

**ASTRON 4 Course Outline as of Fall 2014****CATALOG INFORMATION**

Dept and Nbr: ASTRON 4 Title: ASTRONOMY/SOLAR SYSTEM

Full Title: Astronomy of the Solar System

Last Reviewed: 4/10/2023

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 extra-solar 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 extra-solar 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**

**Outcomes and Objectives:**

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

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 extra-solar 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. Extra-solar 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. Reading from the textbook or instructor prepared materials (averaging one chapter per week, roughly 20-30 pages).
2. Homework assignments (5-20) which may include: a) independent research, b) group projects, c) problem sets, d) written work.
3. Five to ten page, typed research paper (using at least two outside sources) on instructor approved subjects.
4. In-class exercises and activities on subject matter presented in class and/or pertaining to videos watched.
5. Extra credit assignments involving visits to Santa Rosa Junior College Planetarium, and/or reaction papers to selected scientific movies or articles. Reaction papers should be typed and 1 to 1.5 pages.
6. Exams (2-4), as well as a final exam (which may or may not be comprehensive). Exams may consist of true-false, multiple choice, problem-solving completion and/or essay questions.

### **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.

Written homework, Term papers, Extra credit essays
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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	Problem solving 5 - 30%
<b>Skill Demonstrations:</b> All skill-based and physical demonstrations used for assessment purposes including skill performance exams.	
None	Skill Demonstrations 0 - 0%
<b>Exams:</b> All forms of formal testing, other than skill performance exams.	
Exams: Multiple choice, True/false, Matching items, Completion, Problem-solving, essay questions	Exams 60 - 80%
<b>Other:</b> Includes any assessment tools that do not logically fit into the above categories.	
Participation, individual/group projects	Other Category 0 - 10%

### **Representative Textbooks and Materials:**

THE COSMIC PERSPECTIVE - THE SOLAR SYSTEM. Bennett, Jeffrey. Donahue, Megan. Scheider, Nicholas. Voit, Mark. Pearson Addison Wesley: 2013.

PATHWAYS TO ASTRONOMY. Schneider, Stephan. Arny, Thomas. McGraw Hill: 2011.

ASTRONOMY - THE SOLAR SYSTEM AND BEYOND. Seeds, Michael. Backman, Dana. Thomson Brooks/Cole: 2013.