

INTRODUCTION TO ASTRONOMY

Tuesday & Thursday | Zoom | 12:30p-1:45p

Class Meeting Room: <https://utexas.zoom.us/j/93284602627>

Instructor

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Help Sessions:

M: 11a-12p, W 330p-430p

Teaching Assistants

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Help Session: Th 2-3p

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Help Sessions: M 4-5p, F 12-1p

What is intro to astronomy about?

This introductory course for non-science majors will survey all of astronomy, starting with the ancient Greeks and how their studies led to the correct model for the Solar System, moving on to studying other stars and planets. We will finish with learning about our own Milky Way galaxy, and peering back into the early phases of the Universe to see early galaxies and understand the Big Bang. By participating in this class, ***you will develop*** an appreciation for astronomy and the night sky around you. ***You will improve skills*** in critical thinking, communication and teamwork.

This course carries the ***Quantitative (QR) Reasoning flag***. QR courses are designed to equip you with skills that are necessary for understanding the types of quantitative arguments you will regularly encounter in your adult and professional life. You should therefore expect a substantial portion of your grade to come from your use of quantitative skills to analyze real-world problems.

Course Learning Objectives: You will...

Develop a broad understanding of the nature, scope and evolution of the Universe, and where the Earth and Solar System fit in.

Improve your critical thinking and quantitative reasoning skills, and their importance in the context of the scientific process

Learn that science is a process, the world is knowable, and we come to know it through observations, experiments and theory.

Get acquainted with the history of astronomy and the evolution of scientific ideas (science as a cultural process).

Gain a familiarity with the night sky and how its appearance changes with time and position on Earth.

Each class period will have learning objectives linked to one or more of these course goals

Required Materials:

Good news, there is only one thing you need to buy for this course! It is **Lecture-Tutorials for Introductory Astronomy, 3rd Edition**, by Prather, Slater, Adams & Brissenden. Do not rent or buy used. Available at Coop or online.

Your reference text for this class is available for free online, in web view and PDF format: **Astronomy from OpenStax**, ISBN 1938168283 **Link: www.openstax.org/details/astronomy** If you prefer a print version, you can purchase that from Open-Stax on amazon.com, but web view is recommended - the responsive design works seamlessly on any device. If you buy on Amazon, use the link on your book page on openstax.org so you get the official OpenStax print version.

A device for the InstaPoll *in-class response system* - we will be piloting a UT-developed **free** system through Canvas. Have ready a device which will allow you to respond to my questions.

Class recordings: These are reserved only for the use of members of this class (students, TAs, and the instructor) and only for educational purposes. Recordings should not be shared outside the class in any form.

Email Policy: I can be emailed any time for questions of a personal nature. For questions about class content or logistics, you **must** first post the question to the canvas discussion board. If no one answers after 6 hours, or five people chime in to say they have the same question, you may email me or a TA, including a link to the discussion post.

What is expected of me in this class?

- Attend class and participate! Work collaboratively and be prepared to share your ideas. If you're not comfortable working with others, this is not the 301 for you.
- Complete all assigned online modules on time. Make sure to take time to think deeply about the videos, and spend time with the book or come get help if you have questions!
- Don't procrastinate on the projects! Everything you need to know is in this syllabus, so get them done early!
- Take advantage of us! We are here to help you!

What happens in lecture?

- We will **meet synchronously** during our scheduled time via Zoom. You should treat this as you would any in-person class - put away distractions and be ready to engage. The good news is, there is not much lecturing! I have designed this class to be very interactive, focusing on your attainment of the course learning outcomes. You will be exposed to the content outside of class through Canvas homework modules, which replace the typical lecture component.
- In class is time to work! As a class we will review concepts you've learned prior to coming to class through Canvas homework modules, and you will work with your peers in Zoom breakout rooms to practice these concepts with engaging activities.
- You will only learn if you participate, thus attendance and participation are **required!** Students distracting or not participating will be asked to leave.
- A typical class day will be composed of the following:
 - Astronomy in the news – submit at the start of class.
 - Review of homework questions
 - Several think-pair-share and discussion questions.
 - Answering questions from you about the topics which may still be unclear.
 - Activities in groups, followed by whole class discussion.

