



Syllabus: **ASTR101N - Solar System**

Course Information

Course Title: Solar System

Course Prefix/Number: AST 101N

Semester: Fal 2023

Class Days/Times: Online : T & Th 5:30 - 8:00

Credit Hours: 4

Instructor Information

Name: Dr. Peter Milne

Phone/Voice Mail: 520-820-5741

E-mail: pmilne@tocc.edu

Office hours: Online using email

Course Description

This online course introduces the student to the nature and origin of the solar system, including the Sun and its family of planets, comets, minor planets and asteroids. It covers the principles of physics that allow us to understand the nature of these bodies. The history of astronomy, space exploration, and extraterrestrial life are also discussed. The student will also learn about scientific thinking and the scientific method, as applications of critical thinking, in contrast to pseudoscience.

Prerequisites

MAT 089 or higher, and WRT 101 or higher, or permission of instructor

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Student Learning Outcomes

After completing this course, students will be able to:

- 1) Discuss how astronomical observations contributed to the scientific revolution of the 17th century and explain the evidence for a heliocentric model for our solar system.
- 2) Describe and explain the apparent motions of celestial bodies as seen from an observer on Earth and apply this knowledge to predict positions and appearances of objects in the sky based on the time and the location of the observer.
- 3) Describe current theories of planet formation and relate these to present-day understanding of the structure of our solar system.
- 4) Recognize the immense spatial scale and time scale of the solar system, compare and contrast these with human experience using scientific notation, distance ranking, and scale models.
- 5) Predict the orbital properties of gravitating systems by applying Kepler's laws of planetary motion and Newton's laws of motion and Universal Gravitation.

Course Structure

This online course has an integrated lecture/activity format. The activities are typically related to the lecture topics. Each lesson consists of homework assignments in Pearson *Modified Mastering Astronomy*, Activities solved on worksheets and submitted via Canvas quizzes, and a Discussion topic with fellow classmates. In addition, there will be a few Projects that will be written up and submitted via a Dropbox within Canvas.

Course Learning Materials and Textbook Information

The course resources are purchased online:

1. Pearson Modified Mastering Astronomy Access Card with etext, There are 2 versions to consider, a 6-month or 24-month subscription. This item is purchased using a link that appears on your Pearson course registration page.
2. Stellarium. This is a free software that can be downloaded and installed on your computer, or one can use a less functional web-page version.

Courses Outline and Important Dates

Below is a general outline of AST 101N that provides an overview of topics, rather than a course schedule. For specific dates, see the Assignment schedule in Canvas.

Course Syllabus

1) General Introduction

- A. What is science?
- B. The role of mathematics in science?
 - A. Quantitative vs. qualitative understanding
 - B. Linear and angular measurements
 - C. Unit conversion
 - D. Equations
 - E. Graphing
- C. What is Astronomy?
- D. Value of Astronomy and benefits to the individual
- E. Scientific method and the central role of skepticism
 - A. Contrasts with pseudoscience
 - B. Possible pseudo sciences related to Astronomy
 - A. UFOs
 - B. Ancient Astronauts
 - C. Scientific creationism as related to the age and origin of the Universe.

2. Nature of Starlight

- A. Electromagnetic Spectrum
- B. Physics and light
 - i. Thermal spectra and radiation laws
 - ii. Emission and absorption spectra and elemental fingerprints
 - iii. Doppler effect

3. Modern Astronomy

- A. Telescopes
- B. Ground-based versus Space Telescopes

4. Our Solar System

- A. Solar System Formation
 - 1. Patterns in the Solar System
 - 2. Exceptions to the Patterns
 - 3. Nebular Hypothesis
- B. Inner Planets
 - 1. Planetary Geology
 - 2. Planetary Atmospheres
 - 3.

Course Syllabus

- C. Outer Planets
 - 1. Gas Giants
 - 2. Moons
 - 3. Dwarf Planets
- D. Comets and Asteroids
- E. The Sun
- 5. Other Solar Systems
 - A. Habitable Zone and chances for Life
 - B. Exoplanets. Discoveries to date
 - C. Revisiting the Nebular Hypothesis

Evaluations and Grading & Assignments:

90 and above is an A

80 - 89 is a B

70 - 79 is a C

60 - 69 is a D

Under 60 is Failing

Your grade will be determined by the following:

There will be 1000 possible points in the course.

There will be 15 Homework assignments worth 20 points each. Dropping low 2 scores leads to 260 HW points

There will be 15 Activity assignments worth 20 points each. Dropping low 2 scores leads to 260 Activity points

There will be 10 Discussions worth 10 points each. This leads to 100 Discussion points.

There will be 3 Projects worth a total of 130 points.

There will be 2 Exams, a midterm worth 120 points and a Final worth 130 points. This leads to 250 Exam points

$260 + 260 + 100 + 130 + 250 = 1000$ points

SCAC General Education Learning Outcomes

Apache Wisdom

Learning from the teachings carried on from Apache elders and other community leaders, students will appreciate their unique history, language, and culture as a source of strength for their personal, family, academic, and career aspirations.

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Critical Thinking

Approach critical issues, problems, or questions using creativity and deductive reasoning, evaluating evidence, acknowledging diverse perspectives and contexts, and synthesizing one's own viewpoint into ongoing conversations and debates.

