

## ASTR 1000-001: The Solar System – Fall 2011

Tues Thurs 11am-12:15pm, Duane G1B20

<http://learn.colorado.edu>

### Goals:

1. Instill the idea that we are all scientists, and benefit from use of the scientific method
2. Demonstrate that science naturally evolves to explain “why and how” (**not** “what”)
3. Illustrate that a few scientific concepts explain many diverse phenomena
4. Convey a sense of excitement associated with scientific discovery

### 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, the current theory for solar system formation, planetary geology, planetary atmospheres, and applications to our current understanding of planets, moons, and small bodies in our solar system.

### Format:

The course will meet twice per week for 75 minutes. Most meetings will be in the lecture hall and will consist of a mixture of classroom lecture, demonstrations, and active learning (discussion, clicker questions, etc.). 3-4 times over the semester we will instead meet at Fiske Planetarium on campus.

In addition to the meetings at the regularly scheduled class time, there will be opportunities to engage with the course material in a guided manner at night, when the planets are visible. 6 nights have been reserved for you at the telescopes of the Sommers-Bausch Observatory (SBO) on campus. A field trip away from the lights of Boulder may be scheduled if there is popular demand.

### University Science Requirement:

This course fulfills part B (non-sequence course) of the Natural Science requirement of the Arts & Sciences Core Curriculum. Coupled with ASTR-1020 it fulfills part A (two-semester sequence).

### Required Items:

- Textbook: *The Cosmic Perspective 6<sup>th</sup> Edition*, by Bennett, Donahue, Schneider, and Voit. Published by Addison Wesley. Purchase new or used.
- An account on MasteringAstronomy.com. Comes bundled with new textbooks, or can be purchased separately. Detailed instructions available on Desire2Learn.  
Course Code: **BRAIN2011FALL**
- An iClicker available at the CU bookstore. New textbooks come with a discount coupon.

### Course Web Site:

All course materials, announcements, and grades will be posted on Desire2Learn at <http://learn.colorado.edu>. **If you need something course-related, go here first!**

### Instructor:

Dave Brain ([david.brain@colorado.edu](mailto:david.brain@colorado.edu); 303-735-5606)

Office Hours: Mondays 5:30-7:00pm in the UMC across from Baby Doe's.

Tuesdays 2:30-4:00pm in Duane D1B19 (my office)

By appointment

### Teaching Assistant:

Josh Moloney ([joshua.moloney@colorado.edu](mailto:joshua.moloney@colorado.edu); 303-492-5010)

Office Hours: Tuesdays 12:30-1:30pm in Duane E-122

Wednesdays 11:00am-12:30pm in Duane E-122

By appointment

### Anticipated Course Schedule

Tuesday		Thursday	
Aug 23	Welcome / Scale of solar system <b>C1</b>	Aug 25	<b>Fiske:</b> The Night Sky <b>C2</b>
Aug 30	Motions in the Sky <b>C2</b>	Sep 1	The Wanderers <b>C2</b> <span style="float: right;">HW 1 due</span>
Sep 6	<b>Fiske:</b> Night Sky Motions <b>C2</b>	Sep 8	Science of Astronomy <b>C3</b> <span style="float: right;">HW 2 due</span>
Sep 13	Understanding Motion <b>C4</b>	Sep 15	<b>Exam 1</b>
Sep 20	Understanding Gravity <b>C4</b>	Sep 22	Solar System Overview / Formation <b>C7/8</b> <span style="float: right;">HW 3 due</span>
Sep 27	Solar System Formation <b>C8</b>	Sep 29	Planetary Interiors <b>C9</b> <span style="float: right;">HW 4 due</span>
Oct 4	Planetary Surfaces <b>C9</b>	Oct 6	Case Studies in Planetary Geology <b>C9</b> <span style="float: right;">HW 5 due</span>
Oct 11	Light and Matter <b>C5</b>	Oct 13	<b>Exam 2</b>
Oct 18	Learning from Light <b>C5</b>	Oct 20	<b>Fiske:</b> Mars Revealed <span style="float: right;">HW 6 due</span>
Oct 25	Atmospheric Structure <b>C10</b>	Oct 27	Weather and Climate <b>C10</b> <span style="float: right;">HW 7 due</span>
Nov 1	Climate Evolution <b>C10</b>	Nov 3	Jovian Planets <b>C11</b> <span style="float: right;">HW 8 due</span>
Nov 8	Jovian Planet Moons <b>C11</b>	Nov 10	<b>Exam 3</b>
Nov 15	Solar System Debris <b>C12</b>	Nov 17	Dwarf Planets <b>C12</b> <span style="float: right;">HW 9 due</span>
Nov 22	<b>Thanksgiving Break</b>	Nov 24	<b>Thanksgiving Break</b>
Nov 29	Exoplanets <b>C13</b>	Dec 1	Life in the Solar System <b>C24</b> <span style="float: right;">HW 10 due</span>
Dec 6	<b>Student's Choice</b>	Dec 8	The Last Lecture

