

# ASTR 1030: ACCELERATED INTRODUCTORY ASTRONOMY I

University of Colorado, Boulder / Fall 2018

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

Lab: M 11:00-12:45 / M 1:00-2:45 / M 3:00-4:45 / F 11:00-12:45 / F 1:00-2:45

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**Prof:** Paul Hayne

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**Office Hours:** Tu 3:00-5:00 PM, or by appointment.

**Lecture TA:** Daniel Everding ([Daniel.Everding@Colorado.edu](mailto:Daniel.Everding@Colorado.edu))

Duane D142 (AHR) / Tu & Th 3:00-4:00 PM, or by appt. in DUANE D132.

**Lab TA:** Daniel Sega ([dase5159@colorado.edu](mailto:dase5159@colorado.edu))

Duane D142 (AHR) / TBD, or by appointment.

**Lab TA:** Sarah Hicken ([Sarah.Yenchik@Colorado.EDU](mailto:Sarah.Yenchik@Colorado.EDU))

Duane D142 (AHR) / TBD, or by appointment.

**LA:** Colleen Feuerborn ([Colleen.Feuerborn@colorado.edu](mailto:Colleen.Feuerborn@colorado.edu))

**LA:** Christopher Creery ([Christopher.Creery@colorado.edu](mailto:Christopher.Creery@colorado.edu))

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**Welcome to ASTR 1030 – Accelerated Introductory Astronomy!** This course is a one-semester introduction to the science of astronomy, focusing on the Solar System. We will discuss **motions in the night sky** and astronomy’s historical context, **Solar System and planet formation**, planetary **geology and geophysics**, planetary **atmospheres**, and applications to our current understanding of **planets, moons, and small bodies** in our own Solar System and beyond. As an accelerated course, we will include substantial quantitative reasoning.

## Course Goals:

1. Convey a sense of excitement through scientific discovery
2. Practice using the scientific method to explain astronomical phenomena
3. Gain experience using physics to interpret observational data
4. Demonstrate that science is driven by the “how” (not “what”)
5. Encourage clear presentation showing understanding of scientific concepts

**Course Page:** <https://cuboulder.instructure.com/courses/21431>

→ Please use the course page to access lecture content, grades, quizzes, questions and discussion.

**Format:** The course consists of both lecture and laboratory sessions. Lectures will be a mix 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 1<sup>st</sup>-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.

**Clickers:** We will use CUClickers, available from [myCUinfo](#).

**Reading:** Our textbook is *The Cosmic Perspective 8<sup>th</sup> Edition*, by Bennett, Donahue, Schneider, and Voit. Purchase new, used or electronically. (7<sup>th</sup> Edition is OK too)

**Laboratory Manual:** Available for purchase in the CU Bookstore. You will need the hard-copy in order to complete the weekly laboratory assignments.

**Grading Policy\*:** Homework (20%), Labs (25%), Two highest Midterms (25%), Final exam (25%), Participation (5%). Homework is assigned each Wednesday, due the following Wednesday in class. Late homework will be penalized 20% per day. We will have two online quizzes, which together count as the third midterm. 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 thresholds may go lower, but not higher. This is intended to encourage students to learn together.

\*subject to change

### Important Dates:

Midterm #1 ..... Sep 26, 2018 / 9:00 - 9:50 AM  
Midterm #2 ..... Nov 14, 2018 / 9:00 - 9:50 AM  
Final Exam ..... Dec 19, 2018 / 1:30 - 4:00 PM

**Exams/Quizzes:** There will be two quizzes and two 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. 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 dropping the lowest midterm (or combined quiz) score.

**Homework:** Homework assignments provide an opportunity for you 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. Late homework (5 min after start of class) will be penalized 20% per day, until solutions are posted. While you are encouraged to work together on HW, you must submit your own work. The lowest HW grade will be dropped.

**Labs:** Each student is enrolled in a lab section associated with the course. These sessions are designed for you to learn the 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 (per instructions from your TA). You must attend your registered lab, and your lowest four lab scores will be dropped. **You must complete at least two night labs, and you must pass the lab component (>60% average) to pass the course.**

**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 '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.

**Attendance:** Regular attendance and active participation is essential and expected. Participation grades will be based on attendance through use of CUClickers, with extra credit available for asking/answering questions in class or online.

**Laptop/tablet Policy:** Laptops and other electronics are discouraged in lecture. Those needing laptops to take notes should sit at the sides of the classroom. Other accommodations require a letter from [Disability Services](#).

**Honor Code:** All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the [Honor Code](#). Violations of the policy may include: plagiarism, cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. All incidents of academic misconduct will be reported to the Honor Code Council ([honor@colorado.edu](mailto: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 <https://honorcode.colorado.edu>.

**Accommodations for Disabilities:** Students with a [documented disability](#) should submit to me a letter from Disability Services in a timely manner. For exam accommodations provide your letter at least one week prior to the exam. Contact Disability Services at 303-492-8671 or by e-mail at [dsinfo@colorado.edu](mailto:dsinfo@colorado.edu). If you have a temporary medical condition or injury, see the [Temporary Medical Conditions](#) guidelines and discuss your needs with me.