How is my performance in this class assessed?

What is the grading scale?*

93.0 - 100	A
90.0 - 92.99	A-
87.0 - 89.99	B+
83.0 - 86.99	B
80.0 - 82.99	B-
77.0 - 79.99	C+
73.0 - 76.99	C
70.0 - 72.99	C-
67.0 - 69.99	D+
63.0 - 66.99	D
60.0 - 62.99	D-
< 59.9	F

*no rounding

Your final course grade will be determined as follows:

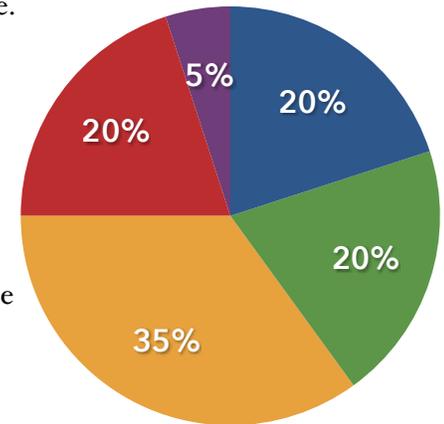
20% - In-class participation: You will receive credit for this component by answering in-class think-pair-share questions through InstaPoll on your device. As this component is giving you credit for participating in *all* in-class activities, it is not permissible to respond to instapoll when not logged in and engaged via Zoom. We will randomly check the zoom logs each class to ensure that you do not respond to Instapoll when you are not connected to zoom and participating in the class. This grade will be calculated as an average of the grade for each class, where each class grade is equal to the percentage of questions you submit an answer to. Although ***makeup participation points will not allowed***, I realize that you may need to occasionally miss class, or have a technical problem submitting a question. For this reason, Canvas will automatically drop your three lowest participation class grades.

20% - Online homework modules: Online modules will be assigned to be completed before most classes, and will be due before the start of that class. These include (up to four) short lecture videos, followed by a multiple choice quiz. The point values vary with the length of the module. Your two lowest homework grades will be dropped. Any missed homeworks beyond those two will count as a zero. There is no late work accepted.

35% - Quizzes: Rather than a few big exams, we will have eight roughly bi-weekly quizzes. These will be held during synchronous class-time, and administered via Canvas. **You must be logged into the course on Canvas to take the quiz.** These are still in development, but will likely contain 10-15 multiple choice questions, and five short answer questions. These quizzes are non-cumulative, and will cover the contents of 2-3 class periods, and will be done during the first 30 minutes of the next class period. ***There will be no makeup quizzes***, but your lowest score will be dropped. If you miss two quizzes, then one will count as a zero. You are not allowed to access any materials, other websites, notes, or other people during the exam. You will be asked to have your video on. Myself and the TA's will be on-hand during the exam time to answer questions over Zoom in real time.

5% - Astronomy in the News: You will submit two astronomy news items that you have read throughout the semester. You will do this by creating a Canvas discussion post, providing the link to the article, and 4-5 sentences of description. I'll pick a few per class, bring up the website, and if chosen you will unmute (and share your video if you're comfortable) and explain your article to everyone, and

- Participation
- Online Homework (2 drops)
- Quizzes
- Projects
- In-Class News Items



moderate a short discussion. You must submit at least one news item by Oct 13th. The second one of each must be completed by Dec 3rd. See Canvas for details on where to look, and how to turn one in.

