



Contact information:

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Office Hours: by appointment

Course Delivery: 2021 spring semester EARTH 107 'Solar System Studio' will be delivered as a hybrid course with much of the formal lecture instruction and homework assignments being online, the laboratory and project component being taught in person, in POST 544, to class subgroups to be assigned, and scheduled on T/R 1:30 - 4:20 pm. Online Zoom office hours are scheduled at time convenient to all participants, or as needed by appointment.

Required Text: *Foundations of Astronomy*, Michael A. Seeds and Dana E. Backman, 14th edition, Cengage 2019.

Course Technologies and Equipment: We will be using WebAssign and Lulima to access online materials including the course textbook, uploaded video and PowerPoint files, announcements, and additional reading. Online homework and exams are managed through WebAssign. A WebAssign link in Lulima provides instructions on how to purchase WebAssign and Textbook access.

Website: Assignments and course material are posted on WebAssign and Lulima.

Description: EARTH 107 Solar System Studio is a specially designed introductory course about the world we live in and beyond. Instead of sitting and listening to teachers lecture and instead of reading dry book chapters for homework, you will be expected to take an active role in your own learning and to help teach each other through participation in in-class activities. You will have authentic research experiences through several weeks-long group projects. Group project results will be presented at the end of each project in mini-

reports and mini-talks. Each project is designed to increase your independence and inspire confidence in your ability to conduct scientific inquiry. Instructor-supplied student support will slowly be removed over the course of the laboratory learning experience. Our end-of-the-semester goal is for you to develop your understanding of the scientific method and to be able to devise and complete a scientific investigation all on your own.

Class contact hours: The first class meeting will be a Zoom meeting at the scheduled date and time: Tuesday, January 12, at 1:30 pm HST. Thereafter class will follow a hybrid schedule that will be discussed in class. You must keep the T/R 1:30 – 4:20 pm schedule free of conflict for Zoom class sessions, small group F2F laboratory demonstrations, laboratory experiments, and group project work, following UH COVID rules. Regular office hours will be held via Zoom once per week at a time convenient to all participants or by appointment as needed. Class will return to a regular F2F delivery when the UH COVID rules will permit it.

Learning Objectives/Course Objectives

University-Level Learning Objectives

The design and structure of the course delivers learning outcomes aligned with the University of Hawaii Institutional Learning Objectives for Undergraduate Students. The course:

- Gives in depth experience in the conduct of scientific inquiry and research;
- Engages students in continuous practice with critical and creative thinking;
- Is structured around procedures of conducting research in Earth and planetary science;
- Engages students through intensive interaction with instructors and peers by means of classroom activities and projects;
- Directly cultivates the habits of scholarly inquiry and intellectual curiosity, including inquiry across disciplines.

Department-Level Learning Objectives

- Students can explain the relevance of solar system studio outcomes to human needs;
- Students can apply knowledge of relevant research methods, and the supporting disciplines to solve real world problems;
- Students use the scientific method to define, critically analyze, and solve a problem in solar system science;
- Students can report solar system knowledge in both oral presentations and written reports;
- Students can evaluate, interpret, and summarize the basic principles of solar system science, and their context in relationship to other core sciences, to explain complex phenomena.

Course-Level Student Learning Objectives:

1. Explain how the Scientific Method works, apply it to evaluate good vs. bad science and to analyze and assess data and draw conclusions about the world;
2. Develop a better understanding and appreciation for the world we live in, extending beyond our home planet Earth; and
3. Demonstrate improved communication and teamwork skills that will serve you throughout life by collaborating in writing, presenting & displaying data to communicate your knowledge, analysis, synthesis of data and ideas and your assessment of what it means.

Topics

Exact content and order of topics will depend on progress and student interest: What is Knowledge? Reasons for the Seasons; Lunar Phases and Tides. Birth of Our Solar System; Solar System Roadmap; Leftovers of Solar System Formation – Asteroids and Comets. Our Sun is a Star; Our Place in Space – Planet, Solar System, Galaxy, Universe; Space radiation environment. Shaping Planets: Cratering, Volcanism, Plate Tectonics and Fluvial and Hydrologic Systems; Comparative Planetology. Solar System Exploration: Light and the Electro-Magnetic Spectrum, Ground-based vs. Space Mission Exploration, On-board Instruments, and Current Missions; Planetary Atmospheres and Climate Change; Extraterrestrial Oceans and the Possibility of Life elsewhere.

Online Homework

Online homework will count 20% towards your grade. The homework will be assigned through WebAssign every week .

