GG 107 Solar System Studio
Spring 2019

T/R 1:30 – 4:20 PM in POST 544
Planetary Data Center

Contact information:
Dr. Peter Englert: POST 508B, 808-384-3500, penglert@hawaii.edu
Office Hours: MWF 1-2 pm, or by appointment


Website: Computer access is required for this course. Pre-class assignments and course material is posted on Laulima. Please check for pre-class assignments before the next class period in the Resources folder!

Description: GG 107 Solar System Studio is a newly 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 class period combines lecture and laboratory all in one. Each meeting is about 3 hours long (including a break) to allow time for brief lectures, exercises, collaborating on projects, analyzing data, and testing hypotheses. We anticipate that most group project work will take place during the class period, but there may be some extra work on projects that needs to be completed at home.

**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 (and Why Pluto Got Demoted)
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
Wacky Objects in the Solar System

Homework
Homework will count toward your grade for this class (20%). The homework will predominantly be assignments through Cengage Unlimited and pre-class assignments distributed through Laulima. The pre-class assignments are intended to introduce you to the ideas we will learn about in-class. They will make your learning easier and prepare you to participate in class at a higher level. Occasionally a set of homework problems will be issued for you to complete and return for grading. The occasional homework is intended to enhance learning outcomes of subjects covered in class.

Polling
Questions will be asked during class periods that require you to participate using a polling system. The polling will be used for questions asked during each class for which you will not be graded. These questions are intended to help you and us assess your learning.

Grading
Grading is not curved. Everyone can get an A. Grading will be based mostly on 3 group projects. Small contributions to your grade will come in the form of participation, end of class quizzes and attendance at one of several possible field trips. Grading is based on participation and attendance, homework, and individual’s grades in group projects. There will be one practice group project and three main group projects.

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<tr>
<th>Percentage</th>
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<tr>
<td>5%</td>
<td>Participation and Attendance</td>
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<td>5%</td>
<td>Individual’s Grade on initial practice Group Project</td>
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<td>20%</td>
<td>Homework</td>
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<tr>
<td>20%</td>
<td>Individual’s Grade on Group Project 1</td>
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<td>20%</td>
<td>Individual’s Grade on Group Project 2</td>
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<td>30%</td>
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Each individual’s project grade will be determined by a combination of the grade the group receives on the project, the Group Project Grade, and the average grade given by their peers in their own group for their participation and contribution on the project, the Peer Participation Grade. The final Individual Grade for each project will be determined as follows: (Group Project Grade plus Group Project Grade multiplied by Peer Participation Grade) divided by 2. For example, if the Group Project Grade is 95% and the Peer Participation Grade is 75%, the Individual’s Grade on the project is 

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\frac{95\% \text{ Group Project Grade} + 95\% \times 75\% \text{ Peer Participation Grade}}{2} = 83\% \text{ Individual's Grade.}
\]

Be sure to stick around for Group Project work and to participate.

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%

**Grading of Group Projects**

Time will be spent in class on identifying with you and your team members 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 work on and hand in one consensus-based write up 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 considerations:

- **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

- **In-Group Participation**
  - Your group’s assessment of your participation in and contribution to each project will impact your individual project grade. See individual project grade breakdown above.
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. They are part of the process of learning what makes a good presentation of a science project. Your peers from other groups will likely give you helpful comments that will allow you to 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. For example, groups may be given the opportunity to have their Group Project Reports posted on UH News for some extra credit.

Your roles
1. Please read this syllabus and keep a copy of it to refer to in future.
2. Come to learn and to share your particular knowledge, skills and learning styles with the rest of us. Everyone has something to offer and something to receive.
3. Be respectful of other students, of their desire to learn, their learning process, and their time.
4. Come prepared by doing the pre-class assignment. Because the in-class period is long, pre-class assignments will usually be short.

Teacher roles
1. We will give you the same respect that we ask you to give to us and to the other students in the class.
2. We are your guides and advisors as you learn, but we cannot “mind meld” knowledge and understanding to you.
3. We want to see you learn and grow in this class and to take that learning and growth with you as you go on in your life, so we very much welcome your constructive comments on how to improve the class for future students – or for you if you love learning so much that you take it again with another team of teachers and different projects.

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.