

Here Comes the Sun: How the Nearest Star Affects our Lives

First-Year Seminar FYSM-1000-009 CU Boulder Syllabus (Fall 2019)

Class Times & Location: Mon./Wed./Fri., 11:00-11:50 am, Duane Physics D142
Instructor: Prof. Steven R. Cranmer (steven.cranmer@colorado.edu)
Office Hours: Duane D111: Mon. 12:00–1:00, Thurs. 10:00–11:00, or by appointment
Course Web Page: http://lasp.colorado.edu/~cranmer/FYSM_1000_2019/

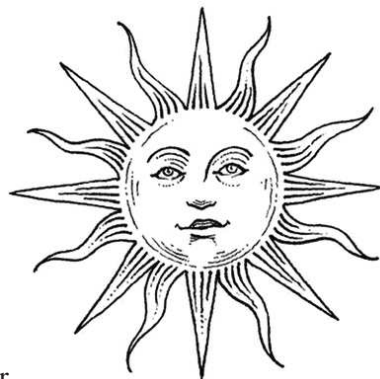
OVERVIEW

This class is for anyone fascinated by that huge, fiery powerhouse up in the sky that sustains all life on Earth. In this seminar, you will discover what makes the Sun shine, how it affects Earth’s climate and biology, how we can harness its power, and how it can produce hazardous “solar storms” that may have serious consequences here on the ground. We will seek out deep connections between topics as seemingly different as rainbows, ancient myths, and alien life forms. You’ll also chart your own course by designing your own group projects, writing about topics of interest to you, and carrying out in-class debates... all the while picking up useful skills for college.

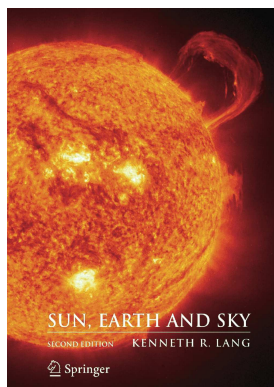
COURSE GOALS

Our hope is that a graduate of this course will:

- Develop a sense of awe & appreciation about the physical universe (in general) and about our own Sun (in particular).
- Understand how science allows us to confidently answer many questions that lie far outside the realm of what we experience in everyday life.
- Learn how we “stand on the shoulders of giants” by building on earlier discoveries. Science isn’t a static set of rules and equations, but is constantly changing in response to new observations and interpretations.
- Develop some experience using skills such as critical thinking, problem solving, and quantitative reasoning (yes, there will be *a bit of math*) that are very useful for life beyond this course.
- Become inspired to share what you’ve learned with other people (friends, family, or random strangers on the HOP bus).



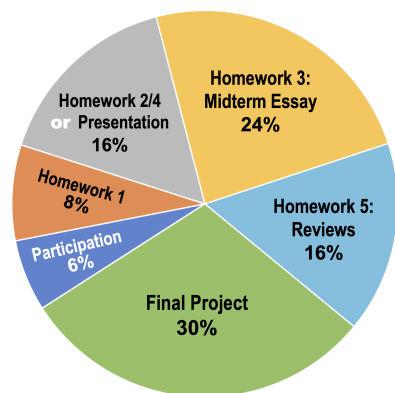
COURSE MATERIAL



Our textbook for this course is *Sun, Earth, and Sky* by Kenneth R. Lang (2nd edition, Springer Publishing, 2006). The CU Bookstore has ordered a number of copies, but the CU Library system has also made it possible for you to [download the full book for free as a PDF file](#). (If you’re reading this on paper, please get the online version of this syllabus, and you can click on the blue links.) The book download is only possible when your internet connection is from a colorado.edu domain. It’s up to you which format you obtain.

On the [course web page](#) (not Canvas), I will also distribute copies of my lecture slides, instructions for the assignments, and other optional reading material that we’ll discuss throughout the semester.

HOW YOUR GRADE IS COMPUTED



- 6% Class Participation
- 8% Homework 1: Orientation
- 16% Homeworks 2 & 4 *or* give a Class Presentation
- 24% Homework 3: “Midterm” Article (with peer edits)
- 16% Homework 5: Media and Movie Reviews
- 30% Final Group Project

More information about each part of your grade is given below.

Because some parts of this course are being offered for the first time, I will probably be adding some number of points to everyone’s final score at the end (as compensation for you being “guinea pigs” on a subset of the course work). After that addition, the final letter grade will be computed from the following scale that is used frequently at CU: A (93 and up), A– (90 to 93), B+ (87 to 90), B (83 to 87), B– (80 to 83), C+ (77 to 80), C (73 to 77), C– (70 to 73), D+ (67 to 70), D (63 to 67), D– (60 to 63), F (below 60).