20% - Projects: There are four projects, each worth 5% of your total grade. Details will be listed on Canvas, but a listing of the projects is provided here with a due date (any can be turned in early!):

- Project #1 (due Oct 1): Paper about a recent astronomy news item (not to be confused with the in-class news discussions, though you may use the same article for both).
- Project #2 (due Oct 15): Moon Journal — Observe the Moon over the course of one phase cycle, and keep track of the phases in a journal, which you will scan and submit on Canvas.
- Project #3 (due Nov 3): The Anti-Science Movement — You will investigate an anti-science movement (e.g., climate change deniers), explain the reasoning behind the believers, and show how the scientific method refutes their arguments.
- Project #4 (due Nov 24): Diversity and Inclusion in Astronomy — You will learn about multiple women astronomers and astronomers of Color, and submit a creative report on their accomplishments.

Optional Astronomy Project - You may choose to complete this optional fifth project to replace a non-zero exam grade (your lowest grade is always dropped, so this can replace your second-lowest non-zero grade). You will pick a specific astronomical object or topic and find a creative way to present about it. This could be making an electronic poster; an infographic; a video or podcast, or something else even more creative. This is a chance for you to be creative, and spend time researching and thinking about astronomy from a perspective that interests you. We want you to learn and enjoy the experience, mindful also that the optional project counts as much as one quiz, so the work you put into it will be reflected in the grade you get out of it. More details can be found on the Canvas assignment.

Class Etiquette

General: All classroom norms apply when in a Zoom session. If you wouldn't do something in a physical class, don't do it in a digital classroom. Please dress similar to how you would in a university classroom.

Questions During Class: I'm always happy to take questions during lecture; please use the 'raise hand' feature in Zoom so that I can see that you have a question. Since I will be actively leading the class, I may not see typed questions in the chat window, so it is best to raise your hand. Please refrain from using the chat for comments not related to the class.

Microphone: Please ensure that your microphone is working before class. You will be working with other students in breakout rooms during lecture periods and conversing with your classmates will be an important part of the experience. **Mute your audio whenever you are not speaking.**

Environment: I am committed to providing you with a friendly, productive, and effective learning. There are things that you can do to help with this:

Video: If you are comfortable with it, I encourage you to keep your video on to help us maintain a personal connection (this is especially true when in small breakout rooms). You may use video and Zoom backgrounds if your device allows, but they must be appropriate. If I ask you to change your background, you must do so immediately.

Breakout Rooms: Breakout Room discussions should be structured and on topic. Take turns sharing ideas without a single person dominating the discourse. The instructor, teaching assistant, and learning assistant will be dropping in at random to listen in, promote the discussion, and answer questions.

Expectations regarding mutual respect: Astronomy belongs to all people, independent of race, religion, gender, gender identity, gender expression, or sexual orientation. Incidents of discrimination, assault, harassment, threats, intimidation, profiling, or coercion based on membership or perceived membership will not be tolerated. Show each other respect no matter perceived knowledge or performance in this class, or any other.

What are other policies on exams, assignments, and other course structure?

Course Website:

Canvas page for this course:

<https://utexas.instructure.com/courses/1283912>

Course Webpage: The course webpage on the Canvas system will be updated with course announcements, homework and reading assignments, and deadlines. It is your responsibility to check these on a regular basis. Please come to class prepared, having done the assigned module. Also please be prepared to participate in in-class discussions and activities, this is for your benefit.

Late work: Late work is not accepted. Makeup (or early) quizzes or exams are not offered. *However*, I understand that life events happen, so if you are unable to turn an item in on time or attend a quiz or exam, contact me ***in advance of the due date***. Note that being busy with other classes will not be considered a valid excuse. If you miss class for a sponsored University event, and you contact me ***in advance of the due date***, we can discuss accommodations.

Where can I find.. ?

Canvas will have:

1. Important announcements
2. Lecture slides
3. Weekly assignments and modules
4. Syllabus
5. List of Learning Objectives
6. Gradebook

Canvas will be our main form of communication, so check it regularly and stay up to date on assignments and communications.

Course Conduct: Please maintain respect for your fellow students and instructors while in this class. Keep your zoom microphone muted unless you have been called on to speak. Do your best to put aside distractions such as your phone, other apps on your computer, other people, etc., during class time.

