

INTRODUCTION TO ASTRONOMY

Meeting Times: MWF 10am - 10:50am | Room: PAI 3.02 | Unique Number: 46550

How can I contact my professor or TAs?

Professor:

Dr. Keely Finkelstein
Dept. of Astronomy
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Email:
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Instructor Weekly Help

Sessions: Mondays 2:30 -
3:30pm, Thursdays 11:30 -
12:30pm or by appt. in Dr.
Finkelstein's office, PMA
(RLM) 16.228

TA: Sudesh Agrawal
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Email: sudesh@utexas.edu
Help Session Hours: TBD

TA: Jamie Barber
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Email:
jamie.barber@utexas.edu
Help Session Hours:
Tuesdays 4-5pm

What is this course about?

This course is an introductory survey course into general Astronomy. Topics will cover everything from stars, planets, and galaxies. We will focus on conceptual understanding, rather than memorization of facts, although you do need to remember some fundamental ones. You will learn how science works, and develop critical thinking skills while you gain insight into how the Universe works. These skills should help you understand news about incredible scientific discoveries, whether they are true, or just a hoax.

Astronomy is an observational science. This class will discuss how observations are made, discussion of “natural phenomena” and some of the needed ideas from physics to help us understand these observations. We will also introduce many of the areas of physics necessary to appreciate the origin and evolution of stars, planets, and galaxies.

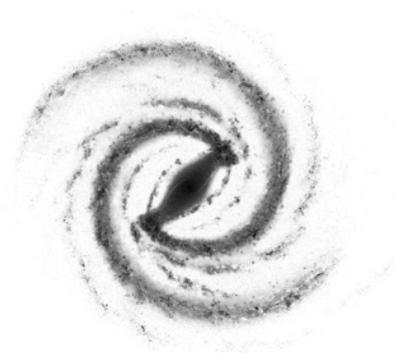


Image credit: <http://www.enderra.com>

What are the Required Materials?

Textbooks: We will use two textbooks for AST 301: "Lecture Tutorials for Introductory Astronomy", Prather et al. 3rd Edition (this can be purchased at the Co-Op or online).

And good news: the second textbook, "Astronomy" from OpenStax, for this course is available for free online, in web view and PDF format!

www.openstax.org/details/astronomy

It will also be available in PDF format on Canvas. You can also purchase a print version, if you prefer, via OpenStax on Amazon.com.

You can use whichever formats you want. Web view is recommended -- the responsive design works seamlessly on any device. If you buy on Amazon, make sure you use the link on your book page on openstax.org so you get the official OpenStax print version.

Other Required / Recommended materials:

In-class response system - we will be using a system through Canvas, called **InstaPoll**. Be prepared to bring a device to class each day which will allow you to respond to instructor questions and get immediate feedback.

Course Learning Objectives:

Core course themes and learning objectives are centered around the following, and *by the end of the semester students will be able to:*

Theme: Cosmic perspective, specifically:

- Demonstrate an understanding of the nature, scope, and evolution of the Universe, and where the Earth and Solar System fit in.
- Demonstrate an understanding of related subjects / content (e.g., gravity, light, spectra) and use "tools" from related subjects such as mathematics and physics.
- Use critical thinking and quantitative reasoning skills, and gain an understanding of the importance of them in the broader context of the scientific process and scientific theory.

Theme: Motions of the Sky, specifically:

- Apply Kepler's laws in our Solar System and other planetary systems.
- Discuss objects in the night sky and explain how its appearance changes with time and position on Earth.
- Explain the origin of seasons on Earth.
- Examine phases of the moon.

Theme: An understanding of Stars and Stellar Evolution, specifically:

- Use a Hertzsprung-Russell diagram to describe a given stellar population.
- Explain the origin of elements heavier than helium.
- Describe the death of stars for a range of masses.

Theme: Cosmology: From the Big Bang to the Present Day, specifically:

- Discuss evidence for the Big Bang.
- Describe dark matter and dark energy and articulate the differences between the two.
- Identify different types of galaxies, and discuss how galaxies form and evolve.

Theme: Possibilities and implications of life in the Universe, specifically:

- List necessary ingredients for life.
- Determine if a planet is in the habitable zone.

Course Website:

Canvas page for this course:

[https://
utexas.instructure.com/
courses/1239367](https://utexas.instructure.com/courses/1239367)

Where can I find... ?

Canvas will have the following:

1. Lecture slides
2. Weekly reading assignments / modules
3. Weekly quizzes
4. List of Learning Objectives
5. HW assignments
6. Gradebook
7. Important Announcements
8. Access to the ebook (main course textbook)



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

What is expected of me in this class?