CLASS PARTICIPATION

Your participation is required if this class is to be successful, but quality is more important than quantity. Thus, even though I think things like “good attendance” and “asking/answering questions in class” are important, I can’t always keep track of every single comment and contribution. I’ll ask you to fill out a *Participation Log* to remind me of the different ways that you’ve contributed to the life of the class, and you’ll submit it at the end of the semester. (Practically, the only way to not get participation credit is to have nothing to write in your Log.)

HOMEWORK

There will be approximately 5 written homework assignments over the course of the semester, and a detailed list of due dates will be posted on the course [web page](#). Homeworks 1, 3, and 5 are required, and Homeworks 2 & 4 are only for the students who end up *not* doing in-class presentations (see below).

Homework 3 will be an article, written by you about a topic of your choosing, that will be done in several steps. After selecting a topic and getting it approved, you will write and submit a first draft. Then each article will be read and reviewed by one of your classmates. You will receive that feedback and have a chance to produce a second draft, which will then be your official submission to be graded. Details on the format, length, and overall objectives of the article will be forthcoming.

Policies: Written homework is due at the beginning of class on the day it is due. Late homework can be turned in up to one week after the due date, and will receive up to 50% credit. For some of the homeworks, answers will be posted one week after the due date, and after that late submissions cannot be accepted.

STUDENT PRESENTATIONS

On most Wednesdays of the semester, we will devote half of the class to a student presentation. This is an opportunity for one of you to prepare a lecture and teach the class about a topic relevant to the course. The mode of teaching (i.e., powerpoint vs. whiteboard; traditional lecture vs. interactive discussion) is up to

each individual. Unfortunately, we have time for only 10 presentations, so not everyone will get a chance to give one. In Homework 1, I'll provide a list of the topics and dates, and you will give me your first, second, and third ranked choices. Your choice can also be "*I don't want to do a presentation,*" and if ~half of our 19-person class chooses this option, then there's a good chance for everyone to get what they want.

FINAL GROUP PROJECTS

An important part of the First-Year Seminar experience is to collaborate with your fellow students to accomplish something big. Thus, over the course of the semester you will form a group (usually with 3, 4, or 5 members) and design a project on a topic relevant to this course. I will provide a list of example topics and ideas, and you can either sign up with a group to do one of them, or you can self-organize into a group to develop an idea of your own. As a component of Homework 1, you will take an online assessment called [CliftonStrengths](#) to help identify the unique strengths and talents that you bring to group activities.

The projects will have three primary milestones. (1) Early in the semester, your group will submit a written plan that describes the expected contributions of each member. (2) After receiving feedback on the plan, and spending a few more weeks developing your idea, you will submit a mid-course progress report about how it's going. (3) In the final week of class, each group will give presentations to the entire class that will have different features, depending on the type of project (i.e., if it's a movie trailer, we watch it and discuss; if it's a game, we play it; if it's a plan for a debate, the whole class has the debate).

QUESTIONS & CONCERNS

We're here to help! Please don't hesitate to get in touch with your professor if you have questions about any aspect of the class, or if you start running into difficulties following the material or keeping up with assignments. There are many resources, including office hours and the Astronomy Help Room (the latter mainly for problems involving math). Please let me know if you need help on any aspect of the course.

What the heck are office hours? The time that I have listed as office hours is time for you. It is time that I have dedicated to be in my office and available for whatever you need. This doesn't mean I'll be staring sadly out the window waiting for students to arrive—I'll probably be doing other work, but the second you show up, that work gets put away and the time is yours. We can talk about this course or about any other aspect of your college experience. If you can't make it to any of the scheduled office hours, please feel free to email me to schedule a chat for another time.

How much math will there be? For Homeworks 2 and 4, some familiarity with basic algebra and scientific notation will be helpful. (Keep this in mind for your choice about whether to do an in-class presentation or not.) We'll spend a little time at the start of the course to review these concepts, but for a more thorough review, see: <http://lasp.colorado.edu/~bagenal/MATH/main.html>

CHECKLIST FOR SUCCESS IN THIS CLASS

- Attend class regularly. Sit up front and ask questions. (There are no "dumb" questions!)
- Get a copy of the textbook and read the parts assigned.
- In class, put away your phone and laptop.
- Turn in something for *every* assignment. Partial credit is a lot better than no credit.
- Don't settle for being confused. If you don't understand something, I guarantee there will be several other students in class who also don't. Help them out by asking a question.

