



Syllabus: **AST 101N “Solar System”**

<p>Course Information</p> <ul style="list-style-type: none"> • Course Prefix/Number: AST 101N • Semester: Spring 2020 • Class Days/Times: <i>ONLINE</i> 	<ul style="list-style-type: none"> • Credit Hours: <i>4.0</i> • Course Title: <i>“Solar System”</i> • Room: <i>ONLINE</i>
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<p>Instructor Information:</p> <p>Name: Dr. Michael Newberry</p>	<p>Phone/Voice Mail: N/A</p> <p>E-mail: mnewberry@tocc.edu</p> <p>Office location: N/A</p> <p>Office hours: N/A</p>
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Course Description:
 AST 101N: “Solar System”: Introduction to the science of the nature and origin of the solar system, the sun and its family of planets, comets, and asteroids. Includes the history of astronomy and special topics regarding the space program. Scientific thinking as an application of critical thinking and science in contrast to pseudoscience is also covered. Lecture and lab are integrated.

Student Learning Outcomes:

After completion of the 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 in order to predict positions and appearances of objects on the sky as a function of time and the observer’s location.
3. Describe current theories of planet formation and relate these to the present-day structure of our own solar system.
4. Recognize the immense spatial and time scales of the solar system, compare & contrast these with human scales using scientific notation, distance ranking and scale models.

5. Predict orbital parameters for gravitating systems by applying Kepler's laws of planetary motion and Newton's laws of motion and Universal Gravitation.

Course Structure:

This course is an integrated lab/lecture course where the labs are integrated into the regular class periods. This course is delivered online, with an optional, but recommended, meeting one day per week. This course consists of ten units. Each unit consists of assignments in Pearson "Mastering Astronomy", "SkyGazer" Labs, and other assignments.

Texts and Materials:

- "Mastering Astronomy with Pearson eText and Instant Access" for The Cosmic Perspective, 9th Edition, Jeffrey O. Bennett, Megan O. Donahue, Nicholas Schneider, Mark.
- Textbook: The Cosmic Perspective, 9th Edition.
- Lecture Tutorials for Introductory Astronomy, 3rd Edition, Edward E. Prather, Tim P. Slater, Jeff P. Adams, Gina Brissenden.
- SkyGazer Software for installing on your computer. This software is also installed on computers in I-We:mta Ki ("IWK") Room 24 and on several computers in the Student Tutoring Center.

For the optional Observing Nights (weather permitting):

- Portable Telescopes (provided by TOCC) for outdoor observing of the night sky.
- Binoculars (provided by TOCC) for outdoor observing of the night sky.

Your Final Course Grade is determined as follows:

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

Himdag Cultural Component:

Tohono O’odham traditions and cultural beliefs will be discussed as relevant course topics, and only as appropriate to the Tohono O’odham Nation’s traditional standards for sharing information as determined by the Himdag committee.

This course includes a PowerPoint project based on interviewing one or more Elders to learn more about how the Tohono O’Odham used the sky for traditional purposes (commerce, planning, agriculture, ceremonies, guidance, etc.)

Course Policies

Student Expectations

- 1) Attend the first 2 (organizational) class meetings and the final meeting for your Himdag (PowerPoint) Presentation;
- 2) Complete all assignments and submit them to the instructor by the listed deadline;
- 3) Take all exams;
- 4) Deliver the final Himdag (PowerPoint) Presentation.

Attendance

This is an online course. There are 2 meetings in room IWK-24 to help you get started with the course and 1 class meeting at the end of the semester when you present your individual PowerPoint presentations on Tohono O’Odham Use of the Sky. There are no class meetings between these times. Submission of assignments is considered to measure “attendance”. Missing submission of assignments for 4 consecutive lessons may result in withdrawal and a “W” or “Y” grade for the course.

Make-up policy

Late assignments are allowed up to 1 week late but will be penalized with a 25% deduction. Extra credit opportunities may be offered as scheduled outdoor observing at the TOCC campus – weather permitting.

You may request an extension for an assignment 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 email the instructor as soon as possible before the target date.

Academic Integrity

Violations of scholastic ethics are considered serious offenses by Tohono O'odham Community College, the Student Services Department, and by your instructor. Students may consult the TOCC Student Handbook sections on student code of conduct, on scholastic ethics and on the grade appeal procedure. Copies are available at Tohono O'odham Community College.

All work done for this course must be your own. While you may discuss assignments with other course members, the written assignments must clearly be your own. You may use work from other materials if it is properly cited. Copying from a book without proper reference or from a person under any circumstances will result in an "F" for the assignment, and at the instructor's discretion, possibly an "F" for the course.

Classroom Behavior

This is an online course, so this section does not apply.

Course Feedback

All assignments, written papers and quizzes will be graded and returned within one week after the assignment is due. E-mail and phone messages will be returned within two days. Students should regularly check Canvas to monitor their grades.

Instructor Withdrawals

Students who have missed submitting assignments from 4 consecutive lessons or have not submitted any assignments nor taken any quizzes by the 45th day census report, due on February 27, 2020 are assumed NOT to be participating in the course and will be withdrawn at the faculty member's discretion.

