

## **AST 309 - The Birth of Stars and Planets Course Description and Syllabus - Spring 2015**

**Instructor:** Dr. Keely Finkelstein  
Dept. of Astronomy  
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Unique Number: 47355  
Lecture Time: MWF 2 - 2:50 PM  
Lecture Location: WEL 3.502

Office Hours: Monday 11am - 12pm, Thursday 10 - 11am, or by appt.

Textbook: None required. Required reading will come from online reading assignments. Recommended - general introductory astronomy textbook.  
Other Required Materials: Calculator

Course Website: **Canvas website** for this course  
<https://utexas.instructure.com/courses/1127080>

**Course TA:** Guneet Kaur  
Email: [gkaur@utexas.edu](mailto:gkaur@utexas.edu) ; Office hours to be held in PMA  
Library located in RLM.  
Office Hours: Monday 1 - 2pm; Wednesday 3 - 4pm

### **Course Description:**

AST 309 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. This course will present a study of how stars and 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. This course will study this process including results from state of the art extrasolar planet searches, discussing implications on the formation of our own solar system. We will use high school algebra in this class.

### **Course Requirements:**

**In-Class Participation** - this class will be structured with a combination of shorter lectures as well as interactive lessons and activities. These in-class participation activities are an important of the course, therefore attendance and participation is required, and they will count as a part of your grade. The interactive material and discussions will help to reinforce the concepts in the class, as well as assisting you in completing your homework assignments and preparing you for the exams. In-class participation, including Interactive Activities, and Lecture Tutorials, will make up 20% of your course grade.

Some of the in-class materials will be collected to establish your participation grade. These assignments or questionnaires will not be given letter grades or a numeric grade, rather you will be given credit for what you complete on an all or nothing basis and your in-class participation grade will be established on the following grading scheme:

- 80% or more of participations points - A (100%)
- 70% - 79% of participation points - B (85%)
- 60% - 69% of participation points - C (75%)
- 50% - 59% of participation points - D (65%)
- 30% - 49% of participation points - F (58%)
- 29% or less of participation points - actual participation %

**Homework** - There will be a few short (~ 5) HW assignments that will be assigned throughout the semester. You are encouraged to discuss the homework and work on it together, however each student must write up and turn in their own work. **Late homework will lose one letter grade (10%) each day it is late, it can be turned in up to 5 days late for up to 50% credit.** Homework will make up 15% of your course grade, the lowest homework assignment will be dropped.

**Reading assignments** - There will be a number of assigned online reading assignments, typically one module per week, that **will be required**. These assignments will often consist of news articles, press releases, or other online sources. These required online reading assignments will be followed by an online quiz to be taken through Canvas. These assignments will be due before the start of class. The online reading assignment quizzes will make up 20% of your course grade.

**Exams** - There will be 4 in-class midterm exams. These exams will emphasize the material discussed in lecture, and on the HWs, and in-class discussions or lecture tutorials, as well material covered in the assigned online readings. All exams will be closed-book, closed-notes. You will be allowed to drop the lowest of your four mid-term exams. The mid-term exams will make up 45% of your course grade. There will be no make up exams.

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

**Grades** - Grades will be based on:

- 1.) Four exams (drop lowest) 45%
- 2.) Homework 15%
- 3.) In-class participation 20%
- 4.) Online reading quizzes 20%

**Collaboration** - The interactive component of this class is designed around student collaboration, with activities such as Voting/Peer Discussions, In-Class activities, and Lecture Tutorials. For some of the group in-class assignments your group will turn in one collective assignment and each member of the group will receive the same amount of participation credit. You are also encouraged to study and work on HW assignments with other students and to get help during office hours. *However, your work must be*

*your own*. If you copy someone else's homework or let someone copy yours, both students will receive zero credit. Cases of cheating and plagiarism may also be reported to the Office of the Dean of Students.

**Course Outline & Reading Assignments (subject to change):**

Dates	Topics	Reading & HW Assign.
Week 1 - Jan. 21/23	Intro/Review / Review Star Clusters HR Diagrams	Module 1 due Friday 1/23
Week 2 - Jan. 26/28/30	Review Black Body Radiation / Intro to ISM / Giant Molecular Clouds, Dust & Chemistry	Module 2 due Friday 1/30
Week 3 - Feb. 2/4/6	(In)Stability of GMCs & Virial Theorem / Stages of Star Formation / Protostars	<b>HW 1 due Monday 2/2</b>
Week 4 - Feb. 9/11/13	Initial Mass Function / Review for Exam 1 / <b>Exam 1 (Feb 13th)</b>	
Week 5 - Feb. 16/18/20	Binary Stars / Outflows & Jets in Protostars	<b>HW 2 due Friday 2/20</b>
Week 6 - Feb. 23/25/27	YSOs / Disks / Hayashi tracks	
Week 7 - March 2/4/6	Clusters / Star Forming regions / HII regions (Blister HII regions)	
Week 8 - March 9/11/13	Massive Stars / Low-Mass Stars / Review for Exam 2 / <b>Exam 2 (March 13)</b>	<b>HW 3 due Monday 3/9</b>
Week 9 - March 16-20	Spring Break - no classes	
Week 10 - March 23/25/27	Triggered SF / Intro to Planet Formation	
Week 11 - March 30 / April 1/3	Planetesimals / Gas Accretion / Giant Planet Formation Terrestrial Planets	<b>HW 4 due Monday 3/30</b>
Week 12 - April 6/8/10	Our Solar System / Roadblocks to Planet Formation / Search for other worlds	
Week 13 - April 13/15/17	Review for Exam 3 / <b>Exam 3 (April 15)</b> / Detection Methods for Exoplanets	

Dates	Topics	Reading & HW Assign.
Week 14 - April 20/22/24	Exoplanet Detections / Comparing Our Solar System to Others / Intro to Galaxies	<b>HW 5 due Wed. 4/22</b>
Week 15 - April 27/29 / May 1	Forming the first stars and galaxies / Star Formation in the Milky Way / Star Formation in Galaxies	
Week 16 - May 4/6/8	Are we alone? / Review for Exam 4 / <b>Exam 4 (May 8)</b>	

### Course Conduct:

Please silence cell phones before you enter the classroom, no texting or using your cell phone during class. 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 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.

The Canvas course webpage will be updated with course announcements, reading assignments, and deadlines. **It is your responsibility to check these on a regular basis.** Please come to class prepared, having read the required reading assignments, also please be prepared to participate in in-class discussions and activities, this is for your benefit.

### Academic Dishonesty:

#### University of Texas Honor Code:

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, including the possibility of failure in the course and/or dismissal from the University. Standards for Academic Integrity are posted at [http://deanofstudents.utexas.edu/sjs/acint\\_student.php](http://deanofstudents.utexas.edu/sjs/acint_student.php)

### 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/sjs/academicintegrity.html>

### Documented Disability Statement

Please notify me of any modification/adaptation you may require to accommodate a

disability-related need. The University of Texas at Austin provides upon request appropriate academic accommodations for qualified students with disabilities. For more information, contact Services for Students with Disabilities at 471-6259 (voice) or 232-2937 (video phone) or <http://www.utexas.edu/diversity/ddce/ssd>

**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.

**Additional Information - Attend an Astronomy Department Viewing Night**

The department offers weekly public viewing nights at on the roof of RLM (Wednesday nights) and at Painter Hall (Friday & Saturday nights). Observing nights dependent on weather, so check the website for viewing times and for updated info on any weather cancellations. <http://outreach.as.utexas.edu/public/viewing.html>