

Fall 2017 – AST 301: Introduction to Astronomy
Unique No. 47555 – TTh 9:30 – 10:45 @ PAI 3.02
Unique No. 47565 – TTh 11:00 – 12:15 @ PAI 3.02

Instructor:

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Teaching Assistants:

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Help Sessions:	M&W 10-11a	Th & F 130-230p	Tu 3-4p & W 1130-1230p

Undergrad TA: Alex Sobotka - Help Sessions: **W 2-3p** in RLM 15th floor Peridier Library (down hall from elevator, veer left, then take first right; its on the right).

Course Sections: _____

I am teaching two sections of this course. While the class content will be broadly the same in both sections, you will not receive credit for attending the section you are not registered in unless you have secured permission from me.

Prerequisites and Core Requirements: _____

This course has no prerequisites. AST 301 is intended to meet the requirements for the Core Component Area Natural Science and Technology and may be combined with AST 309C, 309G, 309L, 309N, 309R, or 309S for a six-hour Core sequence. This course will include work designed to develop skills in critical thinking, communication, quantitative analysis, and teamwork. This will involve such activities as peer-to-peer discussions and critical analysis of key concepts, written or oral presentations on current discoveries, and quantitative problem solving. Communication in the course will consist of student questions and subsequent classroom discussions during lecture and may also involve essay exams, and take-home assignments. Teamwork in the course may consist of working in small groups during help sessions and instructor-modeled problem solving that is guided by student decisions and group feedback. The course material will emphasize the synthesis of observation and theory to gain insight into the operation of the natural world, drawing on other fields such as physics, chemistry, geophysics, or biology.

Course-Level Learning Goals: _____

- A broad understanding of the nature, scope and evolution of the Universe, and where the Earth and Solar System fit in.
- Students can make 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.
- Students understand that science is a process, that the world is knowable, and that we are coming to know it through observations, experiments and theory.

- An understanding of a limited number of crucial astronomical quantities, together with some knowledge of appropriate physical laws, and the notion that physical laws and processes are universal.
- An acquaintance with the history of astronomy and the evolution of scientific ideas (science as a cultural process).
- Familiarity with the night sky and how its appearance changes with time and position on Earth.

Class Website: _____

This course will be primarily run through the Canvas system, at canvas.utexas.edu. All class communication will be done through Canvas. You are responsible for checking Canvas daily. I recommend setting up email alerts to be notified when I send messages or post assignments. You may also wish to download the mobile app.

Course Description: _____

This course will provide an overview of astronomy, including basic physical concepts, planets, stars, galaxies, and cosmology. The design of the course will focus on conceptual understanding, rather than memorization of facts. The students will learn how science works, and develop critical thinking skills, as well as gaining an appreciation for the universe around us, and an understanding of the importance of continued scientific study. There are no prerequisites for this course. The concepts will be primarily qualitative, though there will be a small amount of algebra in the course.

Required Texts and Other Items: _____

- Required purchase: Lecture-Tutorials for Introductory Astronomy, 3rd Edition, Prather, Slater, Adams & Brissenden. Do *not* rent or buy used. Available at Coop or online.
- Your primary textbook for this class is available for free online, in web view and PDF format! You can also purchase a print version, if you prefer, via the campus bookstore or from 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. (Simple printouts sold by third parties on Amazon are not verifiable and not as high-quality.) Astronomy from OpenStax, ISBN 1938168283, www.openstax.org/details/astronomy

Bring to Class: _____

- Your Lecture Tutorial book.
- Your ABCD voting card. A copy is available on Canvas (see announcements) to download. Please download and print *in color* and bring to class. You *must* have a voting card to receive participation credit. We will have additional copies available for free through the third class day. After that time, you may purchase one for \$1.

Class Structure: _____

Rather than a typical college survey course composed of solely lecturing, this course will be flipped. In class, *you* will be doing the work! More specifically, you'll be practicing concepts which you've

learned prior to coming to class through Canvas homework modules and assigned reading. You will only learn if you participate, thus attendance and participation is **required!** A typical class day will be composed of the following:

- Astronomy in the news – submit ideas by the night before class.
- Several think-pair-share and discussion questions.
- Answering questions from you about things from the topic which you are still unclear on.
- Activities in groups, followed by whole class discussion.

Grading Components and Policies: _____

You will receive the grade you earn. There will be no extra credit awarded after the semester, so please be sure to put in the effort throughout the semester to earn the grade you want.