#### Final Exam: Dec 12, 4:30-7:00pm

- Lectures labeled “**Fiske**” will be held in the Fiske Planetarium across campus.
- Reading for each lecture is labeled in **green**, and refers to the Chapter # in the textbook.
- SBO observing nights are available on: Aug 30, Sep 12, Sep 28, Oct 13, Oct 31, Nov 10. These are the only dates for our class, regardless of weather or cloud conditions. So don't wait until the end of the semester to go (I advise visiting on one of the first three opportunities)!

**Course Evaluation:**

35%	Final exam	(Dec 12, 4:30-7:00pm)
30%	Mid-term exams	(drop lowest one of three scores)
25%	Weekly homework	(drop lowest one of ten scores)
10%	Clicker questions	(drop lowest 5 of ~22 scores, or replace with lowest mid-term)

I plan to 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 – everyone can earn higher grades.

**Exams:**

Exams will test the application of concepts discussed in the course (not the facts themselves). They will consist of a mixture of true/false, multiple choice, short answer, and more detailed questions. This mixture minimizes the influence of ‘question type’ on the assessment of your mastery of the material. The final exam will be cumulative, with the same format as the midterms. There are no make-up exams even for excused absences; many students will have to miss one exam during the semester, and I accommodate this by dropping one score.

**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 ten homework assignments due on Thursdays, five minutes after the start of class. No late homework will be accepted – no exceptions. Nominally, five assignments will be on-line, and five will be written. This plan may change after the first two assignments have been submitted.

The two lowest homework grades will be dropped. In addition, one homework score can be replaced with full credit for attending one of the observing sessions at SBO and completing a short assignment. Two more homework score can be replaced with two typed 2-3 page essays (due Nov 1 & Dec 1) that give you an opportunity to reflect on the course material from a non-technical perspective. Possible topics will be discussed in class and posted at Desire2Learn.

**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, each question will be worth three points. Two points will be awarded for any answer, and one more point will be awarded for the correct answer. Scores for each day will be averaged separately, and each day will be weighted equally. Research shows that use of clickers can dramatically improve student understanding, leading to improved course grades. Note that you must attend class regularly to achieve a good clicker score. Your clicker score will be automatically replaced with your lowest midterm exam grade if it benefits you.

**Advice for success in this course:**

- Attend lectures and stay to the end. Take notes. Participate. Try not to be passive.
- Stay up-to-date on Desire2Learn. All important information will be reflected there.
- Read the textbook. Skim the material before class, and try to come prepared with one question.
- Study with classmates. Work together, but write-up HW on your own and in your own words.
- 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 Josh.
- Don’t cheat. Please. It may be the only thing that makes me mad.

What follows is “Grumpy Professor” and University legalese. It is important to read and be familiar with these statements, and I will abide by them. But it is also 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 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; 303-735-2273). 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/>

**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. See policies at <http://www.colorado.edu/policies/classbehavior.html> and at [http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student\\_code](http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student_code)

**Discrimination and Harassment:**

The University of Colorado at Boulder Discrimination and Harassment Policy and Procedures, the University of Colorado Sexual Harassment Policy and Procedures, and the University of Colorado Conflict of Interest in Cases of Amorous Relationships policy apply to all students, staff, and faculty. Any student, staff, or faculty member who believes s/he has been the subject of sexual harassment or discrimination or harassment based upon race, color, national origin, sex, age, disability, creed, religion, sexual orientation, or veteran status should contact the Office of Discrimination and Harassment (ODH) at 303-492-2127 or the Office of Student Conduct (OSC) at 303-492-5550. Information about the ODH, the above referenced policies, and the campus resources available to assist individuals regarding discrimination or harassment can be obtained at <http://www.colorado.edu/odh>

**Disability Accommodations:**

If you qualify for accommodations because of a disability, please submit to me a letter from Disability Services in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities. Contact: 303-492-8671, Center for Community N200, and <http://www.colorado.edu/disabilityservices>.

If you have a temporary medical condition or injury, see guidelines at <http://www.colorado.edu/disabilityservices/go.cgi?select=temporary.html>

**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 to make alternative arrangements. See full details at [http://www.colorado.edu/policies/fac\\_relig.html](http://www.colorado.edu/policies/fac_relig.html).

Have a great semester!

A handwritten signature in black ink, appearing to read "Not a word", is written in a cursive style.