

ROCHESTER COMMUNITY AND TECHNICAL COLLEGE

COMMON COURSE OUTLINE: Course discipline/number Earth Science 1124

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**A. CATALOG DESCRIPTION (include prerequisites)**

**Course Title:** Solar System Astronomy  
**Credits:** 4  
**Hours/Week:** 3 hours lecture and 2 hours lab per week  
**Quarter Offered:** Spring  
**Prerequisites:** None

This course will meet the requirements for the Minnesota Transfer Curriculum in CT (Critical Thinking) and NS (Natural Sciences).

A survey of the solar system, including the earth-moon system, the planets and their satellites, asteroids, meteors, comets, and the nearest star, our sun. Study includes the history of astronomy leading up to our modern view of the sun and planets as provided by optical and radio telescopes, spectrographic study and manned and robotic spaceflight. Topics include light and telescopes, planetary surfaces and atmospheres, the origin of planetary systems and the search for extraterrestrial life. Lab work is supplemented by field trips and observations using the unaided eye and telescopes.

**B. DATE LAST REVISED (use current date):** August 1997

**C. RECOMMENDED ENTRY SKILLS/KNOWLEDGE:**

12th grade reading and writing skills. A working knowledge of elementary algebra is helpful.

**D. OUTLINE OF MAJOR CONTENT AREAS:**

Lecture:

1. History of astronomy
2. Orbits and Gravity
3. The Earth-Moon System
4. Radiation And Spectra
5. The Telescope And Other Instruments
6. The Earth As A Planet
7. The Moon
8. Mercury
9. Venus
10. Mars
11. Jupiter
12. Saturn
13. Uranus
14. Neptune
15. Pluto
16. Planetary Rings
17. The Moons Of The Jovian Planets
18. Comets
19. Asteroids And Meteorites
20. Origin of The Solar System
21. The Sun

**D. OUTLINE OF MAJOR CONTENT AREAS: (continued)**

The laboratory exercises are intended to correlate with and reinforce the lecture topics. The labs also demonstrate the methods used by professionals in the earth sciences. Error analysis is used when it is appropriate. Field trips are intended to allow for students to analyze geologic phenomena by using the methods and tools of a geologist.

Laboratory:

1. The Metric System
2. Planetarium
3. The Telescope
4. Celestial Sphere
5. Observing The Sun
6. Observing The Planets
7. Observing The Moon
8. Daily And Annual Motions Of The Sun
9. Spectrum-Spectroscope
10. Phases Of The Moon
11. Graphical Construction Of Orbits
12. Image Analysis
13. Radioactive Decay And The Dating Of Rocks
14. Evaluating Astrology

**E. LEARNING OUTCOMES (GENERAL):**

1. Demonstrate an understanding of scientific theories
2. Discuss and question theories in astronomy
3. Perform laboratory experiments in astronomy to develop in greater depth the students' experience in the collection and analysis of data and the sources of error and uncertainty
4. Evaluate societal issues from a natural science perspective and make informed judgments about astronomically-related topics and policies
5. Become a more scientifically concerned and informed citizen.

**F. LEARNING OUTCOMES (MNTC):**

Critical Thinking

- a. Gather factual information and apply it to a given problem in a manner that is relevant, clear, comprehensive and conscious of bias in the information selected.
- b. Imagine and seek out a variety of possible goals, assumptions, or perspectives which can give meaning to a given problem.
- c. Analyze the logical connections between facts, goals and assumptions relevant to a problem and evaluate claims which may be said to follow from them.
- d. Describe and improve one's own critical thinking and problem solving procedures.

Natural Sciences

- a. Demonstrate understanding of scientific theories and the ways in which scientists develop, express and question theories in the areas of astronomy.
- b. Formulate and test hypothesis by performing laboratory experiments, requiring collection of data, its statistical and/or graphical analysis and an appreciation of uncertainty and sources of error.
- c. Communicate their findings, analysis and interpretations with other students and/or instructor orally and/or in writing.

**G. METHODS FOR EVALUATION OF STUDENT LEARNING:**

1. Laboratory reports, telescope observation reports and/or quizzes
2. 3 major exams
3. Weekly homework assignments

**H. SPECIAL INFORMATION (fees, directives on hazardous materials, etc.):**

Included in the initial lab session is a discussion on general safety hazards and safety equipment. During the pre-lab instruction of labs involving hazardous materials or equipment, students are given information pertaining to the use, safety precautions, and disposal of these materials or equipment. The instructor directs all students to wear the necessary protective equipment while working with any hazardous chemicals. A copy of Material Safety Data Sheets for chemicals used is available in the lab.