Stars and the Universe – PHYS 1062.401 (Summer 2026)

Instructor Information

Dr. Rebekah Purvis, she/her Email: rebekah.purvis@unt.edu
Online Office Hours): By appointment only

My research background is in heliophysics, which is the study of the Sun and its effect on objects in the solar system. I am very excited to work with you this semester!

Teaching Assistant (TA): Tise Fagbeja – oluwatisefagbeja@my.unt.edu

Course Information

This introductory astronomy course offered by the UNT Physics Department emphasizes exploration of celestial motions, phases of moon, eclipses, the history of astronomy, gravity, electromagnetic radiation, telescopes, physical properties of the stars, galaxies, and the search for life in the universe.

The course is organized in the following units:

- Unit 1: Basic Astronomy and the Nighttime Sky — basics of motion & gravity; seasons; phases of the Moon & eclipses; the night sky & constellations; properties of light, spectroscopy; telescopes; laws of planetary motion; differences in everyday experiences, environmental conditions, and geological forms, if one were living on another planet (Mars).
- Unit 2: Stars — The Sun & properties of stars (how they work, mass, luminosity, temperature, color, etc.); stellar birth and death; white dwarfs, neutron stars, black holes; extrasolar planets and astrobiology.
- Unit 3: Galaxies and Cosmology — topics: Structure and composition of the Milky Way Galaxy, including star clusters, nebulae, and stellar remnants; different types and sizes of galaxies; galaxy evolution; dark matter & dark energy; the Big Bang & history of the Universe.

This course is a part of the Life and physical sciences core**.** Courses in this category focus on describing, explaining and predicting natural phenomena using the scientific method. Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences by fostering skills associated with the four core objectives:

- **Critical Thinking Skills**, including creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information
- **Communication Skills**, including effective development, interpretation and expression of ideas through written, oral and visual communication
- **Empirical and Quantitative Skills**, including the manipulation and analysis of numerical data or observable facts resulting in informed conclusions
- **Teamwork**, including the ability to consider different points of view and to work effectively with others to support a shared purpose or goal

Course Format

This section of The Solar System course covers the same topics as other sections of PHYS 1062, but the learning materials are an interactive video game, a robotic telescope platform, and a free online textbook. The lecture portion of this course is asynchronous and online with no in-person lecture component, but there are lecture deadlines over the semester. The lab portion of this course is also asynchronous and online using a robotic telescope service. The cost for the video game is $40, and the cost for the telescope platform is $25. The game must be downloaded onto a laptop or desktop machine, so you must have access to a computer that you have permission to download to.

I selected these non-traditional learning materials with three goals in mind: 1) to engage students in an investigation of astronomy in a more active way so that they will achieve a greater understanding; 2) to cultivate in students a heightened sense of excitement about recent developments in the field while teaching basic concepts; and 3) to convey the idea that astronomy has relevance to many people, through appreciation of beauty of astronomical objects.

Course Learning Objectives

- By the end of this course, students will be able to:
- describe the position of the Earth in the Universe, in orbit around the Sun which is one of many stars traveling around the center of the Milky Way galaxy that is one of billions and billions of galaxies in the Universe
- describe why the Sun shines and why stars come in different colors
- give a brief history of the solar system
- assess the connections between human life and the universe as a complex, orderly system
- apply basic scientific principles to explain everyday phenomena
- recognize science as a process through which we seek to understand the world around us
- apply the critical thinking, empirical and quantitative skills needed to solve scientific problems
- express their scientific ideas in clear, logical, organized, and concise ways
- evaluate scientific validity as life-long learners
- to understand and have an interest in newspaper and magazine articles on astronomy written for the public.

How to Succeed in this Course

To be successful in this course, you will need to be proficient in the following:

- Using Canvas
- Downloading and uploading files
- Sending and receiving emails
- Using *University of Mars* platform
- Using the robotic telescope platform

Announcements

Announcements will be posted on Canvas as needed. Make sure you read these announcements. These announcements may include changes in due dates, ways to resolve problems, or hints for success. If you email me and ask a question that has been answered in an Announcement, I will reply and direct you to

the Announcement. If you have a question about something from an Announcement, be sure to include the date or title of the Announcement in your question.

Office Hours

During my online office hours, I will be available to answer any questions via Teams. The link for this can be found under "Office Hours, Tutoring, and Other Student Support" on the course Canvas page. You can also reach out to your TA to request time to meet and discuss course content. When a student joins office hours, I am often able to help them solve their problem or clear up a misconception in just a few minutes. Students will often tell me that they spent a lot of time (sometimes hours) trying to figure it out on their own before joining office hours. There is no need to do that – let's work together!

Canvas Messages

You can reach out to me using the Canvas Inbox. I will generally respond to messages within 24 hours unless it is the weekend, in which case I will get back to you on Monday.

