Astro 1040

For additional course information, including prerequisites, corequisites, and course fees, please refer to the Catalog: https://catalog.uvu.edu/

Semester: Spring
Year: 2025
Course Prefix: Astro
Course and Section #: 1040 X01
Course Title: Elementary Astronomy
Credits: 3

Course Description

This course introduces astronomy and cosmology. It provides a physics-based overview of the solar system, the lives and deaths of stars, galaxies, and the evolution of the Universe. It explores the basic principles of physics and light, the tools of astronomy, and interesting concepts such as the Big Bang and black holes

Course Attributes

This course has the following attributes:
☒ General Education Requirements
☐ Global/Intercultural Graduation Requirements
☐ Writing Enriched Graduation Requirements
☐ Discipline Core Requirements in Program
☐ Elective Core Requirements in Program
☐ Open Elective
Other: *Click here to enter text.*

Instructor Information

Instructor Name: Christian Draper

Student Learning Outcomes

Upon successful completion of this course, students will be able to:

1. Describe the process of science and tools by which astronomers gain knowledge about the universe, including how our understanding of the universe, its scale and our place in it has changed over time.
2. Make connections between the earth's daily and yearly motions and their experience of the sky, including positions and motions of celestial bodies, seasons, phases of the moon, and eclipses.
3. Recognize how underlying physical laws govern the formation and evolution of stars, planetary systems, galaxies, and the universe as a whole.
4. Apply basic principles of physics and light to the interpretation of astronomical observations and phenomena.
5. Identify scientific information conveyed in various forms, including simple equations, numbers, diagrams, charts, and graphs.
6. Answer conceptual questions with correct terminology in the fields of stellar astronomy, cosmology, and solar system science.

7. Apply concepts learned in the course to observations of the real night sky, current news and events, and representations of astronomy in the media and popular culture.

Course Materials and Texts

Mastering Astronomy Course Bundle

Course Requirements

Assignments:
Pre/Post Test: 2% - standardized test to check classes improvement
Syllabus Quiz: 1% - quiz about the syllabus
Homework: 32% - assorted practice questions done outside of class
Activities: 4% - activities to clarify difficult concepts
Discussions: 10% - weekly group discussions
Observation Projects: 13% - self-selected activity to expand astronomy experiences beyond classwork
Exams: 32% - unit exams to test comprehension
Final Essay: 6% - essay to apply information learned in class to personal experience.

Final Letter grades are given using a standard grade scale. If your grade is in the range, you are guaranteed that letter grade. I occasionally bump grades up if you are very close to a boundary, but I will never move someone to a lower letter grade.
A 94.0 -100.
A- 90.0 - 93.9
B+ 87.0 - 89.9
B 84.0 - 86.9
B- 80.0 - 83.9
C+ 77.0 - 79.9
C 74.0 - 76.9
C- 70.0 - 73.9
D+ 67.0 - 67.9
D 64.0 - 66.9
D- 60.0 63.9
F Below 60.0

Tentative Semester Schedule
Subject to change as course progresses

Module	**Topics**	**Assignments**
Course Orientation		**Anonymous Pre-test** **Syllabus Quiz** **Discussion: Student Introductions**

Module	Topics	Assignments
Module 1	Introduction	Homework Ch. 1
	Motion of the Sun and Stars in the Sky	Homework Ch. 2.1-2.2 Discussion: Your View of the Celestial Sphere
Module 2	Motions of the Moon in the sky	Homework Ch. 2.3-2.4 Activity: Phases and Position of the Moon
	Roots of Astronomy	Homework Ch. 3 Activity: Position of Inferior Planets Discussion: How Would Our Understanding Be Different?
Module 3	Physical Laws	Homework Ch. 4
	Light and Matter	Homework Ch. 5.1-5.2 Discussion: How Would Our World Be Different?
Module 4	Light and Telescopes	Homework Ch. 5.3 Discussion: Light Pollution in your Area
End of Unit 1	Modules 1-4	End of Unit Essay 1 Exam 1
Module 5	The Sun	Homework Ch. 11
	Measuring Stellar Properties	Homework Ch. 12 Discuss: A Better Mnemonic for OBAFGKM Discuss: Life and Our Star
Module 6	Stellar Birth and Low Mass Stars	Activity: Gravitational Equilibrium in Stars Homework Ch. 13.1-13.2
	High Mass, White Dwarf and Neutron Stars	Homework Ch. 13.3-14.2 Discussion: What Will Happen to the Planets
Module 7	Black Holes	Homework Ch. 14.3-14.4 Discussion: Dangerous Black Holes?
End of Unit 2	Modules 5-7	End of Unit Essay 2 Exam 2
Module 8	Milky Way Galaxy	Homework Ch. 15