**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, veterans 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](#).

**Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation:** The University of Colorado Boulder (CU Boulder) is committed to fostering a positive and welcoming learning, working, and living environment. CU Boulder will not tolerate acts of sexual misconduct (including sexual assault, exploitation, harassment, dating or domestic violence, and stalking), discrimination, and harassment by members of our community. Individuals who believe they have been subject to misconduct or retaliatory actions for reporting a concern should contact the [Office of Institutional Equity and Compliance](#) (OIEC) at 303-492-2127 or [cureport@colorado.edu](mailto:cureport@colorado.edu). Information about the OIEC, university policies, [anonymous reporting](#), and the campus resources can be found on the OIEC website. Please know that faculty and instructors have a responsibility to inform OIEC when made aware of incidents of sexual misconduct, discrimination, harassment and/or related retaliation, to ensure that individuals impacted receive information about options for reporting and support resources.

**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. Contact me within the first two weeks of the semester to make alternate arrangements. See the [campus policy](#) regarding religious observances for full details.

*As your instructor, I take all of the above very seriously, and will do my best to ensure an equitable and inclusive learning environment!*

*-P.H.*

Course Plan

Week	Lab*	Monday Lecture	Wednesday Lecture	Friday Lecture
1 8/27	<i>CU Scale Model of the Solar System</i>	Scales of the Universe C1	<i>The Night Sky (FISKE)</i> C2	Daily Motion C2
2 9/3	<i>Motions of Sun and Moon</i>	Labor Day	Annual Motion C2 HW1	Lunar and Planetary Motion C2
3 9/10	<i>Kepler's Laws</i>	Copernican Revolution C2	Science of Astronomy C3 HW2, Quiz 1	Kepler's Laws C3
4 9/17	No Lab	Newton's Laws C3	Conservation Laws C4 HW3	Gravity C4
5 9/24	<i>Survivor Challenge (Fiske)</i>	Tides C4	<b>Exam 1</b>	<i>Solar System Tour (FISKE)</i> C7
6 10/1	<i>Collisions</i>	Solar System Formation 1 C8	Solar System Formation 2 C8 HW4	Satellite Formation C8
7 10/8	<i>Planetary Surfaces</i>	Solar System Age C8	Planetary Interiors C8 HW5	Planetary Surfaces 1 C9
8 10/15	<i>Optics 1</i>	<i>Planetary Surfaces 2 (FISKE)</i> C9	Light C9 HW6	Spectra C5
9 10/22	<i>Optics 2</i>	Planetary Spectra C5	TBA C5 HW7, Quiz 2	Atmospheres C10
10 10/29	<i>Spectroscopy 1</i>	Atmospheric Structure C10	Atmospheric Evolution C10 HW8	Climate C10
11 11/5	<i>Spectroscopy 2</i>	Jovian Planets C11	Moons C11 HW9	Rings C11
12 11/12	No Lab	Comets C12	<b>Exam 2</b>	Pluto and KBOs C12
13 11/19	Fall Break			
14 11/26	<i>Mass of Saturn</i>	Asteroids / Meteorites C12	Exoplanets 1 C13 HW10	<i>Exoplanets 2 (FISKE)</i> C13
15 12/3	<i>Exoplanets</i>	Life in the Solar System C24	Students' Choice C24 HW11	Frontiers (Handout)
16 12/10	<i>No Lab / Review</i>	TBA	Review HW12	(No lecture)
17 12/17			<b>Final Exam</b>	
*Dates refer to week of Friday lab sections; Monday lab sections do the same lab the FOLLOWING week				
RED: Exams		PURPLE: reading assignments		BLUE: Fiske lectures

Night Observing Schedule (Preliminary)

<b>Date</b>	<b>Day</b>	<b>Time</b>	<b>Twilight Ends (Standard Time)</b>	<b>Lunar Phase</b>	<b>Moonrise</b>	<b>Moonset</b>
Sep 05	Wednesday	20:00 / 8:00 PM	20:00	26%	00:40	15:42
Sep 10	Monday	20:00 / 8:00 PM	19:51	1%	06:32	19:17
Sep 17	Monday	20:00 / 8:00 PM	19:38	53%	13:50	23:39
Sep 27	Thursday	20:00 / 8:00 PM	19:20	95%	19:39	08:18
Oct 02	Tuesday	20:00 / 8:00 PM	19:11	51%	23:32	13:36
Oct 10	Wednesday	20:00 / 8:00 PM	18:59	2%	07:36	18:51
Oct 25	Thursday	20:00 / 8:00 PM	18:38	99%	18:13	07:12
Nov 08	Thursday	20:00 / 8:00 PM	18:24	1%	07:29	17:58
Nov 13	Tuesday	20:00 / 8:00 PM	18:20	29%	11:57	21:55
Nov 29	Thursday	20:00 / 8:00 PM	18:13	58%	23:47	12:41