Tutoring

Astronomy tutors will also be available to assist you in the Hickory Hall Physics and Biology Tutoring Center (Room 266). The times they will be available will be posted during the first week of class under "Office Hours, Tutoring, and Other Student Support" on the course Canvas page.

Technical Support - UNT systems

The Information Technology Helpdesk will provide support with any issues you might have with Canvas and they may be able to help you troubleshoot other computer issues. 940-565-2324 or helpdesk@unt.edu

Technical Support - University of Mars

For help with the University of Mars system (setting up your account and running the program), you can join the Astro Venture team's Zoom room from 10 am to 10 pm (link in Canvas), or email them at: info@theastroventure.com

Technical Support - Robotic Telescope Platform

For help with the Slooh system, start here: https://support.slooh.com/technical-support

The University of North Texas makes reasonable accommodations for students with disabilities. To request accommodations, you must first register with the Office of Disability Access (ODA) by completing an application for services and providing documentation to verify your eligibility each semester. Once your eligibility is confirmed, you may request your letter of accommodation. ODA will then email your faculty a letter of reasonable accommodation, initiating a private discussion about your specific needs in the course.

You can request accommodations at any time, but it's important to provide ODA notice to your faculty as early as possible in the semester to avoid delays in implementation. Keep in mind that you must obtain a new letter of accommodation for each semester and meet with each faculty member before accommodations can be implemented in each class. You are strongly encouraged to meet with faculty regarding your accommodations during office hours or by appointment. Faculty have the authority to ask you to discuss your letter during their designated office hours to protect your privacy. For more

information and to access resources that can support your needs, refer to the Office of Disability Access website (https://studentaffairs.unt.edu/office-disability-access).

Supporting Your Success and Creating an Inclusive Learning Environment

Taking an online course is very different from taking an on-campus course. You, the student, are responsible for your own learning. We have provided tools that you can use to facilitate this learning, but it will require self-discipline and motivation as well as effective time management to get the most out of this course and earn a high grade.

Even though this is an online course, there will be opportunities to interact with your classmates. Please work with me to create a classroom culture of open communication, mutual respect, and belonging. If you ever have any concerns about how you or someone else in the class is being treated, please email me.

As the instructor in this course, I am responsible for

- providing course materials that will assist and enhance your achievement of the stated course goals,
- providing timely and helpful feedback within the stated guidelines, and
- assisting in maintaining a positive learning environment for everyone.

As a student in this course, you are responsible for

- reading and completing all requirements of the course in a timely manner,
- working to remain attentive and engaged in the course and interact with your fellow students, and
- assisting in maintaining a positive learning environment for everyone.

Required Materials

- This course has digital components. To fully participate in this class, students will need internet access to reference content on the Canvas Learning Management System, the University of Mars Video Game, and the robotic telescope platform.
- You must have access to a laptop or desktop to download the University of Mars game.
- There is no official textbook for the course, but you may find this Open Education Resource helpful as a secondary resource: https://openstax.org/details/books/astronomy-2e
- If circumstances change, you will be informed of other technical needs to access course content. Information on how to be successful in a digital learning environment can be found at Learn Anywhere (https://online.unt.edu/learn).

Course Schedule

You will begin the semester by downloading the “University of Mars Video Game” program from the AstroVenture website (links and README file with instructions in Canvas). You will begin your work by getting started with the game to learn the core astronomy concepts that will inform later lessons and reflections that will be due later in the semester. If you have an account from PHYS 1052, please email Dr. Purvis so we can get the accounts synced up.

There are individual deadlines for completing portions of the game. There will be periodic reminders through Canvas Announcements, and they appear in the Canvas Calendar. There is some flexibility with these deadlines.

There are three Reflection assignments. Each of these will ask you to take on the part of your main character from the game, and either write a short piece or record yourself reflecting on the material most recently covered. You will have a chance to share these with your classmates and participate in a ranking assignment for fun. The due dates for these are provided in Canvas. Do not use AI to help you compose your reflections. More about AI use in Canvas!

There are weekly "Astronomy in the News" activities. These utilize online NASA and American Astronomical Society articles to connect course content to real astronomy missions and discoveries.

There are no unit exams in this course. You demonstrate your learning in your game progression, Reflections, discussion boards, and Slooh Quests.

The lab portion of the course is completed using guided investigations using a robotic telescope service. The lab activities were selected to reinforce your learning of the basic concepts in astronomy and to learn the experience of being an astronomer. You will be able to request images from research-quality telescopes. You do not need to be logged into the system at your scheduled telescope time – the system will save images for you. Because these telescopes are subject to weather and other issues, please do not wait until the last minute to request images.

You will be notified by Eagle Alert if there is a campus closing that will impact a class (including online learning). The course calendar is subject to change, citing the Emergency Notifications and Procedures Policy (https://policy.unt.edu/policy/06-049).