The composition of the course grade is:

- Exams = 20% (two exams at 10% each – no drops)
- In-class group quizzes = 20% (drop the lowest score)
- Online homework = 20% (drop two lowest scores)
- In-class participation = 20% (drop three lowest scores)
- Projects = 15% (no drops)
- Submission of news items = 5% (no drops)

This class will not be graded on a curve. The average percentage in each of these grade components will be weighted by the above percentages to derive the final course grade, which will be assigned as follows (where the numbers represent the percentage of total points). **There is no rounding and no extra credit.** Emails to me at the end of the semester asking about either will be referred to this syllabus.

	93.00–100 = A	90.00–92.99 = A–
87.00–89.99 = B+	83.00–86.99 = B	80.00–82.99 = B–
77.00–79.99 = C+	73.00–76.99 = C	70.00–72.99 = C–
67.00–69.99 = D+	63.00–66.99 = D	60.00–62.99 = D–
	< 59.99 = F	

Exams: There will be two in-class multiple choice exams. The first will be on October 19th, and will cover everything up to that point. The second will be on the last class day, and will cover all material between the first exam and that point. There will be no final exam. There are no drop exams, and no makeup exams.

If an emergency or personal event occurs which causes you to miss one of the exams, and **you contact me prior to the start of the exam**, I will work with you to schedule a makeup. If you are on official university travel, I will arrange with you to take the exam before or after your trip.

Group Quizzes: There will be six *approximately* bi-weekly, in-class, non-cumulative short answer group quizzes. The quiz grade will be composed of the mean of the five highest quiz scores; in other words, you get to drop one quiz. **There will be no makeup quizzes**, thus if you miss a quiz, that is your drop. If you miss two, then one will count as a zero. These quizzes will not be cumulative, and will cover set lecture periods. Again, **there will be no makeup quizzes.** If

an emergency or personal event occurs which causes you to miss multiple quizzes, please contact student services. If I hear from them, I will then meet with you to discuss options.

Homework: Homework will be composed of online modules on Canvas. These will typically be assigned to be completed before *every* class. They will be due 5 min before the start of class. 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. Again in the case of an emergency, if you contact me prior to the missed assignments due date, I will work with you.

In-Class Participation: In-class activities play a big role in this class, and your **participation is required**. You will receive your participation credit by turning in a 3×5 notecard with your name, EID, and answering a question asked in class (occasionally you will turn in a worksheet with your name on it instead). You must turn in your card directly to a TA who will be stationed by the exits. Only one card can be handed in per person. Anyone caught turning in a card for someone not in class will be violating the university's honor code. If you need to arrive late or leave early for an excused reason, please contact me prior to class. Although makeup participation points will not be allowed, I realize that students may need to occasionally miss class. For this reason, the three lowest in-class participation scores will be dropped. Students who have excused absences as part of a university sponsored event are required to come talk to me in advance of the absence.

Astronomy in the News: Astronomy is a dynamic field where new discoveries are made daily. Part of your astronomy education will also be to review recent events in astronomy, by frequently visiting websites such as space.com, sciencedaily.com, and astronomy.com. As part of your participation grade, you will be *submit two astronomy news items* that you have read throughout the semester. These will be submitted to me prior to the beginning of class by handing me a 3×5 notecard with your name, EID, web-link to the article. I will then pick a few per class, bring up the website, and *you* will come to the front of the class and explain your article to everyone, and moderate a short discussion (if you are not present to explain your article, you will receive a zero). You must submit at least one news item by Oct 26th. The second one of each must be completed by Dec 5th.

Projects: This component of the grade will be based on three separate projects.

- Project #1: Writing assignment about a recent astronomy news item (can be the same one you submitted to class, or a new one). This assignment must be two pages typed, double spaced, with 12 pt font, and with citations appearing on a third page (in any format you wish). The student's name and EID must be at the top of the first page. *This assignment will be submitted electronically through Canvas.* This writeup should include:
 - Introduction to the topic, and why it is important. (1 point)
 - How the new observations or analyses have led to the current discovery (1 point)
 - What are some remaining questions in this area? (1 point)
 - Poke at least one scientifically-motivated hole in their process, and discuss what test you would design to plug this hole. Be critical! (1 point)
 - Follow the correct format, including length and citations (1 point).
- Project #2: Astronomical Observing: To do this, students 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 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, 12 pt, 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 should also research the object you observed, and include a discussion in their write-up. You will attach a sketch of the night sky around this object. You must also include proof of attendance, which can be obtained by the telescope operator. I suggest that you start early, as these events are not held during cloudy nights, and this assignment *will not be excused*.