Communication

Effectively express ideas orally and in writing. Good communication includes understanding one's audience, organizing one's thoughts, acknowledging and integrating outside sources, using the most recent technology, and following the accepted writing and citation conventions of the particular discipline.

Environmental Literacy

Students will understand their connection to social, cultural, physical, and global environments. Students will consider and evaluate strategies for cultural, community and global sustainability.

Policies and Expectations

Attendance Policy

Four unexcused absences may result in withdrawal and a "W" or "Y" will be recorded. The course is set up to permit course material to be reviewed outside of class. This means that an unexcused absence will be considered not attending a class session, not contacting the instructor about that absence, and not completing work due for that class period. You may request to be excused from class for religious observances and practices, for illness, for school or work-related travel or for personal or family emergency. If you will be absent, please notify the instructor as soon as possible.

Academic Integrity:

Violations of scholastic ethics are considered serious offenses by San Carlos Apache College. Students may consult the SCAC Student Handbook sections on student code of conduct, on scholastic ethics and on the grade appeal procedure.

All work done for this class must be your own, or the original work of your group. While you may discuss assignments with other class members, the final written project must clearly be original. You may use work from books and other materials if it is properly cited.

Course Feedback:

All assignments will be graded and returned to the students promptly, typically within a week after the assignment is closed for handing in. Email and phone messages will be returned within 24 hours. A student or the instructor may request a student conference at any time during the semester. Quarterly grade reports will be provided to each student, either in person, by email or via the electronic system of Canvas.

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Faculty/Student Communication

A faculty member will respond to a student's communication within 24 hours of receiving the communication excluding weekends and college closures. If a course is online a faculty will login their Canvas classroom a minimum of three times per week spread evenly throughout the week and respond to any discussion posts and check on student progress in the course.

Incomplete Policy

Incomplete (I) grades are not awarded automatically. The student must request an "I" from the instructor who can choose to award an Incomplete only if all three of the following conditions are met:

1. The student must be in compliance with the attendance policy.
2. The student must have unavoidable circumstance that would prohibit the student from completing the course.
3. The student must have completed over 75% of the course requirements with at least a "C" grade.

Incompletes are not a substitute for incomplete work due to frequent absences or poor academic performance. Incomplete grades that are not made up by the end of the ninth week of the following semester will be automatically changed to an F if the agreed upon work, as stipulated on the written form signed by the instructor and the student when the I grade is awarded, is not completed.

Instructor Withdrawals

Students who have missed four consecutive classes (or the equivalent), or have not submitted any assignments nor taken any quizzes by the 45th day census report, due on [date of 45th day found in Academic Calendar on SCAC website], are assumed NOT to be participating in the class and may be withdrawn at the faculty member's discretion.

Student Withdrawals

Students may withdraw from class at any time during the first 2/3 of the semester without instructor permission and without incurring any grade penalty. Please be sure to withdraw yourself by [withdrawal deadline date found in Academic Calendar on SCAC website] if you do not expect to complete the class; otherwise, you may receive an "F" grade.

Special Withdrawals (Y) Grade

The "Y" grade is an administrative withdrawal given at the instructor's option when no other grade is deemed appropriate. Your instructor must file a form stating the specific rationale, with documentation, for awarding this grade. "Y" grades are discouraged since they often affect students negatively. Your instructor will not award a "Y" grade without a strong reason.

Equal Access Statement/Disability Accommodations

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San Carlos Apache College seeks to provide reasonable accommodations for qualified individuals with disabilities. The College will comply with all applicable regulations, and guidelines with respect to providing reasonable accommodations as required to ensure an equal educational opportunity. This process includes self-identifying as a student with a disability, providing supporting documentation of their disability, and being approved for services through the Disability Resources Office (DRO). It is the student's responsibility to make known to their instructor(s) the student's specific needs within the context of each class in order to receive appropriate accommodations. We will work together in order to develop an accommodation plan specifically designed to meet the individual student's requirements.

For more information or to request academic accommodations, please contact: Anthony Osborn, TOCC Disabilities Resource Coordinator, aosborn@tocc.edu, or 520-383-0033 for additional information and assistance.

Title IX

San Carlos Apache College encourages each student to have the knowledge and skills to be an active bystander who intervenes when anyone is observed or being harassed or endangered by sexual violence. Sexual discrimination and sexual violence can undermine students' academic success and quality of life on campus and beyond. We encourage students who have experienced or witnessed any form of sexual misconduct to talk about their experience and seek the support they need.

Conduct: Bias, Bullying, Discrimination and Harassment

San Carlos Apache College faculty and staff are dedicated to creating a safe and supportive campus environment as a core value. Harassment based on age, class, color, culture, disability and ability, ethnicity, gender, gender identity and expression, immigration status, marital status, political ideology, race, religion/spirituality, sex, sexual orientation, and tribal sovereign status will not be tolerated.

Late Work

Each assignment will have a due date that can be known by visiting the Course Schedule on Canvas. Late work can be accepted without penalty if prior arrangements have been made with the instructor. If no prior arrangements have been made, it will be up to the instructor to determine whether there will be a penalty, and the percentage deduction for that penalty.

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