

Astronomy 301: Introduction to Astronomy

Spring 2016; MWF 1pm-2pm in WEL 3.502

Unique Number 46840

Instructor: Prof. Mike Boylan-Kolchin

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Office hours: Wednesday 3:00pm-4:00pm, and by appointment

TA: Otitoaleke (Leke) Akinola

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TA: Nicholas Miller

Office hours: M 2-3pm, Tu 1-2pm

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Course Overview

This course will provide an overview of astronomy, including basic physical concepts, planets, stars, galaxies, and cosmology. The course will cover the familiar (the solar system, the Sun, etc.) and the exotic (for example: black holes, dark matter, dark energy). The design of the course will focus on conceptual understanding rather than memorization of facts. Students will learn how science works, develop critical thinking skills, and gain an appreciation for the Universe around us and an understanding of the importance of continued scientific study (both applied and theoretical). The concepts will be primarily qualitative, though there will be a small amount of algebra in the course.

Prerequisites and Core Requirements

There are no prerequisites for this course. AST 301 is intended to meet the requirements for the Core Component Area Natural Science and Technology and may be combined with AST 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. 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.

Class Website

This course will be primarily run through the Canvas system, at canvas.utexas.edu. The primary mode of communication will be via Canvas.

Required Textbooks and Other Items

- *The Cosmic Perspective* (7th Edition), Bennett, Donahue, Schneider & Voit
- *Lecture-Tutorials for Introductory Astronomy*, 3rd Edition, Prather, Slater, Adams & Brissenden
- You are required to bring one 3×5 notecard to each class, which you will turn in to receive participation credit.
- You will be required to print, in color, the ABCD voting card and bring it to every lecture. You can find this on Canvas, by clicking on "Files" on the left side.

Grading

You will receive the grade you earn in this course. There will be no extra credit awarded during or after the semester, so please be sure to put in the effort during the semester to earn the grade you want. Your grade will be based on three components:

- **Five in-class exams** (dates below): 40% (your lowest test score will be dropped)
- **Homework** (approximately weekly): 40% (your lowest homework score will be dropped)
- **Class participation:** 20%

The class will not be graded on a curve. Your grade will be computed as follows: the average grade you receive in each of the components listed above will be weighted by the percentage listed above and then rounded to the nearest 1 decimal place. Your final grade will be given by the following 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

Exams: There will be five in-class exams; *there is no final exam*. Your exam grade will be based on the average of your four highest exam scores (i.e., I will drop your one lowest exam score). **There will be no makeup exams;** if you miss one exam, that will be your dropped exam. If you miss two exams, one will count as a zero. The exam dates are listed in the course schedule below. A review session will be held before each exam; dates and times for the review sessions will be announced by the 2nd week of classes.

Homework: Homework will be assigned on a weekly basis, approximately. **Late homework will not be accepted.** Your homework grade will be based on the average over all of the assignments (weighted equally) after dropping your lowest homework score. If you do not turn in one homework, this will count as your drop. Any additional homeworks not turned in will receive a zero.

It is fine to discuss problems and concepts with your classmates – trying to explain something to someone else is a good way to see how well you understand it! We will also engage in group discussions in class. **However, it is crucial to remember that all graded assignments, including homeworks and examinations, must consist of your own thoughts in your own words.** Please also see the statement on academic integrity below.

Participation: In-class activities are crucial to this class, and your participation is required. You will receive participation credit for each class by turning in 3x5 notecard at the end of that class with your name, EID, and answering a short question asked in class. I realize that students may need to occasionally miss a class. While makeup participation points are not allowed, *you will be allowed to miss 5 classes without affecting your participation score.* If you have an excused absence as part of a university-sponsored event, you must discuss it with me in advance of that absence. If there are additional activities required for participation credit, they will be announced *at least* one week in advance of the due date.

