



Syllabus for AST 101N, “Solar System”

Course Information

Course Title: Solar System
Course Prefix/Number: AST 101N
Semester: Fall 2020
Class Days/Times: Online
Credit Hours: 4

Instructor Information

Name: Dr. Michael Newberry
E-mail: mnewberry@tocc.edu
Office hours: Online using e-mail.

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, 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.

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 lab/lecture course. The lab topics are typically related to the lecture topics. Each lesson consists of homework assignments and quizzes in Pearson *Modified Mastering Astronomy* and labs using the *Starry Night* software and other platforms.

Course Learning Materials and Textbook Information

The course resources are purchased online:

- 1) Pearson Modified Mastering Astronomy Access Card with e-Text. There are two versions to consider: \$59.99 (6 months) or \$94.99 (24 months). This item is purchased using a link that appears on your Pearson course registration page.
- 2) Starry Night software, [Web Edition \(Links to an external site\)](#). \$29.99

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.

- 1) General Introduction
 - a) What is Science?
 - b) The role of mathematics in science
 - i) Quantitative vs. qualitative understanding
 - ii) Linear and angular measurement
 - iii) Unit conversion
 - iv) Equations
 - v) Graphing
 - c) What is Astronomy?
 - d) Value of Astronomy and benefits to the individual
 - e) Scientific method and the central role of skepticism
 - i) Contrasts with pseudoscience
 - ii) Possible pseudo sciences related to Astronomy

- (1) UFOs (flying saucers)
- (2) Ancient astronauts
- (3) Scientific creationism as related to the age and origin of the Universe
- 2) Nature of Starlight
 - a) Magnitude system
 - b) Electromagnetic spectrum
 - c) Physics: what light tells us
 - i) Radiation Laws (Planck, Wien, Stephan-Boltzmann)
 - ii) Doppler effect
- 3) Modern Astronomy
 - a) Major observatories
 - b) Telescopes
 - i) Optics
 - ii) Instruments
 - c) Celestial coordinates
- 4) Stars
 - a) Introduction to their physical nature
 - b) The Sun
- 5) Universe
 - a) Description of the present-day Universe and recent discoveries
 - b) Theories of origin
 - c) Future of Universe
- 6) Life in the Universe
 - a) The nature of life
 - b) Probability estimates
 - c) Pseudoscience: UFOs and ancient astronauts
- 7) Cosmic Perspective: Beyond Global Awareness
 - a) Our location in space and time
 - b) Astronomical numbers
 - c) Specialized units
- 8) Individual Laboratory Exercises
 - a) Tools of the astronomer
 - b) Electromagnetic radiation
 - c) Constellations

Evaluations and Grading & Assignments:

- 89% and above is an A
- 78 – 88% is a B
- 67 – 77% is a C
- 56 – 66% is a D
- Under 56% is Failing

Your final course grade will be determined by your performance, as follows:

Assignments	Total Value
This course has 13 lessons, 2 exams, and a Himdag project due at the end of the semester.	1002
Each lesson has a homework assignment with 10 to 18 questions. Each question is worth 1 point.	212
Each lesson has a visual quiz with 10 questions. Each question is worth 1 point.	130
Most lessons include a lab. There are 10 labs during the semester, and each lab is worth 30 points.	300
A Himdag project is assigned for a topic related to "Tohono O'odham use of the Sky". You will choose your topic after clearing it with the professor. The graded assignment is a PowerPoint presentation that you develop by the end of the semester.	50
Exam 1 covers lessons 1 through 7 and is assigned in the middle of the semester.	150
Exam 2 covers lessons 8 through 13 and is assigned at the end of the semester.	150
Extra Credit: Participation points for completing all assignments on time.	(50)

Himdag Cultural Component

A Himdag project for a topic related to "Tohono O'odham use of the Sky" will be assigned and is due as a Powerpoint presentation on the last day of the course. Your topic must be approved by the professor. The grade is determined from the PowerPoint presentation due at the end of the semester.

Policies and Expectations

Expectations of the Student

1. Students are expected to complete each assignment on time.
2. Class participation and preparation are essential to student success. In this online course, attendance is assessed by submitting assignments for grading. For example, if you submit the homework assignment for Lesson 3, then you are considered to be present for Lesson 3.
3. Students must read textual material, prepare for projects, complete required research as stated on the course schedule.

DISCLAIMER: This syllabus is designed to evolve and change throughout the semester based on class progress and interests. You will be notified of any changes as they occur.

4. Late work will be penalized by a 10% deduction for each day past due.
5. No work accepted after the due date for the final lesson.

Attendance Policy

Four (4) unexcused absences may result in withdrawal, and a W or Y grade will be recorded for the course. You may request a due date extension on assignments for religious observances and practices, illness, a personal family emergency, or for school or work-related travel. When requesting a due date extension, please notify your professor as soon as possible (this policy approved by the TOCC Faculty Senate, April 2014).

Incomplete Policy

Incomplete (I) grades are not available in this online course.

Instructor Withdrawals

Students who have missed four consecutive classes (or the equivalent) not submitted any assignments nor taken any quizzes by the 45th day census report, due on October 8, 2020, are assumed NOT to be participating in the class and may be withdrawn at the faculty member's discretion. [faculty members should be clear in their withdraw policy, if you do not withdraw students please note in appropriate sections].

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. If you do not intend to complete the course, please be sure to withdraw yourself by November 9, 2020. 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 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

Tohono O'odham Community 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 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

Tohono O'odham Community 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.

Confidential support and academic advocacy can be found with Student Services Title IX Coordinator/Counselor, Alberta Espinoza, M.Ed., located in I-We:mta Ki: Room 18. Phone 520-383-0033 e-mail: aespinoza@tocc.edu

Conduct: Bias, Bullying, Discrimination, and Harassment

Tohono O'odham Community 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 are not tolerated.