

**ASTRON 4 Course Outline as of Summer 2021****CATALOG INFORMATION**

Dept and Nbr: ASTRON 4 Title: ASTRONOMY/SOLAR SYSTEM  
 Full Title: Astronomy of the Solar System  
 Last Reviewed: 9/25/2017

Units	Course Hours per Week	Nbr of Weeks	Course Hours Total
Maximum 3.00	Lecture Scheduled 3.00	17.5	Lecture Scheduled 52.50
Minimum 3.00	Lab Scheduled 0	6	Lab Scheduled 0
	Contact DHR 0		Contact DHR 0
	Contact Total 3.00		Contact Total 52.50
	Non-contact DHR 0		Non-contact DHR 0

Total Out of Class Hours: 105.00

Total Student Learning Hours: 157.50

Title 5 Category: AA Degree Applicable

Grading: Grade or P/NP

Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP

Also Listed As:

Formerly:

**Catalog Description:**

A descriptive introduction to the Solar System including the Sun, Moon, planets, asteroids, and comets. Topics will include lunar phases, eclipses, historical geocentric and heliocentric models of the cosmos, planetary geology, planetary atmospheres and climates, the formation of the Solar System, and extrasolar planetary systems.

**Prerequisites/Corequisites:****Recommended Preparation:**

Completion of MATH 150A or higher AND Completion of ENGL 100 or ESL 100

**Limits on Enrollment:****Schedule of Classes Information:**

Description: A descriptive introduction to the Solar System including the Sun, Moon, planets, asteroids, and comets. Topics will include lunar phases, eclipses, historical geocentric and heliocentric models of the cosmos, planetary geology, planetary atmospheres and climates, the formation of the Solar System, and extrasolar planetary systems. (Grade or P/NP)

Prerequisites/Corequisites:

Recommended: Completion of MATH 150A or higher AND Completion of ENGL 100 or ESL 100

Limits on Enrollment:

Transfer Credit: CSU;UC.

Repeatability: Two Repeats if Grade was D, F, NC, or NP

### **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

<b>AS Degree:</b>	<b>Area</b>		Effective:	Inactive:
	C	Natural Sciences	Fall 1981	
<b>CSU GE:</b>	<b>Transfer Area</b>		Effective:	Inactive:
	B1	Physical Science	Fall 1981	
<b>IGETC:</b>	<b>Transfer Area</b>		Effective:	Inactive:
	5A	Physical Sciences	Fall 1981	
<b>CSU Transfer:</b>	Transferable	Effective:	Fall 1991	Inactive:
<b>UC Transfer:</b>	Transferable	Effective:	Fall 1991	Inactive:

### **CID:**

### **Certificate/Major Applicable:**

Major Applicable Course

### **COURSE CONTENT**

#### **Student Learning Outcomes:**

Upon completion of the course, students will be able to:

1. Critically analyze astronomical observations and the scientific theories used to explain them.
2. Recognize, differentiate, and describe the various astronomical bodies within the Universe, concentrating on the celestial bodies within the Solar System.
3. Explain why some astronomical bodies exhibit phases.
4. Recognize the factors affecting planetary seasons and atmospheres, and relate these to Earth.

#### **Objectives:**

During this course, students will:

1. Define and apply the scientific method.
2. Compare the Solar System and its components to other celestial bodies and structures within the Universe.
3. Describe the physical and orbital properties of the Jovian and Terrestrial planets.
4. Identify the major contributions to astronomy made by various philosophers, natural scientists, and astronomers.
5. Construct a diagram of the Earth-Moon-Sun system to determine the Moon's phases at specific times during the lunar cycle.
6. Explain why seasons occur on Earth and other planets.
7. Describe and summarize the relationships between comets, asteroids, and meteor showers.
8. Summarize the physical properties of the major planets and their largest satellites.
9. Classify the major types of meteorites and summarize the characteristics of each.
10. Describe the structure of the Sun as well as various solar processes and phenomena.
11. Discuss the methods of detection of extrasolar planets and describe the properties of some of

these recently found worlds.

## **Topics and Scope:**

- I. Overview of the Universe
  - A. The nature of science
  - B. Celestial bodies of the Universe
  - C. Distance scales
- II. History of Astronomy
  - A. Historical geocentric and heliocentric models of the cosmos
  - B. The Copernican revolution
  - C. Kepler's 3 laws of planetary motion
  - D. Newtonian laws of motion and gravity
  - E. Surface gravities of planets
- III. Terrestrial Worlds: Mercury, Venus, Earth and Mars
  - A. Interiors and compositions
  - B. Geological processes and surface features
  - C. Atmospheres
  - D. Seasons and climates
  - E. Comparative planetology
  - F. Exploration
- IV. Jovian Worlds: Jupiter, Saturn, Uranus, and Neptune
  - A. Interior structure and composition
  - B. Atmosphere and cloud layers
  - C. Ring systems
  - D. Discovery of Uranus and Neptune
  - E. Satellites
  - F. Exploration
- V. Pluto and Other Dwarf Planets
  - A. Discovery
  - B. Properties
  - C. Exploration
- VI. Comets and Meteor Showers
  - A. Anatomy of a comet
  - B. Orbital paths
  - C. Historical comets
  - D. Comet-meteor relationships
  - E. Meteors and meteor showers
- VII. Asteroids and Meteorites
  - A. Asteroid classification
  - B. Impacts
  - C. Meteorite classification
- VIII. The Moon
  - A. Lunar rise/set times
  - B. Phases
  - C. Orbital and surface properties
  - D. Geology
  - E. Tides
  - F. The Space Program
- IX. Eclipses
  - A. Types of shadows
  - B. Lunar eclipses

- C. Solar eclipses
  - D. Eclipse seasons and future eclipses
- X. The Sun
- A. Interior and atmosphere
  - B. Nuclear fusion
  - C. Photosphere and sunspots
- XI. The Origin of the Solar System
- A. Nebular Hypothesis
  - B. Age of the Solar System
- XII. Extrasolar Planets
- A. Methods of detection
  - B. Types and properties
  - C. Discoveries of potentially habitable worlds
- Additional topics may include:
- XIII. Earth and Sky
- A. Celestial Sphere
  - B. Diurnal and annual motion
- XIV. Constellations and Mapping
- A. Star charts and planispheres
  - B. Terrestrial and celestial coordinate systems
- XV. Optical Systems
- A. Image formation
  - B. Lenses and mirrors
  - C. Telescopes types
  - D. Cameras

**Assignment:**

1. Weekly reading from the textbook or instructor prepared materials (20-30 pages)
2. Homework assignments (5-20)
3. Five to ten page, typed research paper using at least two outside sources (0-1)
4. In-class exercises (0-30)
5. Quizzes (0-30)
6. Exams (0-4)
7. Final exam

**Methods of Evaluation/Basis of Grade:**

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Homework, research paper
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Writing 10 - 30%
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**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework problems, in-class exercises
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Problem solving 5 - 30%
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**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

None

Skill Demonstrations  
0 - 0%

**Exams:** All forms of formal testing, other than skill performance exams.

Exams and/or quizzes

Exams  
60 - 80%

**Other:** Includes any assessment tools that do not logically fit into the above categories.

Participation

Other Category  
0 - 10%

**Representative Textbooks and Materials:**

The Solar System. 10th ed. Seeds, Michael and Backman, Dana. Cengage Learning. 2018

The Cosmic Perspective; The Solar System. 8th ed. Bennett, Jeffrey and Donahue, Megan and Scheider, Nicholas. Pearson. 2016

Pathways to Astronomy. 4th ed. Schneider, Stephan and Arny, Thomas. McGraw Hill. 2014