Be respectful of others, especially during in-class peer discussion times, and even if you disagree with them.

Extra credit: Other than the optional project (which can replace one non-zero exam grade), there are no opportunities for extra credit.

Students with Children: I recognize the difficulty of being a full time student with children. If you have children, or other family commitments, please come see me to discuss any modifications of the course policies which will maximize your success in this course.

Email: Email is recognized as an official mode of university correspondence; therefore you are responsible for reading your email for university and course-related information and announcements. Please check your email regularly and frequently.

Frequently Asked Questions:

What about technical difficulties?

If you have a technical problem that causes you to miss a class, this is one of the reasons you get three drop participation grades. If you have a recurring computer or internet problem, please email me to help find a solutions. If **my** internet goes out during class, don't leave! I will log back in via my phone and continue the class (I will also strive to upload in-class lecture PDFs before class so you can follow along).

Do you record the in-class lectures?

Yes! Although there is not much in-class lecturing, it may still be useful to review the video of our think-pair-share discussions, or the debrief after the lecture tutorials. You will find the Zoom tab along the left side navigation in Canvas. Zoom will automatically record the class and post it to the course Canvas site. If the video is not accessible, just send me a quick email. I will also post a PDF of the lecture slides.

How do I succeed in this class?

The best way to succeed is to prepare and participate. Do the modules ahead of time, and take the time to watch them in full (and multiple times if needed). When in class, buy in and **participate!** The green book is your textbook and you are the author. If you don't work hard on it, you won't have it to study from!

How do I study for the quizzes?

- 1) Study the lecture tutorials. Don't just read them, re-do them! Cover your old answers, then check your new answers against them. Work in a group if you can!
- 2) Go over the in-class PDFs, and practice the think-pair-share questions.
- 3) Re-watch the relevant module videos, find concepts which you feel less secure on, find those concepts in the book, and read up.
- 4) Come to help sessions!!!

I missed a quiz, when can I make it up?

There are no makeup quizzes. The only exception to this will be:

- 1) If you have a major life event, **and you notify me ahead of time**. Depending on the situation, I may ask you to contact Student Emergency Services for assistance.
- 2) I am contacted by Student Emergency Services, and they request a makeup.
- 3) You are absent for a university-sponsored event, **and** you notify me ahead of time.

I'm sick, and can't come to class today, what do I do?

You don't need to email me! Stay home and get better (you can miss 2-3 classes, and still receive a full participation grade). Still do the module before class (late submissions are not allowed), and after class, download the PDF to see what you missed. Do the missed lecture tutorials, in a group if you can find some classmates, or on your own. If you have to miss

multiple consecutive classes, please contact Student Emergency Services, and they will let me know if they feel you should be allowed to make up for missed participation.

I need to leave class early? How do I make sure I don't lose participation?

Participation is counted through InstaPoll. You will not receive credit for questions you miss.

I forgot to do my homework before class, can I turn it in this afternoon?

No, late homework is not accepted. You get to drop your two lowest homework grades, so make sure it doesn't happen again!

I forgot to turn in my project! Can I turn it in this afternoon?

No, late projects are not accepted. Don't let this be you, turn it in early!

Its two days before the moon journal is due, and I haven't started!

There's nothing I can do to help you. Don't let this be you - do this early in the semester!

I got a zero in the gradebook for something I did or turned in!

We can make mistakes when inputting 200 grades! If you believe there is a mistake in the gradebook, stay calm, just send myself or one of the TA's an email, and we'll investigate.