Regular Homework

Regular homework will count 10% towards your grade. Four regular homework assignments will be issued online through Lulima using the Test & Quizzes tab.

Group Projects

Group projects (three) will count 70% towards your grade. The general scope of these projects is described below.

Grading

Grading is not curved. Everyone can get an A. Grading is based on online homework, regular homework, and individual's grades in three group projects. There will be one practice group project (Group Project 1) and two main projects (Group Projects 2 &3).

| <u>Percentage</u> | <u>Activity</u> |
|-------------------|---------------------------------------|
| 20% | Homework |
| 10% | Regular Homework |
| 20% | Individual's Grade on Group Project 1 |
| 20% | Individual's Grade on Group Project 2 |
| 30% | Individual's Grade on Group Project 3 |

Letter grade breakdown:

A- = 90 – 92%, A = 93 – 96%, A+ = 97 – 100%

B- = 80 – 82%, B = 83 – 86%, B+ = 87 – 89%

C- = 70 – 72%, C = 73 – 76%, C+ = 77 – 79%

D- = 60 – 62%, D = 63 – 66%, D+ = 67 – 69%

F = < 60%

Group Projects Rules

Time will be spent in class on identifying with your team on how to formulate a science question for your project that you are really interested in. Group project teams will vary for each project, and group project teams will be established through class discussion led by the instructors.

Each group will prepare one consensus-based paper per project. At the start of each project, a grading rubric will clearly establish how each project will be graded. Grading will vary slightly with each project, but in general, it will include the following items:

Written Report (few pages)

Problem or Question is clearly stated

Hypothesis is clearly stated ; Hypothesis is testable

Materials and Methods or Procedure are appropriate to test hypothesis

Data analysis is thoroughly described

Data presentation is appropriate (numbers or graph or side-by-side images)

Conclusions drawn are supported by data: Did you confirm or falsify your hypothesis?

Bonus: If your hypothesis was confirmed, what predictions or further test of the hypothesis can you make? If falsified, can you create a new testable hypothesis?

Oral Report (10-15 minutes)

Participation by all group members. Presentation style is clear and understandable.

Presentation of data communicates results well.

Other Group Assessments

Each group will also get the opportunity to give formative and summative assessment of the other group's projects. These assessments will NOT formally count toward your grade. Your peers from other groups will likely give you helpful comments that can improve your presentation (both written and oral), which will allow your group to get a higher grade.

Extra Credit

Opportunities for extra credit will be announced during the semester.

Plagiarism

You will be preparing short written reports and short oral presentations for each project. DO NOT JUST COPY text from the Internet or from a book without a citation. Put your findings in your own words. Plagiarized text in a group report will result in a grade reduction by 2 levels (e.g., grade drop from an A to a C) for the first occurrence. A second occurrence will result in a zero for that project.

Other Resources

Disability Access:

The Earth Science Department will make every effort to assist those with disability and related access needs. For confidential services, please contact the Office for Students with Disabilities (known as "Kokua") located in the Queen Lili'uokalani Center for Student Services (Room 013): 956-7511, kokua@hawaii.edu, www.hawaii.edu/kokua

Learning Assistance Center (LAC) is here to help students:

- Use appropriate study skills to achieve academic goals.
- Learn how to adjust learning approaches to fit their individual learning needs.
- Learn how to study effectively with others.
- Use effective learning practices.
- Use self-reliant learning behaviors.
- Have a functional understanding of course content.

www.manoa.hawaii.edu/learning

Gender-Based Discrimination or Violence

University of Hawaii is committed to providing a learning, working and living environment that promotes personal integrity, civility, and mutual respect and is free of all forms of sex discrimination and gender-based violence, including sexual assault,

sexual harassment, gender-based harassment, domestic violence, dating violence, and stalking. If you or someone you know is experiencing any of these, the University has staff and resources to support and assist you. Staff can also direct you to community resources. Here are some options:

- If you wish to speak with someone **CONFIDENTIALLY**, contact the confidential resources available here:
<http://www.manoa.hawaii.edu/titleix/resources.html#confidential>
- If you wish to **REPORT** an incident of sex discrimination or gender-based violence, contact: **Dee Uwono**, Title IX Coordinator, Hawai'i Hall 124, t9uhm@hawaii.edu, (808) 956-2299
- **As members of the University faculty, your instructors are required to immediately report any incident of potential sex discrimination or gender-based violence to the campus Title IX Coordinator.** Although the Title IX Coordinator and your instructors cannot guarantee confidentiality, you will still have options about how your case will be handled. Our goal is to make sure you are aware of the range of options available to you and have access to the resources and support you need.