

THE BIRTH OF STARS AND PLANETS

Meeting Times: MWF 10am - 10:50am | Room: PAI 3.02 | Unique Number: 46000

How can I contact my professor or TAs ?

Professor:

Dr. Keely Finkelstein
Dept. of Astronomy
Office: PMA (RLM) 16.206

Email:

keelyf@astro.as.utexas.edu

Instructor Weekly Help

Sessions: Wednesdays
1:30 - 2:30pm, Thursdays
11:30 - 12:30pm or by
appt. in Dr. Finkelstein's
office, PMA (RLM) 16.206

TA: Jessica Luna

Office: PMA (RLM) 16.307

Help Session Hours:

Mondays & Fridays

11am-12pm

TA: Chandra Shekhar

Office: PMA (RLM) 17.312

Help Session Hours:

Mondays 1-2pm

What is this course about?

This course will present a study of how stars & planets form. Stars form out of giant clouds of gas and dust, locked in a battle between gravity and pressure. Gravity eventually wins and stars and planets form in the resulting disk of material. We will study this process including results from state of the art extrasolar planet searches, discussing implications on the formation of our own solar system.

AST 309C is a one semester class on the specific topic of star and planet formation. AST 301, 302, or 303 is a prerequisite for this course. Along with AST 301 this course meets the Natural Sciences Part I Core Requirement.

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:*

- Understand and describe science as a process.
- Use of 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.
- Gain a broad understanding of the nature, scope, and evolution of the Universe, and where the Earth and Solar System fit in.
- Describe how physical systems change and evolve with time.
- Use models and observations to explain processes related to star formation, planet formation, and solar systems.
- Evaluate and Interpret key scientific points from public scientific sources, such as popular press articles.

What are the Required Materials?

Textbooks:

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

www.openstax.org/details/astronomy

You can also purchase a print version, if you prefer, via OpenStax on amazon.com, or Download a free copy through Kindle, iBooks, or the App.

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 assigned readings will always be made available through Canvas in the weekly modules.

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.

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 In-class Lecture Tutorials.

What happens in Lecture?

- You will prepare for every class by doing the assigned reading and Canvas Module quiz problems, as needed.
- Every class meeting has specific Learning Objectives associated with it. We will focus on these Learning Goals 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 TAs, 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 Canvas.

Course Website:

Canvas page for this course:

[https://
utexas.instructure.com/
courses/1256567](https://utexas.instructure.com/courses/1256567)

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.

How is my performance in this class assessed?

There will be 3 midterm exams, your lowest midterm will be dropped and your Midterm Exams course grade will be based on your two highest Midterm Exams. There will be a comprehensive Final Exam in the course which cannot be dropped. The midterm exams will consist of short answer problems and multiple choice questions, and will be given during class time (see schedule). The highest two midterm exam scores will be 30% of your final course grade. The Final Exam score will be 15% 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: an article Write-up and Observing Report.

Your final course grade will be determined as follows:

- Midterm Exams - 2 Highest Scores
- Final Exam
- Module Quizzes
- Voting / In-class Participation
- HW
- Article Write-ups

30% - Three Midterm Exams (lowest is dropped)

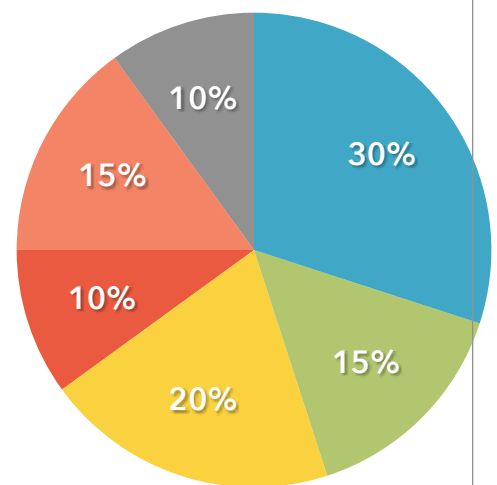
15% - Final Exam

20% - Weekly Canvas Module Quizzes (drop 1)