Assessing Your Work

Your overall grade — out of 100% — will be calculated based on the following:

- 30% for the University of Mars video game. The sum of all 3 Units' parts — a little more than 2% each, for 9 parts. For each unit part (ex: Unit 1 Part 1), the final score is determined as 20% of your Initial Quiz Score + 80% of your Highest Quiz Score
- 9% total for three "Reflection" posts based on the game's lessons and story (audio/video or written; the posts themselves are worth 2.5% each, and two stages of peer rankings together worth 0.5%)
- 45% total for work on the Slooh platform (see Canvas for submission requirements)
- 16% for Astronomy in the News

Your final letter grade will follow this rule:
A ≥ 89.5 B ≥ 79.5 and < 89.5 C ≥ 69.5 and < 79.5 D ≥ 59.5 and < 69.5 F = below 59.5

Extra credit may be offered. If so, it will be posted in a module called "Extra Credit".

Late policy: Except in cases of documented emergency, authorized absence, etc., assignments are expected to be completed by their respective due dates. If you believe you have an excused absence,

reach out to the Dean of Students for assistance. See https://policy.unt.edu/policy/06-039 for more information.

Generative AI

Students in my physics and astronomy courses have shared that they like to use GenAI as a partner in learning. Students shared that they have conversations by asking questions ("Was there ever water on the surface of Mars?") or get help with math by giving it a specific question ("How do you find the acceleration of an object with a mass of 2 kg that experiences a net force of 10 Newtons?"). While I am mostly confident that GenAI will give you correct answers to these questions, I have seen examples where it gives super wrong answers. So, while I encourage you to use this tool to help you study, maintain a critical eye, ask it to give you sources, and reach out if the information you get seems to contradict something we learned in class or does not make sense.

You may not use Generative AI in this course to help you compose your Reflections or answers to questions in the game or quests. You may use a tool to check your original written work for grammar/clarity. It is my expectation that the content you submit in this course is your original work.

I will always disclose how I use GenAI, and I expect the same from you. In accordance with the UNT Honor Code, unauthorized use of GenAI tools is prohibited. Using GenAI content without proper credit or substituting your own work with GenAI undermines the learning process and violates academic integrity. If you're unsure whether something is allowed, please seek clarification.

Please refer to the Academic Integrity Policy (PDF) (https://policy.unt.edu/policy/06-049).

Attendance and Participation

Attendance in the course is measured by play through the University of Mars video game, completing "Parts" of the game's three "Units" by their respective due dates. The game Units are divided into parts, and there are deadlines for completing each part. You can see the complete schedule of due dates in Canvas, just below the "Welcome" message near the top of the Home/Modules page.

Please set aside ample time to play the game, so that you can proceed through it thoughtfully and not in a rush. As a rough estimate, anticipate each "Part" requiring one or two hours of work to go through, thoroughly; some Units or Parts may take less time, and others a little more.

The in-game lessons, questions, and mini-games are designed to help give you an introduction to each astronomy subject in a logical progression — more complex topics later, building on the earlier ones — and to give you some practice applying that knowledge. We strongly encourage you to re-play sections of the game for additional practice or study, and to improve your Game Progress score. A "Repeat a Lesson" menu option in the game gives you access to review any previously completed section, and an in-game robot character ("Copper") can give you practice quizzes.

You must also submit a response to each of the three "Reflection" assignments. Each of these begins with a different prompt related to the subjects covered around the same time. Take these as opportunities to:

- Synthesize what you have learned in the preceding game unit, in ways that make the material familiar enough that you could readily explain it to someone else;

- Consider the relevance of the subjects to your own life, or think of whether something you learned changed a previous misconception or otherwise left a lasting impression;
- Further exercise creativity, in that your reflection entries can take a few different forms depending on what appeals to you — perhaps writing, or audio/video recordings.

The other learning component of the course is the lab, completed using Slooh. You may work ahead on this component. To earn credit for work completed in Slooh, you must submit your work from Slooh in Canvas.

F-1 Visa regulations

Federal regulations state that students may apply only 3 fully-online semester credit hours (SCH) to the hours required for full-time status for F-1 Visa (DOC) holders. Full-time status for F-1 Visa students is 12 hours for undergraduates and 9 hours for graduate students.

UNT strives to offer a high-quality education in a supportive environment where you can learn, grow, and thrive. As a faculty member, I am committed to supporting you, and I want to remind you that UNT offers a range of mental health and wellness services to help maintain balance and well-being. Utilizing these resources is a proactive way to support your academic and personal success. To explore campus resources designed to support you, check out mental health services (https://clear.unt.edu/student-support-services-policies), visit unt.edu/success, and explore unt.edu/wellness. To get all your enrollment and student financial-related questions answered, go to scrappysays.unt.edu.