Student Withdrawals

Students may withdraw from course 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 March 30, 2020 if you do not expect to complete the course, otherwise you may receive an "F" grade.

Incomplete (I) grades

An "I" grade (incomplete) is not available for this online course.

Special Withdrawal (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.

Final Grades

Students will receive a grade transcript from the college mailed to the address given with registration materials at the end of the semester when all grades have been recorded.

SPECIAL NOTE TO THE STUDENT:

For privacy and security reasons, instructors are advised NOT to give grades over the telephone. Grades will only be emailed with written permission from the student.

Your instructor will make every attempt to follow the above procedures and schedules, but they may be changed in the event of extenuating circumstances.

Students submitting assignments through the mail or by email are advised to make copies for their own protection.

If you move during the semester, please file a change of address form with the Student Services Office and inform your instructor.

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 course 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 Dr. 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 email: 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 will not be tolerated.

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

Course Policies:

- 1) Students are expected to contact the instructor to request an extension in case they will not meet the deadline listed in the assignment schedule on the Canvas course page.
- 2) Course participation and preparation are essential to student success. Students must read text material and complete the assignments according to the course schedule. Doing these things defines the level of "participation". The course final grade includes a small number of points according to the degree of participation.
- 3) No cell phone use is allowed during class. Use of cell phones during class, unless permitted by instructor, is a violation of the T-So:son.
- 4) Late work is marked down 25% after it becomes late. No work will be accepted more than 1 week late.
- 5) No work is accepted after the course ends on the date listed on the Canvas course page.

Course Outline

(see the Course Schedule for specific dates):

- I. General Introduction
 - A. What is Science?
 - B. The role of mathematics in science
 1. Quantitative vs. qualitative understanding
 2. Linear and angular measurement
 3. Unit conversion
 4. Equations
 5. Graphing
 - B. What is Astronomy?
 - C. Value of Astronomy and benefits to the individual
 - D. Scientific Method and the central role of skepticism
 1. Contrast with Pseudoscience
 2. Possible Pseudosciences to examine as related to Astronomy
 - a. Astrology
 - b. Scientific creationism as related to the solar system and the origin, age and life on Earth
 - c. Jupiter effect
 - d. Moon muddling
 - e. Comets as mystical messengers of doom
 - f. Immanuel Velikovsky's Planetary Billiards
- II. Solar System
 - A. Cosmic perspective: the Solar System's location in space and time
 - B. General description and structure
 - C. Age of the Solar System
 - D. Origin: theory and evidence
 - E. Planets orbiting other stars
- III. Descriptive Study of Individual Objects
 - A. Sun
 - B. Earth and Moon
 1. Tidal effect
 2. Solar-Terrestrial connections
 3. Origin of the Moon
 - C. Mercury
 - D. Venus
 - E. Mars and satellites
 - F. Jupiter and satellites
 - G. Saturn and satellites
 - H. Uranus and satellites

- I. Neptune and satellites
- J. Pluto and Charon
- K. Comets, asteroids, and their origins
- IV. History of Astronomy
 - A. Astronomical practice, invention, and discoveries around the world
 - B. Development of modern science
 - 1. The Greeks
 - 2. Aristotelian Science
 - 3. Demise of Science
 - 4. Islamic contributions
 - 5. The Scientific (Copernican) Revolution and its impact on the World
- V. The Technical Development of Modern Astronomy
 - A. Major Observatories
 - B. Telescopes
 - 1. Optics
 - 2. Instruments
 - C. Celestial coordinates
- VI. Space Exploration and Development
 - A. History
 - B. Values: costs versus benefits
 - C. Future explorations and economic development
- VII. Reprise: Cosmic Perspective—Beyond Global Awareness
 - A. Our location in time and space
 - B. Astronomical numbers
 - C. Specialized units
- VIII. In-Class Collaborative Exercises and Activities
 - A. Solar System to scale
 - B. Solar System models
 - C. Celestial Sphere and star charts
 - D. Equatorial coordinates
 - E. Horizon coordinates
 - F. Lost on the Moon
 - G. Planetary models
 - H. Discussion groups on varied topics
 - 1. Aspects of Pseudoscience
 - 2. Global warming and what to do about it
 - 3. Space exploration: pros and cons
 - 4. Pluto as a planet: pros and cons
- IX. Individual Laboratory Exercises using SkyGazer software
 - A. Terrestrial and Jovian planets
 - B. The Celestial Coordinate System
 - C. Kepler's Laws
 - D. Motions of the Moon
 - E. Motions of the Sun

- F. Constellations, Stars, and Celestial Phenomena
- G. Eclipses
- X. Videos and Animated figures Related to Lecture Topics
- XI. Space Exploration and Economic Development
 - A. Historical development
 - B. Future exploration possibilities
 - C. Pros and cons of space development
- XII. Observation Projects
 - A. Moon
 - B. Planets and their satellites
 - C. Identifying bright stars and constellations
 - D. Finding asteroids

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