University Resources:

Student Support: COVID-19 Update: "Keep Learning" Resources: This course may be offered in a format to which you are unaccustomed. If you are looking for ideas and strategies to help you feel more comfortable participating in our class, please explore the resources available here: <https://onestop.utexas.edu/keep-learning/>

Academic accommodations (SSD): This class respects and welcomes students of all backgrounds, identities, and abilities. If there are circumstances that make our learning environment and activities difficult, or if you have medical information that you need to share with me, please let me know. I am committed to creating an effective learning environment for all students, but I can only do so if you discuss your needs with me as early as possible. I promise to maintain the confidentiality of these discussions. Any student with a documented disability who requires academic accommodations should contact Services for Students with Disabilities at 471-6259 (voice) or 512-410-6644 (Video Phone) as soon as possible to request an official letter outlining authorized accommodations. For more information, visit <http://ddce.utexas.edu/disability/about/>. *I am also happy to meet in person virtually over Zoom to discuss more.*

Counseling and Mental Health Center: Do your best to maintain a healthy lifestyle this semester by eating well, exercising, getting enough sleep and taking some time to relax. This will help you achieve your goals and cope with stress. All of us benefit from support during times of struggle. You are not alone. There are many helpful resources available on campus and an important part of the college experience is learning how to ask for help. Asking for support sooner rather than later is often helpful. If you or anyone you know experiences any academic stress, difficult life events, or feelings like anxiety or depression, we strongly encourage you to seek support. <http://www.cmhc.utexas.edu/individualcounseling.html>

The Sanger Learning Center: Did you know that more than one-third of UT undergraduate students use the Sanger Learning Center each year to improve their academic performance? All students are welcome to take advantage of Sanger Center's classes and workshops, private learning specialist appointments, peer academic coaching, and tutoring for more than 70 courses in 15 different subject areas (including Astronomy). For more information, please visit <http://www.utexas.edu/ugs/slc> or call 512-471-3614 (JES A332).

University and Course Policies:

Academic integrity: The core values of The University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the university is expected to uphold these values through integrity, honesty, trust, fairness, and respect toward peers and community. Students who violate University rules on scholastic dishonesty are subject to disciplinary penalties. Ethical conduct is expected at all times. For example, answering Voting Questions to receive credit when you are not in class is unethical. Incidences of academic dishonesty will be reported to Student Judicial Services. For more specific information go to: <http://deanofstudents.utexas.edu/conduct/academicintegrity.php>.

You are responsible for understanding UT's Academic Honesty and the University Honor Code which can be found at the following web address: <https://deanofstudents.utexas.edu/conduct/standardsconduct.php>

- **Sharing of Course Materials is Prohibited:** No materials used in this class, including, but not limited to, lecture hand-outs, videos, assessments (quizzes, exams, papers, projects, homework assignments), in-class materials, review sheets, and additional problem sets, may be shared online or with anyone outside of the class unless you have my explicit, written permission. Unauthorized sharing of materials promotes cheating. It is a violation of the University's Student Honor Code and an act of academic dishonesty. I am well aware of the sites used for sharing materials, and any materials found online that are associated with you, or any suspected unauthorized sharing of materials, will be reported to Student Conduct and Academic Integrity in the Office of the Dean of Students. These reports can result in sanctions, including failure in the course.
- **Class Video Recordings:** Class recordings are reserved only for the use of members of this class (students, TAs, and the instructor) and only for educational purposes and are protected under FERPA. Recordings should not be shared outside the class in any form. Violation of this restriction could lead to Student Misconduct proceedings.

Plagiarism: As a research university, the University of Texas at Austin takes plagiarism very seriously. Do not risk getting involved in a plagiarism infraction - the consequences simply aren't worth it. Always cite your sources, and when in doubt consult a professor or librarian. You may also read more about plagiarism at the Student Judicial Services website: <http://deanofstudents.utexas.edu/conduct/academicintegrity.php>

Personal or Family Emergencies: If you experience a personal or family emergency (death in the family, protracted sickness, serious mental health issues) that prevents you from attending an exam or forces you to miss multiple days of class, you should contact Student Emergency Services in the Office of the Dean of Students <http://deanofstudents.utexas.edu/emergency/>. They will work with you to communicate with your professors and let them know of your situation.

Religious Days: A student who is absent from a class or examination for the observance of a religious holy day will be permitted to make up the missed work, if notice is given at least fourteen days prior to such an absence.