10% - Canvas Voting / in class participation

15% - HW Assignments (drop 1 of ~4)

10% - Article Write-ups (2)



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

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 will receive credit for this component by answering in-class think-pair-share questions through InstaPoll on your device. This grade will be calculated as an average of the grade for each class day, where each class' grade is equal to the percentage of questions you submit an answer to. 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. 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 3 lowest participation class grades. *As a reminder: Responding to the InstaPoll questions from outside the classroom is a form of academic fraud.*

- **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. In addition, make sure to always cite your work. If you get information, and even if you paraphrase in your own words you must cite your references and information.
- **Other required assignments: Article Write-up Assignments (1 & 2)** - both of these assignments are required and may not be dropped. Both assignments contain an in-class part, details are given in Canvas. Late assignments will not be accepted. This makes up 10% of your course grade.
 - **Article Writeup 1 - Assignment Details:** This assignment will first include an in-class demo, discussion, and some group work which will take place on Friday Sept. 27th. The remaining part of the assignment will be done independently and will include reading an assigned article and answering the reading guide questions. The final write-up, including responses to both the in-class part and reading guide part is due on Monday Sept. 30th.
 - **Article Writeup 2 — Assignment details:** You will find and select an article from the website: AstroBites based on a given topic list. You will answer some guided questions based on your own



research, and interpretation of your selected article(s), and then discuss and share it out to classmates in class on the due date (November 20th).

- **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:

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.

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. 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), ssd@austin.utexas.edu (email) or online at: <http://diversity.utexas.edu/disability/> If you have accommodations please see me as soon as possible to discuss and make arrangements.

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.

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.

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.

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

Dates	Topics	Reading & HW Assign.
Week 1 - Aug. 28 / 30	Intro/Review / Review Electromagnetic Spectrum and Planck Radiation	Module 1 due Friday 8/30
Week 2 - Sept. 4/6	Review HR Diagrams & Star Clusters	Module 2 due Friday 9/6
Week 3 - Sept. 9/11/13	Intro to ISM / Giant Molecular Clouds - How to Observe Them / (In)Stability of GMCs & Virial Theorem	HW 1 due Wed. 9/11 Module 3 due Friday 9/13
Week 4 - Sept. 16/18/20	Stages of Star Formation / Protostars / Review for Exam 1	Module 4 due Friday 9/20
Week 5 - Sept. 23/25/27	Exam 1 (Sept. 23rd) / Binary Stars / Runaway Stars	<i>In-class part of Article Write-up 1 on Friday 9/27</i>
Week 6 - Sept. 30 / Oct. 2/4	Initial Mass Function / Outflows & Jets in Protostars / Disks	Completed Article write-up 1 due Monday 9/30
Week 7 - Oct. 7/9/11	Hayashi tracks / HII regions & Massive Stars / Low-mass stars	HW 2 due Monday 10/7
Week 8 - Oct. 14/16/18	Young Sun Environment / Exam 2 Review / Exam 2 (Oct. 18th)	
Week 9 - Oct. 21/23/25	Intro to Solar System Formation / Properties of young Solar Systems / Giant Planet Formation	HW 3 due Wed. 10/23
Week 10 - Oct. 28/30 / Nov. 1	Terrestrial Planets / Our Solar System: Moons, Rings, Comets, Asteroids	

Dates	Topics	Reading & HW Assign.
Week 11 - Nov. 4/6/8	What Defines a Planet? / Search for other worlds / Detection Methods	
Week 12 - Nov. 11/13/15	Detection Methods Cont. / Review for Exam 3 / Exam 3 (Nov. 15th)	HW 4 due Monday 11/11
Week 13 - Nov. 18/20/22	Earth-like Worlds / Star Formation in Galaxies	Article write-up 2 due in class 11/20
Week 14 - Nov. 25	First Stars and Galaxies	
Week 15 - Dec. 2/4/6	Life in the Universe / Are we alone?	
Week 16 - Dec. 9/11/13	Review for Final Exam (last class day) / Reading Day (no class) / Final Exam - Friday 12/13 - 9am	Final Exam Friday 12/13 @ 9am