

**ASTRON 4 Course Outline as of Fall 2008****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 emphasizing the Sun, Moon, planets, asteroids, comets and origin of the Solar System.

**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 emphasizing the Sun, Moon, planets, asteroids, comets and origin of the Solar System. (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. Distinguish and summarize the relationship between comets, asteroids, and meteor showers.
8. Summarize the physical properties of the major planets and their largest satellites, comparing such characteristics as atmosphere, surface temperatures, surface composition and features, surface gravity and internal structure.
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.

### **Topics and Scope:**

- I. Overview of the Universe
  - A. The scientific method
  - B. Celestial bodies of the Universe
  - C. Distance scales

## II. History of Astronomy

- A. Historical models of the cosmos
- B. Heliocentric Universe
- C. The Copernican revolution
- D. Kepler's 3 laws of planetary motion
- E. Newtonian laws of motion and gravity
- F. Calculating surface gravities of planets

## III. Overview of the Major Planets

- A. Terrestrial Planets
- B. Jovian Planets

## IV. Mercury

- A. Surface features and other properties
- B. Exploration

## V. Venus

- A. Atmosphere, surface features, and other properties
- B. Exploration

## VI. Earth

- A. Atmosphere, surface features, and other properties
- B. Seasons
- C. Life-planet relationships

## VII. Mars

- A. Canals and historical observations
- B. Atmosphere, surface features, and other properties
- C. Exploration
- D. Evidence of liquid water flow

## VIII. Jupiter and Saturn

- A. Atmosphere, interior structure, and other properties
- B. Satellites
- C. Planetary ring systems and Roche's Limit
- D. Exploration

## IX. Uranus and Neptune

- A. Discovery
- B. Atmosphere, interior structure and other properties
- C. Satellites
- D. Exploration

## X. Pluto and Other Dwarf Planets

- A. Discovery
- B. Properties
- C. Exploration

## XI. Comets and Meteor Showers

- A. Anatomy of a comet
- B. Cometary orbits
- C. Historical comets
- D. Comet-meteor relationships
- E. Meteors and meteor showers

## XII. Asteroids and Meteorites

- A. Asteroid classification
- C. Impacts
- D. Meteorite classification

## XIII. The Moon

- A. Delay in rise/set
- B. Phases

- C. Surface and interior
- D. Orbit
- E. "Geologic" history
- F. The Space Program

#### XIV. Eclipses

- A. Types of shadows
- B. Lunar eclipses
- C. Solar eclipses
- D. Eclipse seasons and future eclipses

#### XV. The Sun

- A. Solar interior and atmosphere
- B. Nuclear fusion
- C. Photosphere and sunspots

#### XVI. The Origin of the Solar System

- A. Nebular Hypothesis
- B. Age of the Solar System

Additional topics may include:

#### XVII. Earth and sky

- A. Celestial Sphere
- B. Diurnal and annual motion

#### XVIII. Constellations and mapping

- A. Star charts and planispheres
- B. Terrestrial and celestial coordinate systems

#### XIX. Optical Systems

- A. Image formation
- B. Lenses and mirrors
- C. Telescopes types
- D. Cameras

#### XX. Extrasolar Planets

### **Assignment:**

Assignments vary but typically include the following:

1. Reading from the textbook or instructor prepared materials (averaging one chapter per week, roughly 20-30 pages).
2. Homework assignments which may include: a) independent research, b) group projects, c) problem sets, d) written work. These homework assignments may involve explaining concepts discussed in class, in the text, and/or problem solving pertaining to such subjects as phases of the Moon, the Law of Gravity, Kepler's 3rd Law, Roche's Limit and escape velocity.
3. Five to ten page, typed research paper (using at least two outside sources) on instructor approved subjects.
4. In-class exercises/activities on subject matter presented in class and/or pertaining to videos watched. Exercises/activities may involve explaining concepts discussed in class and/or problem solving, involving such subjects as phases of the Moon, the Law of Gravity, Kepler's 3rd Law, Roche's Limit, and escape velocity. Exercises/activities may be done individually or in groups.
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. Two to four exams, 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

Writing  
10 - 30%

**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%

**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.

Multiple choice, True/false, Matching items, Completion, Problem-solving, essay questions

Exams  
60 - 80%

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

Attendance, 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: 2007.

PATHWAYS TO ASTRONOMY. Schneider, Stephan. Arny, Thomas. McGraw Hill: 2007.

ASTRONOMY - THE SOLAR SYSTEM AND BEYOND. Seeds, Michael. Thomson Brooks/Cole: 2007.