PRELIMINARY CLASS SCHEDULEFYSM-1000-009: Here Comes the Sun (Fall 2019)

Our exact schedule is likely to change a bit throughout the semester, so please keep checking the course [web page](#) to stay up to date.

| | <i>Monday</i> | <i>Wednesday</i> | <i>Friday</i> |
|--------------------------------------|--|--|--|
| Week 1 (Aug. 26-30) | 1. Course introduction | 2. The sky & our history | 2. The sky & our history |
| Week 2 (Sep. 4-6) | Labor Day, no classes | 2. The sky & our history | FISKE PLANETARIUM |
| Week 3 (Sep. 9-13) | 3. Observing the Sun | 3. Observing the Sun | 3. Observing the Sun |
| Week 4 (Sep. 16-20) | 3. Observing the Sun | 4. Inner workings of the Sun | 4. Inner workings of the Sun |
| Week 5 (Sep. 23-27) | 4. Inner workings of the Sun | 4. Inner workings of the Sun | 4. Inner workings of the Sun |
| Week 6 (Sep. 30 - Oct. 4) | 5. Solar magnetic activity | 5. Solar magnetic activity | 5. Solar magnetic activity |
| Week 7 (Oct. 7-11) | 5. Solar magnetic activity | 5. Solar magnetic activity | 6. Space weather: Dangers from the Sun |
| Week 8 (Oct. 14-18) | 6. Space weather: Dangers from the Sun | 6. Space weather | 6. Space weather: Dangers from the Sun |
| Week 9 (Oct. 21-25) | 6. Space weather: Dangers from the Sun | 6. Space weather | 7. The Sun-atmosphere connection |
| Week 10 (Oct. 28 - Nov. 1) | 7. The Sun-atmosphere connection | 7. Sun-atmosphere connection | 7. The Sun-atmosphere connection |
| Week 11 (Nov. 4-8) | 7. The Sun-atmosphere connection | 7. Sun-atmosphere connection | 8. The Sun & biology |
| Week 12 (Nov. 11-15) | 8. The Sun & biology | 8. The Sun & biology | 8. The Sun & biology 9. Harnessing solar energy |
| Week 13 (Nov. 18-22) | 9. Harnessing solar energy | 9. Harnessing solar energy | 10. Alien life under alien suns? |
| Fall Break (Nov. 25-29), no classes | | | |
| Week 14 (Dec. 2-6) | 10. Alien life under alien suns? | 10. Alien life under alien suns? | Final project presentations/activities |
| Week 15 (Dec. 9-11) | Final project presentations/activities | Final project presentations/activities | Reading Day, no classes |
| Finals Week (Dec. 14-18), no classes | | | |

CLASS POLICIES

You are all mature and responsible adults, and I'll do my best to treat you with respect. On your part, I hope you will do the same for your peers and instructors. For example:

- Please show up to class on time, and be ready to learn when class starts.
- Please don't leave class early, and don't start packing up before class is dismissed. If you know you'll *need* to leave early, please sit near the back of the room and leave as quietly as possible.
- **Laptops and tablets** can be used in class *ONLY* for note-taking, but it is discouraged. If you need to use a laptop, please sit in a seat with nobody behind you.
- **Phones** should not be used in class (this includes texting), except in the case of emergencies.

I try to provide a positive and supportive learning environment for everyone, and it's always helpful for me to hear what works best for you.

ACADEMIC INTEGRITY

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the [academic integrity policy](#) and [Honor Code](#) of this institution. Violations of this 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 must be reported to the Honor Code (honor@colorado.edu; 303-492-5550). Students who are found responsible for violating the academic integrity policy will be subject to nonacademic sanctions from the Honor Code as well as academic sanctions from the faculty member. Additional information regarding the Honor Code academic integrity policy can be found at the [Honor Code Office website](#).

What constitutes plagiarism / cheating?

While I encourage you to discuss course assignments with your fellow students, the answers you submit in the individual Homeworks must be your own independent work. If you do collaborate with other students, a good time to split off from the group is when you start to write up your answers. Use the motto "**work together, write separately**" to guide your actions. Every semester, we receive a number of homeworks with nearly-identical answers. When those are found, both students will receive zero credit for the entire assignment and may be reported to the Honor Code Office. Don't be that person!

In written work (essays), it is expected that you utilize outside sources in your research. Quoting sources is acceptable with proper attribution, however copy/pasting text from another source as your own is plagiarism and constitutes serious academic misconduct.

ACCESSIBILITY AND LEARNING NEEDS

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, but please contact me to discuss how I can help even for conditions not on their list. Information on requesting accommodations is located on the [Disability Services website](#). Contact Disability Services at 303-492-8671 or by email at dsinfo@colorado.edu for further assistance. If you have a temporary medical condition or injury, see the guidelines for [Temporary Medical Conditions](#) on the Disability Services website.

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. If you have religious obligations that result in schedule conflicts, please contact me in the first two weeks of class to make alternate arrangements. For full details, see the [campus policy regarding religious observances](#).

DISCRIMINATION AND HARASSMENT

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 by email at 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.

CLASSROOM BEHAVIOR

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](#).