Class Policies

- The course webpage on the Canvas system 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 be prepared to participate in in-class discussions and activities, this is for your benefit.
- Please arrive on time.
- 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.
- **Phones:** Phone use and texting during class will not be tolerated. Make sure your phones are off, and keep them put away during the class. Students using their phones will be asked to leave, and will not earn participation for that day.
- **Laptops/Tablets:** Laptop and/or tablet use will not be a necessary part of the class. However, some students prefer to take notes electronically, so laptops and tablets will be permitted in class. I request that students using these devices to take notes sit towards the back so that they do not distract other students. Students using their computers for non-class activities are a distraction to those around them; such students be asked to leave and will not earn participation for that day. If laptop distraction becomes a persistent problem, I reserve the right to modify this policy accordingly.
- **Video and/or audio recording of lectures is prohibited.**
- **Religious Holidays:** According to UT Austin policy, you must notify the professor of a pending absence at least fourteen days prior to the date of observance of a religious holy day. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, you will be given an opportunity to complete the missed work within a reasonable time after the absence.

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>

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 are not 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://www.utexas.edu/cola/cwgs/_files/pdf-4/ai2012.pdf

Additional Items

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://ddce.utexas.edu/disability/>

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. When communicating via email with the instructor or the TAs, please include “AST 301” in the subject line.

Department of Astronomy Ground Rules: The Department of Astronomy has ground rules for all of its undergraduate courses. They are described in the document “Memo to Undergraduate Astronomy Students Regarding Astronomy Courses,” which is available online at <http://www.as.utexas.edu/astronomy/education/memo.html>

Emergency Procedures: In the event of an evacuation, follow the instruction of faculty or class instructors. Occupants of buildings on The University of Texas at Austin campus are required to evacuate buildings when a fire alarm is activated. Students requiring assistance in evacuation should inform their instructor in writing during the first week of class. Familiarize yourself with all exit doors of each classroom and building you may occupy and remember that the nearest exit door may not be the one you used when entering the building. Do not re-enter a building unless given instructions by the following: Austin Fire Department, The University of Texas at Austin Police Department, or Fire Prevention Services office.

Behavior Concerns Advice Line (BCAL): The Behavior Concerns Advice Line is a service that provides The University of Texas at Austin's faculty, students and staff an opportunity to discuss their concerns about another individual's behavior. This service is a partnership among the Office of the Dean of Students, the Counseling and Mental Health Center (CMHC), the Employee Assistance Program (EAP) and The University of Texas Police Department (UTPD). An individual can either call the line 512-232-5050 or report online at <http://www.utexas.edu/safety/bcal/>

Preliminary Schedule

Dates	Topics
Week 1 January 20, 22	Course Overview; Units and Scales; a Brief Tour of the Universe
Week 2 January 25, 27, 29	The Night Sky; Seasons; the Moon; Eclipses
Week 3 February 1, 3, 5	Historical Overview of Astronomy; The Scientific Method
Week 4 February 8	Exam #1
February 10, 12	Modern Astronomy's Beginnings; Kepler and Galileo
Week 5 February 15, 17, 19	Newton and Gravity; Relativity
Week 6 February 22, 24, 26	Relativity; the Nature of Light
Week 7 February 29	Exam #2
March 2, 4	Atoms; Atomic Spectra
Week 8 March 7, 9, 11	Properties of Stars
Spring Break March 14, 16, 18	SPRING BREAK
Week 9 March 21, 23, 25	Fusion and the Sun; Stellar Evolution
Week 10 March 28	Exam #3
March 30, April 1	Stellar Deaths; Black Holes
Week 11 April 4, 6, 8	The Solar System; Extra-Solar Planets
Week 12 April 11, 13	Extra-Solar Planets; Life in the Universe
April 15	Exam #4
Week 13 April 18, 20, 22	Galaxies and the Large-Scale Structure of the Universe
Week 14 April 25, 27, 29	Dark Matter and Dark Energy; the Big Bang
Week 15 May 2, 4	The Big Bang; Open Questions in Astronomy
May 6	Exam #5