

# ASTR 2020 INTRODUCTION TO SPACE ASTRONOMY

## HANDOUT #1

### Location

Duane G130

T/Th 12:30 – 1:45pm

or Fiske Planetarium

### Instructors

Prof. Kevin France

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303-492-1429

SPSC N214 / Duane D219

Office Hours: M 2 – 3pm, T 2 – 3pm (Duane D219)

Teaching Assistant: Nicole Arulanantham,

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Office Hours: Th 10 – 11am (Duane D130)

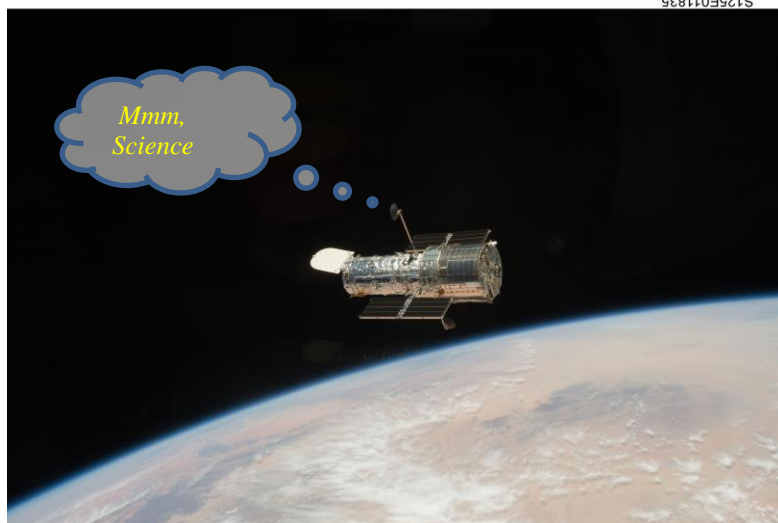
### Overview

Astronomy 2020: Space Astronomy covers physical principles of performing astronomy and human exploration in space. The basic design of launch vehicles and spacecraft, orbital dynamics, and instruments will be described in the context of specific space missions (e.g., Hubble Space Telescope, Mars rovers, other planetary probes) as well as the astronomy and planetary science that motivates these endeavors. The balance between technology and science, humans and robots, as well as near-term and long-term science and exploration missions will be discussed. Astronomy 2020 is an excellent introduction to space science and space engineering for first or second year undergraduates. This class is approved for Arts and Sciences core curriculum: natural science.

### Objectives:

- 1) What are the fundamental physical laws that govern our ability to explore space?
  - 2) How do we explore space with humans and robots? Apollo to the Space Shuttle to the ISS and into the future.
  - 3) How will robotic and human spacecraft travel to Mars? What are the challenges of living on an alien, hostile world? Where else might we explore in the solar system?
  - 4) What will we learn about the cosmos from the Hubble Space Telescope, the James Webb Space Telescope, X-ray observatories? How can the next generation of space observatories quantify the frequency of habitable extrasolar planets?
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## Course Description



### LECTURE SESSIONS:

The course emphasizes the hands-on exercises assigned for throughout the semester. Lecture class sessions will be used to present the relevant concepts, demonstrate examples and techniques and introduce and review the exam material. We will primarily meet in Duane, **please check posted class lecture slides and the class schedule** to keep track!

In addition, we will conduct 2-3 classes this semester at the Fiske Planetarium (near Regent Drive and Kittridge Loop Drive). The Planetarium also has FREE (show your student ID) shows every Thursday night. By attending the show and writing a one-page summary, you will be awarded 5 extra points on one of your mid-term exams. Schedule of Planetarium shows is at <http://fiske.colorado.edu/>.

We will also have occasional in-class exercises & problem solving where students will work in groups.

### In-Class Participation & Clickers:

Regular individual participation in class discussion is a critical part of this class. Each student will have a wireless student response system ("iClicker"). **You must bring your clicker to each class!** About 1 – 3 times each class, you will be asked questions designed to get you to think carefully about some of the concepts that we are discussing in class. Often, you will be asked to talk with your neighbors before answering, so you can help each other to figure out the correct answer.

Use of the clickers:

- a) Improves your grades (everyone's grades!). When you discuss & debate with others, your knowledge improves.
- b) Gives YOU immediate feedback on what you do and do not understand.
- c) Tells me what the class doesn't understand.
- d) Greatly improves class participation.
- e) Generally makes class more interactive and fun for everyone

We will sometimes start class with a clicker question based on the assigned reading. So, do your reading before class! You are entitled to 4 "free clicker" days where your lowest clicker scores will be dropped. If you are sick for a day, have a family emergency, or your clicker stops working, this should cover you.

You will need to register your clicker to get credit for your answers. Instructions on registration of your iClicker are simple. Just go to MyCUinfo:

<<https://portal.prod.cu.edu/MyCUInfoFedAuthLogin.html>>, to the "student" tab, and then to button that says "CUClicker Registration". Enter your clicker ID where it says to register clickers. Please do this as soon as you purchase your clicker. **Buy extra batteries for your clicker now!**

## Prerequisites & Eligibility

ASTR 2020 is open to undergraduate students in Astronomy, Engineering, Physics, Atmospheric Sciences, Applied Math, and any other interested students from non-science fields. There are no prerequisites for ASTR 2020.

