ed.	Pearson	2019	9780134990774
Prather, Edward E, Jack A. Dostal, and Colin S. Wallace	Lecture-tutorials for Introductory Astronomy. 4rd ed.	Pearson	2022	9780135807026

Other Instructional Materials (i.e. OER, handouts)

Description	ISBN: 978-1-951693-50-3
Author	Andrew Fraknoi
Citation	Openstax Astronomy textbook, version 2e, Rice University, 2022.
Online Resource(s)	No value

Materials Fee

No value

Learning Outcomes and Objectives

Course Objectives

Identify, classify and compare the bodies of our solar system.

Recognize and explain the movements of the Sun, Moon and planets.

Examine and critique both the geocentric and the heliocentric models of our solar system and explain them within a historical perspective.

Explain the production, transmission, refraction and reflection of electromagnetic radiation and the detection of this radiation by both Earth-based and space-based instruments.

SLOs

Explain the methods that scientists use to learn about planetary systems and their evolution. Expected Outcome Performance: 70.0

GEOL Physical Science: Earth Science A.S. Degree	Apply scientific method of thinking to analyze and critically evaluate relevant literature and information, and the use of evidence for support
	Communicate effectively in a variety of ways, such as scientific writing, visualization of data and ideas, or through oral communication
	Recognize the interdisciplinary nature of science and enjoy the process of learning science
	Solve quantitative problems, analyze results from data and measurements, form hypotheses from data, test hypotheses
ILOs Core ILOs	Demonstrate depth of knowledge in a course, discipline, or vocation by applying practical knowledge, skills, abilities, theories, or methodologies to solve unique problems.

CHEM Physical Science: Chemistry A.S. Degree	Demonstrate their understanding of common conceptual situation in the physical sciences; and be able solve quantitative problems in the physical science
	Explain the difference between evidence and theory in science and cite an example in their explanation
PHY Physical Science: Physics A.S. Degree	Explain the difference between evidence and theory in science and cite an example in their explanation
Physical Sciences Physical Science A.A. Degree	Explain the difference between evidence and theory in science and cite an example in their explanation.
ASTRO Physical Science: Astronomy A.S. Degree	Identify and comprehend the purpose of elementary equations used in astronomy and describe the functions
	Identify, compare and contrast physical properties of astronomical objects
	Locate, identify and contrast prominent astronomical objects in the night sky
	Use of basic astronomical tools.
ILOs General Education	examine causality or associations between or among variables of the natural world
ASTRO Physical Science - Astronomy A.S. Degree Major	use of basic astronomical tools.

Identify, classify, and compare the objects that make up planetary systems. Expected Outcome Performance: 70.0

GEOL Physical Science: Earth Science A.S. Degree	Apply scientific method of thinking to analyze and critically evaluate relevant literature and information, and the use of evidence for support
	Communicate effectively in a variety of ways, such as scientific writing, visualization of data and ideas, or through oral communication
	Recognize the interdisciplinary nature of science and enjoy the process of learning science
	Solve quantitative problems, analyze results from data and measurements, form hypotheses from data, test hypotheses
ILOs Core ILOs	Demonstrate depth of knowledge in a course, discipline, or vocation by applying practical knowledge, skills, abilities, theories, or methodologies to solve unique problems.
PHY Physical Science: Physics A.S. Degree	Explain the difference between evidence and theory in science and cite an example in their explanation
CHEM Physical Science: Chemistry A.S. Degree	Explain the difference between evidence and theory in science and cite an example in their explanation
	Use instruments and computers to accurately measure, graph, and analyze physical situations
Physical Sciences Physical Science A.A. Degree	Explain the difference between evidence and theory in science and cite an example in their explanation.
ASTRO Physical Science: Astronomy A.S. Degree	Identify, compare and contrast physical properties of astronomical objects
	Locate, identify and contrast prominent astronomical objects in the night sky
	Use of basic astronomical tools.
ILOs General Education	examine causality or associations between or among variables of the natural world

Describe the significance of the exploration and knowledge of planetary systems from a cosmic perspective.

Expected Outcome Performance: 70.0

Additional SLO Information

Does this proposal include revisions that might improve student attainment of course learning outcomes?

No

Is this proposal submitted in response to learning outcomes assessment data?

No Value

If yes was selected in either of the above questions for learning outcomes, explain and attach evidence of discussions about learning outcomes.

No Value

SLO Evidence

No Value

Course Content

Lecture Content

The Copernican Revolution (2 hours)
- The geocentric model of Ptolemy
- The heliocentric model of Copernicus
- Galileo's telescope observations
- Kepler's Laws of Planetary Motion

The Physics of Astronomy (12 hours)
- Newton's Laws of Motion and Gravity
- Conservation laws in physics
- The properties of light
- The magnitude system
- The electromagnetic spectrum
- Doppler shifts
- Spectroscopy
- Atomic structure and spectral lines
- Using spectroscopy to learn about planets

Telescopes (2 hours)
- Refractors and reflectors
- Infrared and radio telescopes

Spacecraft Exploration (1 hour)
- Spacecraft orbits
- Instruments carried by spacecraft

An Overview of the Solar System (4 hours)
- General properties and patterns
- The Sun
- The gravitational influence of the Sun on the planets
- The energy source of the Sun; nuclear energy
- Terrestrial and Jovian planets

Earth and the Moon (8 hours)
- Mapping the sky as seen from Earth
- The zodiac; the ecliptic
- The way the sky changes with the seasons
- Eclipses of the Sun and Moon
- Moon phases
- The atmosphere of Earth
- The magnetosphere of Earth; auroras
- The interiors of the Earth and the Moon
- The surfaces of the Earth and the Moon; impact craters

Mercury (1.5 hours)
- Bulk properties
- Surface features; the findings of the Mariner 10 spacecraft

Venus (1.5 hours)
- Bulk properties
- Surface features; the findings of the Magellan spacecraft
- Atmosphere

Mars (2 hours)
- Bulk properties
- Surface features
- Atmosphere
- Satellites
- Recent discoveries and missions

Jupiter (1.5 hours)
- Bulk properties
- Surface features
- Atmosphere
- Satellites

Saturn (1.5 hours)
- Bulk properties
- Atmosphere
- Magnetosphere
- Ring system
- Satellites
- Recent discoveries and missions

Uranus, Neptune and Pluto (2 hours)
- The discovery of the outermost planets
- Bulk properties
- Atmosphere
- Ring system
- Satellites
- Recent discoveries and missions

Small Objects in the Solar System (2 hours)
- Meteoroids, meteors and meteorites
- Asteroids
- Comets
- Recent discoveries and missions

The Formation of the Solar System (6 hours)
- The solar nebular theory
- The giant impact origin of our Moon

Exoplanets (4 hours)
- Detection methods
- New findings

Life in the Universe (2 hours)
- The origins of life on Earth
- The possibilities of life in our solar system
- The Fermi paradox and possible resolutions

Total Hours: 54

Additional Information

Is this course proposed for GCC Major or General Education Graduation requirement? If yes, indicate which requirement in the two areas provided below.

Yes

GCC Major Requirements

No Value

GCC General Education Graduation Requirements

Natural Sciences

Repeatability

Not Repeatable

Justification (if repeatable was chosen above)

No Value

Resources

Did you contact your departmental library liaison?

No

If yes, who is your departmental library liason?

No Value

Did you contact the DEIA liaison?

No

Were there any DEIA changes made to this outline?

No

If yes, in what areas were these changes made:

No Value

Will any additional resources be needed for this course? (Click all that apply)

- No

If additional resources are needed, add a brief description and cost in the box provided.

No Value