ASTR 1030: Accelerated Introductory Astronomy I

Fall 2017

Lecture: MWF 09:00-09:50 pm, Duane G130 or Fiske Planetarium

Labs: M 11-12:45 / M 1-2:45 / M 3-4:45 / F 11-12:45 / F 1-2:45

http://learn.colorado.edu

Prof:	Dave Brain; 5-5606; david.brain@colorado.edu	Tues 4-6 pm in D142 or by appt.
Lecture TA:	Christopher Pocs; 2-5010; christopher.pocs@colorado.edu	Tues 3-5 in AHR or by appt.
Lab:	Aylecia Lattimer (M11/F11TA); aylecia.lattimer@colorado.edu	Tues 2-4 pm in AHR or by appt.
	Christopher Pocs (F1 TA) ; christopher.pocs@colorado.edu	Tues 3-5 in AHR or by appt.
	Shane Rightley (M1 M3 TA); shane.rightley@colorado.edu	Wed 4-6 pm in AHR or by appt.
	Jeremy Osowski (M11 F11 LA); jeremy.osowski@colorado.edu	Mon 3-5 pm in D220 or by appt.
	Maya Yanez (M1 F1 LA); maya.yanez@colorado.edu	Mon 4-6 pm in D220 or by appt.

Content

This course is a one-semester introduction to the science of solar system astronomy. We will discuss motions in the night sky and the historical progression that led to their understanding, solar system formation, planetary geology, planetary atmospheres, and applications to our current understanding of planets, moons, and small bodies both in our solar system and elsewhere. As an accelerated course, we will include substantial quantitative reasoning.

Goals

1. Convey a sense of excitement associated with scientific discovery
2. Practice using the scientific method to determine 'best explanations' for observations
3. Gain experience using a few fundamental concepts to explain many diverse phenomena
4. Demonstrate that science naturally evolves to explain "how" (**not** "what")
5. Encourage clear presentation of scientific work and reflection on obtained answers

Format

The course consists of both lecture and lab. Lectures will consist of a mixture of content review, demonstrations, and active learning (discussion, clicker questions, etc.). Several lectures will be held in Fiske Planetarium. Lab sessions will be held once per week during the day at Sommers-Bausch Observatory (SBO) on campus, with a few nighttime sessions at the SBO telescopes.

University Science Requirement

This course is the required 1st semester intro course for all ASTR majors. Coupled with ASTR 1040 it fulfills the two-semester sequence requirement (with associated lab) of the Natural Science requirement of the Arts & Sciences Core Curriculum.

Required Items

- Textbook: *The Cosmic Perspective 8th Edition*, by Bennett, Donahue, Schneider, and Voit. Published by Pearson/Addison Wesley. Purchase new, used, or electronically. 7th edition ok.
- ASTR 1030 Laboratory Manual. Printed copy available *only* at the CU Bookstore (~$30). Available at http://sbo.colorado.edu/manuals/astr1030/astr1030.html. You must have your own copy for every lab.
- An iClicker available at the CU bookstore. New textbooks come with a discount coupon.
- Optional: An account on MasteringAstronomy.com. Material will not be assigned from this site, but it can be helpful for review.

Advice for success in this course: (most contributed by more than one or two past students)

- Attend lectures. Participate. Try ***not*** to be passive. Take notes.
- Read the textbook. Skim the material before class, and come prepared with one question.
- Study answers to HW questions, midterms, and clicker questions. You will see them again!
- Seek help if you are having trouble. I like visitors. So does Chris. So does your lab TA/LA.
- Study with classmates. Work together, but write-up HW on your own and in your own words.
- Stay up-to-date on Desire2Learn. All important information will be reflected there.
- Don't cheat. Please. It may be the only thing that makes me mad.

Anticipated Course Schedule

The schedule of lecture topics is nearly certain to change as the semester progresses. This table is provided so that you have an idea of the topics that we will cover (and their order), as well as the expected due dates of graded material. ***The dates for midterm exams will not change, and there are no make-ups.***

- Reading for each lecture is labeled '**C#**', and refers to the Chapter number in the textbook.
- Homework assignment due dates and exams/quizzes are indicated in red.
- Lectures that will meet in the Fiske Planetarium are indicated in blue.

Week	Lab	Monday Lecture	Wednesday Lecture	Friday Lecture
1 08/28	CU Scale Model Solar System	Solar System Scale **C1**	The Night Sky **C2**	Daily Motion **C2** HW 0
2 09/04	No Lab	**Labor Day**	Annual Motion **C2** HW 1	Lunar Motion **C2**
3 09/11	Motions of the Sun and Moon	Planetary Motion **C2**	Science of Astronomy **C3** HW 2, Quiz 1	Copernican Revolution **C3**
4 09/18	Kepler's Laws	Kepler's Laws **C3**	Newton's Laws **C4** HW 3	Conservation Laws **C4**
5 09/25	No Lab / Review	Gravity **C4**	Tides **C4** HW 4	TBA
6 10/02	Eratosthenes	Exam 1	Solar System Tour **C7**	SS Formation 1 **C8**
7 10/09	Collisions	SS Formation 2 **C8**	SS Formation 3 **C8** HW 5	Solar System Age **C8**
8 10/16	Planetary Surfaces	Planetary Interiors **C9**	Planetary Surfaces 1 **C9** HW 6	Planetary Surfaces 2 **C9**
9 10/23	Optics 1	Light **C5**	Spectra **C5** HW 7, Quiz 2	Planetary Spectra **C5**
10 10/30	Spectra 1	Atmospheres **C10**	Atmospheric Structure **C10** HW 8	Feedback and GHGs **C10**
11 11/06	Spectra 2	CO2 Cycle and Climate **C10**	Jovian Planets **C11** HW 9	JP Satellites **C11**
12 11/13	No Lab	Exam 2	Rings **C11**	Comets **C12**
13 11/20	**Fall Break**			
13 11/27	Optics 2	Asteroids / Meteorites **C12**	Exoplanets 1 **C13** HW 10	Exoplanets 2 **C13**
15 12/04	Exoplanets	Solar System Life **C24**	Student's Choice **C24** HW 11	Dwarf Planets **C12**
16 12/11	No Lab	TBA	Last Lecture HW 12	