## Suggested reading

There are no formal textbooks for this class. The majority of the material will come from the class lecture notes (slides to be posted on D2L, recording of materials presented at the board is the responsibility of the student), PDFs of external sources, oral tradition, and the interwebs. In addition, there are some books recommended as complementary to some of the topics covered in class, but these are not required:

### 1) Mankind Beyond Earth: The History, Science, and Future of Human Space Exploration

by Claude A. Piantadosi, 2013

### 2) The Martian

by Andy Weir, 2011

**Schedule:** See Handout #2 for lecture / assignment schedule.

## Logistics

1. Office Hours – We have them! You should come if you need help!
  2. Assignments – There are two primary types of assignments in this course – *homework and exams*. Collaboration is permitted on homeworks. This means you may discuss the means and methods for solving problems and even compare answers, but you are not free to copy solutions from classmates or from internet resources. The work that you turn in must be your own--copying is not allowed for any assignments. Students who are caught copying any portion of an assignment will be reported for violation of honor code and may incur both academic and non-academic sanctions. Please see the 'Grading Breakdown' below for more description. Of course, there is no working together on exams.
  3. Email - **Email Policy: CU requires you to regularly read (or forward) email at your CU-provided address**. Please (1) use this official email address as much as possible, as some email addresses may be blocked by our spam-filters and it may be that we don't need to know that you are [ColludingWithDonnyJr@gmail.com](mailto:ColludingWithDonnyJr@gmail.com), (2) make good use of the "Subject:" line to introduce your problem or question and level of urgency, and (3) always send a copy to yourself on important messages. **Homework or other assignments should never be emailed!**
  4. Deadlines – Late work is NOT accepted without prior arrangement! If a critical life event, desperate need to ski, or political rally arises that will impact your ability to turn in a homework on time, please contact Kevin at least 24 hours before the work is due to explain and make arrangements for extra time. Other late assignments will receive no credit. This is a flexibility-free policy.
  5. Grading – Grades on individual assignments and for the overall course are set based on the following criteria:
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A, A-	Superior understanding of the material beyond the course requirements; excellent technical work
B+, B	Comprehensive understanding of the material; strong technical work
B-	Adequate understanding of the material; complete technical work
C	Barely adequate understanding of the material and minimally sufficient technical work
D	Poor technical work
F	Unsatisfactory performance

## GRADING BREAKDOWN

Activities	%
Homework	40%
Midterm Exams	25%
Final Exam	25%
Active class participation	10%

40% of your grade will be based on a number of homeworks assigned over the course of the semester. 50% of the grade will be based on the two exams and the final. 10% of your grade will be based on attendance and active participation in class. So jump in!

Assignments and grades will be posted on D2L, and announced in class. Interim letter grades (predictions of what your final grade might be) are available from the instructor at any time during the semester.

## University Policies

### CHEATING

Cheating will not be tolerated and the CU Honor Code will be upheld (see below).

### ACCOMMODATION FOR DISABILITIES

Faculty consultations with an Access Coordinator in [Disability Services](#) serve as an opportunity to provide clarity and guidance regarding the implementation of accommodations and working with students with disabilities. To request an appointment with an Access Coordinator, contact Disability Services at [dsinfo@colorado.edu](mailto:dsinfo@colorado.edu) or 303-492-8671

If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner 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](#) ([www.colorado.edu/disabilityservices/students](http://www.colorado.edu/disabilityservices/students)). Contact Disability Services at 303-492-8671 or [dsinfo@colorado.edu](mailto: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 your professor.

## RELIGIOUS HOLIDAYS

It is the responsibility of every instructor to explain clearly her or his procedures about absences due to religious observances in the course syllabus so that all students are fully informed, in writing, near the beginning of each semester's classes. [Campus policy regarding religious observances](#) states that faculty *must* make reasonable accommodations for students and in so doing, be careful not to inhibit or penalize those students who are exercising their rights to religious observance. For more information on the religious holidays most commonly observed by CU Boulder students consult the [online interfaith calendar](#). 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. See the [campus policy regarding religious observances](#) for full details.

## CLASSROOM BEHAVIOR

Faculty and students should be aware of the campus [Classroom and Course-Related Behavior policy](#) which describes examples of unacceptable classroom behavior and provides information on how to handle such circumstances should they arise. 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 race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. 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](#).

## SEXUAL MISCONDUCT, DISCRIMINATION, HARASSMENT AND/OR RELATED RETALIATION

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](#).

## HONOR CODE VIOLATIONS

All students of the University of Colorado at Boulder are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. All incidents of academic misconduct shall be reported to the Honor Code Council ([honor@colorado.edu](mailto:honor@colorado.edu); 303-725-2273). Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions from the faculty member and non-academic sanctions (including but not limited to university probation, suspension, or expulsion). Other information on the Honor Code can be found at <http://www.colorado.edu/policies/honor.html> and at <http://www.colorado.edu/academics/honorcode/>

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