- Project #3: Moon Journal: For at least 10 clear days over the space of one month, go outside and sketch the Moon and any nearby stars (if you can see them), accurately drawing the phase. Label the phase (waxing/ waning, new/quarter/full) for each drawing. Give the time of the observation, as well as the location of the moon in the sky (i.e., high in the southern sky, low in the SW, etc.). Compile these drawings together and turn in to complete your assignment. Be sure to be accurate - I shouldn't see drawings of the new moon at midnight.

The due dates for these assignments are:

- Project #1 (Writing Assignment) – Oct 17
- Project #2 (Observing) – Anytime before or on Dec 5th
- Project #3 (Moon Journal) – Anytime before or on Dec 5th

Extra Credit: There will be *no* extra credit opportunities in this class.

Class Policies:

- 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 read the required reading assignments, also please be prepared to participate in in-class discussions and activities, this is for your benefit.
- 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.
- To facilitate group-work, please sit together, and close to the front.
- Phone: Phone use and texting during class will not be tolerated. Don't let me see you using your phones, or else you will be asked to leave.
- Laptops: Though laptop use will not be a necessary part of the class, I acknowledge that some students prefer to take notes electronically, thus their presence will be permitted. I request that these students sit towards the back so that they do not distract other students. Students found to be using their computers for non-class activities will be a distraction to those around them, and will be asked to leave, and will not earn participation for that day. If laptop distraction becomes a problem, I reserve the right to reverse this policy.
- As part of my duties as professor I am a professional research astronomer, which requires travel during the semester. I will do my best to minimize the impact of this travel, and will endeavor to maintain Canvas communication at all times while out of Austin. When I am gone, another UT astronomer professor will lead the class in my place.

Approximate Course Schedule: _____

Class	Dates	Topics	Online Modules and Assignments Due	Pre-Class Textbook Reading
1	Aug 31 (Th)	Introduction to Class	-----	-----
2	Sept 5 (T)	Tour of the Universe	Module #1	Chapter 1 (1.1-1.9)
3	Sept 7 (Th)	The Celestial Sphere	Module #2	2.1, 4.1
4	Sept 12 (T)	Motions	Module #3	2.1, 4.1
5	Sept 14 (Th)	Seasons & Quiz 1	Module #4	4.2
6	Sept 19 (T)	Phases of the Moon	Module #5	4.5
7	Sept 21 (Th)	Eclipses	Module #6	4.7
8	Sept 26 (T)	Historical Astronomy - Copernicus & Kepler	Module #7	2.2, 2.4, 3.1
9	Sept 28 (Th)	Galileo & Quiz 2	Module #8	---
10	Oct 3 (T)	Process of Science & Motion	Module #9	2.3
11	Oct 5 (Th)	Newton's Laws & Gravity	Module #10	3.2, 3.3
12	Oct 10 (T)	Nature of Light & Blackbody Radiation	Module #11	5.1, 5.2
13	Oct 12 (Th)	Atoms, Spectra & Quiz 3	Module #12	5.3, 5.4, 5.5
14	Oct 17 (T)	Solar System	Module #13, Project #1	7.1, 7.2
—	Oct 19 (Th)	Exam #1	-----	-----
15	Oct 24 (T)	Telescopes	-----	Chapter 6
16	Oct 26 (Th)	Stars	Module #14, 1st news item	16.1-16.3, 15.1-15.3
17	Oct 31 (T)	Stars, cont'd & Quiz 4	-----	17.1
18	Nov 2 (Th)	Evolution of Stars	Module #15	17.2, 17.3, 18.4
19	Nov 7 (T)	Exoplanets #1	Module #16	22.1, 22.4-.5, 23.1-.2
20	Nov 9 (Th)	Exoplanets #2	Module #17	5.6, 21.3-21.5
21	Nov 14 (T)	Life & Quiz 5	-----	---
22	Nov 16 (Th)	Milky Way & Galaxies	Module #18	25.1,25.2,25.4,25.6
23	Nov 21 (T)	The Expanding Universe	Module #19	26.1-26.3
24	Nov 28 (T)	Galaxy Evolution	Module #20	Chapter 28
25	Nov 30 (Th)	Mysteries & Quiz 6	-----	---
26	Dec 5 (T)	Beginning/End Universe	Module #21, Projects #2 and #3; 2nd news item	Chapter 29
—	Dec 7 (Th)	Exam #2	-----	-----

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/conduct/index.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/conduct/academicintegrity.php>

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://diversity.utexas.edu/disability/>

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.