Module	Topics	Assignments
		Discussion: How Would the Sky Change?
Module 9	Other Galaxies	Homework Ch. 16
	Dark Matter, Dark Energy and the Universe	Activity: Expanding Universe and Hubble's Law Homework Ch. 18 Discussion: How Would the Sky Change?
Module 10	The Beginning of the Universe	Homework Ch. 17 Discussion: Our Place in the Universe
End of Unit 3	Modules 8-10	End of Unit Essay 3 Exam 3
Module 11	Formation of the Solar System	Homework Ch. 6
	Earth, a Living Planet	Activity: Craters, Surface Ages, and Geological Activity Homework Ch. 7.1 and 7.5
Module 12	The Moon	Homework Ch. 7.2
	The Terrestrial Planets	Homework Ch. 7.3-7.4 Discussion: How to Terraform Mars
Module 13	Jovian Planets	Homework Ch. 8.1
	Jovian Moons and Rings	Homework Ch. 8.2-8.3 Discussion: Which Planet has the Best Night Sky?
Module 14	Asteroids, Comets, and Dwarf Planets	Homework Ch. 9
	Planets Beyond Our Solar System	Homework Ch. 10 Discussion: Should We Reclassify Pluto?
Module 15	Life in the Universe	Homework Ch. 19 Discussion: Is Life Common in the Universe?
End of Unit 4	Modules 11-15	End of Unit Essay 4 Exam 4 Anonymous Post-test

Module	Topics	Assignments
End of Course		Final Essay

Required Course Syllabus Statements

Generative AI

In this digital age you have nearly infinite resources at your fingertips, including internet search engines and Artificial Intelligence (AI). I encourage you to make use of these resources, but I include a warning that the first thing that pops up after a search or AI prompt may not be accurate. Do not accept the first thing you see as the answer. You need to investigate and make sure it is what you are actually searching for and corresponds to what you already know. You may also find other theories (models) to describe aspects of the universe that are different from what is presented in class. Homework correct answers will be based on the theories given in class and in the text accompanying our course.

Using Artificial Intelligence and Plagiarism:

AI programs are not a replacement for your human creativity, originality, and critical thinking. Writing, thinking, and researching are crafts that you must develop over time to develop your own individual voice. At the same time, you should learn how to use AI and in what instances AI can be helpful to you. AI programs are not a replacement for your human creativity, originality, and critical thinking. Writing, thinking, and researching are crafts that you must develop over time to develop your own individual voice. At the same time, you should learn how to use AI and in what instances AI can be helpful to you.

AI is **good** for:

- Brainstorming
- Finding information (you should confirm this yourself, errors are rampant)
- Checking grammar, style, etc.

AI **cannot** be used for:

- Doing your work for you (especially applying astronomy concepts)
- Writing for you
- Calculations (mostly because AI still gets most of these wrong)

Using Remote Testing Software

☐ This course does not use remote testing software.

☒ This course uses remote testing software. Remote test-takers may choose their remote testing locations. Please note, however, that the testing software used for this may conduct a brief scan of remote test-takers' immediate surroundings, may require use of a webcam while taking an exam, may require the microphone be on while taking an exam, or may require other practices to confirm academic honesty. Test-takers therefore shall have no expectation of privacy in their test-taking location during, or immediately preceding, remote testing. If a student strongly objects to using test-taking software, the student should contact the instructor at the beginning of the semester to determine whether alternative testing arrangements are feasible. Alternatives are not guaranteed.

Required University Syllabus Statements

Accommodations/Students with Disabilities
Students needing accommodations due to a permanent or temporary disability, pregnancy or pregnancy-related conditions may contact UVU Accessibility Services at accessibilityservices@uvu.edu or 801-863-8747.