- Complete the weekly online reading assignments and quizzes.
- Attend class and participate! Work collaboratively in groups in class on the assigned lecture tutorials.
- Look over the Learning Objectives for each class
- Practice and complete the assigned Homework Problems. You will have access to the answers and explanations in Canvas
- Review the material covered in Lecture (see Lecture slides) and in the Lecture Tutorials.

What happens in Lecture?

- You will prepare for every class by doing the assigned reading and practice quiz problems, as needed.
- Every class meeting has specific Learning Objectives associated with it. We will focus on these Learning Objectives during Lecture Class time.
- During class, I will talk about key aspects of the Learning Objectives, and you will solve problems and answer questions using Canvas.
- You will have the opportunity to ask your peers, your TA, and me questions about the material.
- Note that while web-enabled devices are required for the course (to use Canvas InstaPoll response system), I expect you to stay focused on the class content. If you use the device for unapproved activity (texting, surfing, shopping!) will receive a warning. A second violation will result in the loss of remaining Voting points for the semester since you will no longer be allowed to use your device to class.
- Lectures will be captured using the [Lecture Online System](#). You'll be able to review / re-watch the slides and lectures afterwards on Canvas. Links for the recordings will appear in the Lectures Online tab on the Canvas page for this class.

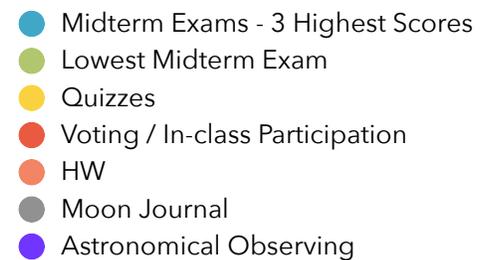
What is the grading scale?

93 - 100	A
90 - 92.9	A-
87 - 89.9	B+
83 - 86.9	B
80 - 82.9	B-
77 - 79.9	C+
73 - 76.9	C
70 - 72.9	C-
67 - 69.9	D+
63 - 66.9	D
60 - 62.9	D-
< 59.9	F

How is my performance in this class assessed?

There will be 4 exams in the course: The exams will consist of short answer problems and multiple choice questions, and will be given during class time (see schedule). The highest three midterm exam scores will be 40% of your final course grade. The lowest midterm exam score will only be 5% of your final course grade. We will also have weekly quizzes, in-class Lecture Tutorials, periodic HW assignments, and Canvas Voting questions to provide feedback on your progress between exams.

There are two other required assignments that will be due towards the end of the semester but can be turned in at any point in the semester: a Moon Journal and Observing Report.



Your final course grade will be determined as follows:

45% - Combined score of three highest midterm grades

5% - Lowest midterm exam grade

15% - Weekly Canvas Module Quizzes (drop 1 of -14)

10% - Canvas Voting / in class participation

10% - HW Assignments (drop 1 of -4)

7% - Moon Journal

8% - Astronomical Observing Report

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

- **Midterm Exams:** According to UT policy, make-up exams may be given only if there is proper documentation of a UT-sanctioned reason (serious illness, death in the family, but not planned vacations, weddings, over-slept, etc). Please email Prof. Finkelstein to discuss.