Final Exam: Sunday December 17, 7:30-10:00 pm in the classroom

Course Evaluation

25%	Final exam	(Dec 17, 7:30-10:00pm)
25%	Two highest Midterms	(Quiz 1 + Quiz 2 counts as a 3rd Midterm)
20%	Weekly homework	(drop lowest score)
25%	Labs	(drop lowest 4 of 15 scores; **must pass lab!**)
5%	HW / Clickers / Lowest MT	(whichever benefits you most)

I'll start with an absolute grading scheme (90/80/70/60 for A/B/C/D, with +'s and –'s within these ranges). These numbers may go lower but not higher. This is intended to encourage students to learn together.

Exams / Quizzes

There will be two quizzes and two midterm exams this semester, emphasizing the application of concepts from the course (not the facts themselves). They will consist of a mixture of true/false, multiple choice, short answer, and more detailed written/calculation questions. This mixture minimizes the influence of 'question type' on the assessment of your facility with the material. The final exam will be cumulative, with similar format to the midterms. Note that each quiz will be worth half of a midterm; the combined score from the two quizzes will be treated as a third midterm grade. **There are no make-up exams/quizzes even for excused absences**; many students will have to miss one during the semester; I accommodate this by weighting the lowest of the three midterms less *and* allowing it to be replaced by your Clicker or HW average.

Homework

Homework assignments provide an opportunity to reflect on the concepts discussed in lecture, and verify that each of you understands and can apply them on your own. There will be ~12 homework assignments due on Wednesdays at the start of class. Homework turned in after the first five minutes of class will be accepted with a 20% late penalty. Homework received after class but before solutions are posted will be accepted for 50% penalty. **While you are encouraged to work together on HW, it must be submitted in your own words.**

The lowest homework grade will be dropped. One more homework score can be replaced with a typed 2-3 page essay (due Dec 10) that requires you to reflect on the course material from a non-technical perspective. The topic will be posted at Desire2Learn about one month before it is due. It might not be announced in class.

Labs

Each student is enrolled in a lab session associated with the course. These sessions are designed to have you work more closely with the course material in a 'hands on' manner. You will be required to work in small groups, and most of the labs will be handed in at the end of the lab session. You must attend your registered lab, and your lowest four lab scores will be dropped. **You must pass the lab (> 60% average) to pass the course**. <u>You must complete at least two night labs</u>.

Clicker Questions

Clicker questions will be asked in most lectures to test your understanding of the concepts *as they are being taught*, and to promote discussion with your peers about the course material. To keep the focus on discussion, and not on right vs. wrong answers, a typical question will be worth three points, with two points awarded for *any* answer and one more point for the *correct* answer. I'll drop your lowest 8 *questions* over the course of the semester. Research shows that use of clickers can dramatically improve student understanding, (and therefore student grades). Note that you must attend class regularly to achieve a good clicker score.

What follows is University legalese. It is important to be familiar with these statements, and I will abide by them. But it is worth noting that it can all be boiled down to the following statement: **I will treat you with respect and as a unique human being, and hope that you do the same to each other and to me**.

Honor Code: All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the academic integrity policy. Violations of the policy may include: plagiarism, cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, resubmission, and aiding academic dishonesty. All incidents of academic misconduct will be reported to the Honor Code Council (honor@colorado.edu; 303-735-2273). Students who are found responsible for violating the academic integrity policy will be subject to nonacademic sanctions from the Honor Code Council as well as academic sanctions from the faculty member. Additional information regarding the academic integrity policy can be found at the Honor Code Office website.

Learning Environment: Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, color, culture, religion, creed, politics, veteran's status, sexual orientation, gender, gender identity and gender expression, age, disability, and nationalities. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. For more information, see the policies on classroom behavior and the Student Code of Conduct.

Discrimination and Harassment: The University of Colorado Boulder (CU Boulder) is committed to maintaining a positive learning, working, and living environment. CU Boulder will not tolerate acts of sexual misconduct, discrimination, harassment or related retaliation against or by any employee or student. CU's Sexual Misconduct Policy prohibits sexual assault, sexual exploitation, sexual harassment, intimate partner abuse (dating or domestic violence), stalking or related retaliation. CU Boulder's Discrimination and Harassment Policy prohibits discrimination, harassment or related retaliation based on race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. Individuals who believe they have been subject to misconduct under either policy should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127. Information about the OIEC, the above referenced policies, and the campus resources available to assist individuals regarding sexual misconduct, discrimination, harassment or related retaliation can be found at the OIEC website.

Disability Accommodations: If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to me in a timely manner (for exam accommodations provide your letter at least one week prior to the exam) so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the Disability Services website. Contact Disability Services at 303-492-8671 or dsinfo@colorado.edu for further assistance. If you have a temporary medical condition or injury, see Temporary Medical Conditions under the Students tab on the Disability Services website and discuss your needs with me.

Religious Observances: Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. **In this class, you must contact me within the first two weeks of the semester to make alternate arrangements.** See the campus policy regarding religious observances for full details.

Have a great semester!