Accessibility Services is located on the Orem Campus in BA 110.

Deaf/Hard of Hearing students requesting ASL interpreters or transcribers can contact Accessibility Services to set up accommodations. Deaf/Hard of Hearing services can be contacted at DHHservices@uvu.edu

DHH is located on the Orem Campus in BA 112.

Academic Integrity
At Utah Valley University, faculty and students operate in an atmosphere of mutual trust. Maintaining an atmosphere of academic integrity allows for free exchange of ideas and enables all members of the community to achieve their highest potential. Our goal is to foster an intellectual atmosphere that produces scholars of integrity and imaginative thought. In all academic work, the ideas and contributions of others must be appropriately acknowledged and UVU students are expected to produce their own original academic work.

Faculty and students share the responsibility of ensuring the honesty and fairness of the intellectual environment at UVU. Students have a responsibility to promote academic integrity at the university by not participating in or facilitating others' participation in any act of academic dishonesty. As members of the academic community, students must become familiar with their rights and responsibilities. In each course, they are responsible for knowing the requirements and restrictions regarding research and writing, assessments, collaborative work, the use of study aids, the appropriateness of assistance, and other issues. Likewise, instructors are responsible to clearly state expectations and model best practices.

Further information on what constitutes academic dishonesty is detailed in UVU Policy 541: *Student Code of Conduct*.

Equity and Title IX
Utah Valley University does not discriminate on the basis of race, color, religion, national origin, sex, sexual orientation, gender identity, gender expression, age (40 and over), disability, veteran status, pregnancy, childbirth, or pregnancy-related conditions, citizenship, genetic information, or other basis protected by applicable law, including Title IX and 34 C.F.R. Part 106, in employment, treatment, admission, access to educational programs and activities, or other University benefits or services. Inquiries about nondiscrimination at UVU may be directed to the U.S. Department of Education's Office for Civil Rights or UVU's Title IX Coordinator at 801-863-7999 – TitleIX@uvu.edu – 800 W University Pkwy, Orem, 84058, Suite BA 203.

Religious Accommodation
UVU values and acknowledges the array of worldviews, faiths, and religions represented in our student body, and as such provides supportive accommodations for students. Religious belief or conscience broadly includes religious, non-religious, theistic, or non-theistic moral or ethical beliefs as well as participation in religious holidays, observances, or activities. Accommodations may include scheduling or due-date modifications or make-up assignments for missed class work.

To seek a religious accommodation, a student must provide written notice to the instructor and the Director of Accessibility Services at accessibilityservices@uvu.edu. If the accommodation relates to a scheduling conflict, the notice should include the date, time, and brief description of the difficulty posed by the conflict. Such requests should be made as soon as the student is aware of the prospective scheduling conflict.

While religious expression is welcome throughout campus, UVU also has a specially dedicated space for meditation, prayer, reflection, or other forms of religious expression.

Student Conduct

Academic integrity is a basic principle which requires that students take credit only for ideas and efforts that are their own. Cheating, plagiarism, fabrication, and other forms of academic dishonesty are often defined as the submission of materials in assignments, exams, or other academic work that is based on sources that are prohibited by the faculty member or in ways that do not properly cite the source of a student's ideas and content. Further information on what constitutes academic dishonesty is detailed in UVU Policy 541: *Student Code of Conduct*Links to an external site.

Cheating is the act of using or attempting to use or providing others with unauthorized information, materials or study aids in academic work. Cheating includes, but is not limited to, passing examination answers to or taking examinations for someone else, or preparing or copying others' academic work.

Plagiarism is the act of presenting another person's ideas, research or writing as your own.

Fabrication is the use of invented information or the falsification of research or other findings.

If students are discovered to be cheating, the relevant grade will be a zero and you will be reported to the University's Judicial Affairs.

All course materials (e.g., outlines, handouts, syllabi, exams, quizzes, PowerPoint presentations, lectures, audio and video recordings, etc.) are proprietary. All planetarium videos are filmed using our Digistar system and are also proprietary. Students are prohibited from posting or selling any such course materials without the express written permission of the professor teaching this course.

University Resources are found in the syllabus in Canvas