- **Weekly Quizzes:** You are allowed to miss one quiz assignment without penalty. Late assignments will not be accepted. Your lowest quiz score will automatically be dropped. Quizzes will be part of the weekly assigned module on Canvas.
- **Lecture class participation:** We will be using the Canvas InstaPoll tool for in-class polling and participation. You are allowed to miss up to 15% of these points without penalty. For example if you earn 85% or more of the Canvas InstaPoll Voting points throughout the semester you will get 100% for this portion of your course grade. If you earn 80-84% you'll receive a 90% for this portion of the course grade; if you earn 70-79% of the Voting points you will receive 80% for participation, etc. Some fraction of the questions you will receive credit for just by answering, other questions you will only receive the points if you get the correct answer, but by being in class and discussions with peers you will have the opportunity to answer those questions correctly. There are no opportunities for make-ups.
- **Assigned HW:** You are allowed to miss one HW assignment without penalty. Late assignments will not be accepted. Your lowest HW grade will automatically be dropped. You are encouraged to discuss the homework, however each student must do their own work: write it up in your own words, and turn in your own work.
- **Other required assignments:** Moon Journal and Astronomical Observing Report - both of these assignments are required and may not be dropped. Both assignments are due at the end of the semester no later than December 3rd, but can be turned in at any point. Late assignments will not be accepted.
 - **Moon Journal - Assignment details:** Go outside find and sketch the Moon for at least 10 clear nights over the space of one month. Draw the phase as accurately as you can and include any nearby stars. Do not forget to label the phase (waxing/ waning, new/quarter/full) for each drawing. Make sure you give the time of the observation, as well as the location of the moon in the coordinate system of your choice (i.e., high in the southern sky, low in the SW, etc.). Create a booklet of your drawings turn it in to complete your assignment.
 - **Astronomical Observing:** To do this, you will need to visit the telescope on the roof of Painter Hall during one of the Friday and Saturday night public viewing events, or the roof of PMA (RLM) during one of the Wednesday night events. Information on these events can be found here: <http://outreach.as.utexas.edu/public/viewing.html> You will then hand in a double spaced, two page summary of what you observed, including details of time of observation, where the object was in the sky, and how you found the object. You will also research the object you observed, and include a discussion in your write-up. You must attach a sketch of the object and night sky around this object. You must also include proof of attendance, which can be obtained by the telescope operator. Full details to include in this report are listed in the Canvas Assignment Details for this project. I suggest that you start early, as these events are not held during cloudy nights, and this assignment *will not be excused*.
- **Course Conduct:** Please silence cell phones before you enter the classroom, no texting or using your cell phone during class except for use in classroom voting / response system. No cell phones may be present during any exam. Also, please do not pack up or leave class early unless you have talked to me



in advance, as a consideration to me and your fellow students. If you bring a laptop computer, don't surf. If I see inappropriate laptop or cell phone behavior, I will have to amend these rules. Be respectful of others especially during in-class peer discussion times, even if you disagree with them.

University Policy:

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>.

- **Online Sharing of course materials:** You cannot share any assignment, handout, or document related to this class. Sharing any class materials online in any form, including lecture slides, homework and assignments you submitted, without my express approval is considered academic dishonesty. If something is found online which you have posted, you will be reported for academic dishonesty to SJS.

Academic accommodations (SSD): The University of Texas at Austin provides upon request appropriate adjustments for qualified students with disabilities. We are committed to making an inclusive, accessible and welcoming classroom environment for all students. For more information, contact Services for Students with Disabilities at: 512-471-6259 (voice), 512-410-6644 (video phone), ssd@austin.utexas.edu (email) or online at: <http://diversity.utexas.edu/disability/>

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.

Schedule of Topics / Due Dates (subject to some changes):

Dates	Topics	Reading & HW Assign.
Week 1 - Jan. 23/25	Intro/Overview, course goals, overview of the universe	Module 1 due Mon. Jan. 28th
Week 2 - Jan. 28/30 / Feb. 1	Motion of the Sky / Path of the Sun	Module 2 due Friday Feb. 1st
Week 3 - Feb. 4/6/8	Seasons / Phases of the Moon	Module 3 due Friday Feb. 8th
Week 4 - Feb. 11/13/15	Eclipses & Tides / Ancient Models / Review for Exam 1	HW 1 due Monday Feb. 11th.
Week 5 - Feb. 18/20/22	Exam 1 (Feb. 18th) / Kepler & Galileo / Newton	
Week 6 - Feb. 25/27 / March 1	Gravity & Newton cont. / Telescopes / Nature of Light	
Week 7 - March 4/6/8	Light Cont. / Atoms & Spectra / Solar System	HW 2 due Monday March 4th
Week 8 - March 11/13/15	The Solar System cont. / Exam 2 Review / Exam 2 (March 15th)	
Week 9 - March 18-22 Spring Break	Spring Break - No Classes	
Week 10 - March 25/27/29	Earth / Sun / Intro to Stars	
Week 11 - April 1/3/5	The HR Diagram / Lives and Deaths of Stars	HW 3 due April 1
Week 12 - April 8/10/12	Review for Exam 3 / Exam 3 (April 10th) / Exoplanets	
Week 13 - April 15/17/19	More Exoplanets / Are we alone? / Intro to The Milky Way	HW 4 due Friday April 19
Week 14 - April 22/24/26	Intro to Galaxies / Distant Galaxies / The Expanding Universe	
Week 15 - April 29/ May 1/3	Mysteries of the Universe / The Big Bang	Moon Journal due Wed. May 1
Week 16 - May 6/8/10	The Big Bang cont. / Review for Exam 4 / Exam 4 (May 10th)	Observing Report due May 6th