Core curriculum: This course may be used to fulfill three hours of the natural science and technology component of the university core curriculum and your successful participation addresses the following four core objectives established by the Texas Higher Education Coordinating Board: communication skills, critical thinking skills, teamwork, and empirical and quantitative skills.

Class #	Dates	Topics	Online Modules and Assignments Due	Pre-Class Reading	In-Class Lecture Tutorials
1	Aug 27 (Th)	Introduction to Class	---	---	---
2	Sept 1 (T)	Tour of the Universe	Module #1	Chapter 1 (1.1-1.9)	Motion of the Sky
3	Sept 3 (Th)	The Celestial Sphere	Module #2	2.1, 4.1	Position, Motion
4	Sept 8 (T)	Motions	Module #3	2.1, 4.1	Path of the Sun
5	Sept 10 (Th)	Quiz 1 & Seasons	Module #4	4.2	Seasons
6	Sept 15 (T)	Phases of the Moon	Module #5	4.5	Cause of Moon Phases, Predicting Moon Phases
7	Sept 17 (Th)	Ancient Observables	Module #6	4.7	Observing Retrograde Motion, The Parsec
8	Sept 22 (T)	Quiz 2 ; Copernicus and Kepler	Module #7	2.2, 2.4, 3.1	Kepler's 2nd Law
9	Sept 24 (Th)	Kepler & Galileo	Module #8	---	Kepler's 3rd Law
10	Sept 29 (T)	Newton & Nature of Light	Module #9	2.3, 8.3, 8.4	Newton's Laws, EM Spectrum
11	Oct 1 (Th)	Quiz 3 : Thermal Radiation	Module #10 Project #1	3.2, 3.3	Blackbody Radiation, Analyzing Spectra
12	Oct 6 (T)	Atoms/Spectra; Process of Science	Module #11	5.1, 5.2	Greenhouse Effect
13	Oct 8 (Th)	Quiz 4 : Climate Change	Module #12	5.3, 5.4, 5.5	---
14	Oct 13 (T)	Climate Change	Module #13 1st news item	7.1, 7.2	---
15	Oct 15 (Th)	Quiz 5 & Telescopes	Project #2	---	Telescopes
16	Oct 20 (T)	Solar System	Module #14	Chapter 6	Sun Size
17	Oct 22 (Th)	Stars	Module #15	16.1-16.3, 15.1-15.3	Apparent and Absolute Magnitudes
18	Oct 27 (T)	Stars & Evolution of Stars	Module #16	17.1	The HR Diagram
19	Oct 29 (Th)	Quiz 6 & Exoplanets #1	Module #15	17.2, 17.3, 18.4	Star Formation and Lifetime, Stellar Evolution
—	Nov 3 (T)	ELECTION DAY <i>No Class - Go vote!!!</i>	Project #3		
20	Nov 5 (Th)	Exoplanets #1	Module #16	22.1, 22.4-.5, 23.1-.2	Doppler Shift, Motion of Extrasolar Planets
21	Nov 10 (T)	Exoplanets #2	Module #17	5.6, 21.3-21.5	Detecting Exoplanets with the Transit Method
22	Nov 12 (Th)	Milky Way & Galaxies	Module #18	25.1,25.2,25.4, 25.6	Milky Way Scales, Galaxy Classification
23	Nov 17 (T)	Quiz 7 & The Expanding Universe	Module #19	26.1-26.3	Looking at Distant Objects, Hubble's Law
24	Nov 19 (Th)	Galaxy Evolution	Module #20	Chapter 28	Expansion, Lookback Time and Distance
25	Nov 24 (T)	Mysteries of the Universe..	Project #4	---	---
26	Dec 1 (T)	Beginning/End Universe	Module #21	Chapter 29	Making Sense of the Universe and Expansion, The Big Bang
—	Dec 3 (Th)	End of Universe & Quiz 8	2nd news item	---	