

ERTH 671B: Remote Sensing, Planets. Fall, 2020 3 Credits

Instructor: Dr. Paul G. Lucey Office: POST 524 lucey@hawaii.edu

Office hours by appointment

Lectures: MWF 1:30 – 2:20 pm, POST 544, 3 credits

Remote sensing provides physical and compositional information regarding planetary surfaces enabling synoptic insight into the evolution of planetary surfaces. The course is aimed at graduate students aiming to be planetary science professionals, and enrollees will be treated as such. This class will give students a basic understanding of the capabilities, methods and limitations of the major remote sensing techniques and how they align with the important science issues for a range of objects. We will also delve into how the measurements are made and how their capabilities match the needs of the scientist user of the data. Students will explore planetary data sets, and obtain them in the laboratory, to support understanding of how surfaces are sensed remotely.

Topics to be covered:

- Basic measurement requirements derived from science of objects throughout the solar system
- Near-infrared spectroscopy, silicates
- Near-infrared spectroscopy, volatiles
- Thermal infrared thermophysical remote sensing: methods and applications
- Thermal infrared spectroscopic remote sensing
- Ultraviolet remote sensing, silicates and volatiles
- Gamma-ray spectroscopy
- X-ray spectroscopy
- Neutron spectroscopy
- Raman, Laser induced breakdown, and laser reflectance spectroscopy
- Principles of light flow through optics systems
- Sensitivity of remote sensing instrumentation for planetary science

Prerequisites: Instructor consent

Grading: It is expected that students will attend all classes, do assigned readings prior to class, and participate in class discussion. In place of a final exam, each student will complete a class project on a topic of interest to the student. Each student will research a project topic, prepare a paper describing what they have learned, and present the results of their work to the class. Grades will be based on class participation (50%) and the final project (50%).

Learning Objectives

The **Department of Earth Sciences** has established the following student learning objectives. All of these objectives are relevant targets for the curriculum of EARTH671C.

SLO2: Students can apply technical knowledge of relevant computer applications, laboratory methods, and field methods to solve real-world problems in geology and geophysics.

SLO3: Students use the scientific method to define, critically analyze, and solve a problem in earth science.

SLO4: Students can reconstruct, clearly and ethically, geological knowledge in both oral presentations and written reports.

SLO5: Students can evaluate, interpret, and summarize the basic principles of geology and geophysics, including the fundamental tenets of the sub-disciplines, and their context in relationship to other core sciences, to explain complex phenomena in geology and geophysics.

All of these objectives will be addressed by class discussion, readings, homework problem sets, and preparing papers and presentations for the class.

Disability Access: If you have a disability and related access needs the Department will make every effort to assist and support you. For confidential services students are encouraged to contact the Office for Students with Disabilities (known as “Kokua”) located on the ground floor (Room 013) of the Queen Lili'uokalani Center for Student Services:

KOKUA Program; 2600 Campus Road; Honolulu, Hawaii 96822 Voice: 956-7511; Email: kokua@hawaii.edu ; URL: <http://www.hawaii.edu/kokua>

Discrimination: The University of Hawai'i 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 on your campus to support and assist you. Staff can also direct you to resources that are in the community. Here are some of your options:

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.

If you wish to remain ANONYMOUS, speak with someone CONFIDENTIALLY, or would like to receive information and support in a CONFIDENTIAL setting, use the **confidential resources available here:** <http://www.manoa.hawaii.edu/titleix/resources.html> - confidential

If you wish to directly REPORT an incident of sex discrimination or gender-based violence including sexual assault, sexual harassment, gender-based harassment, domestic violence, dating violence or stalking as well as receive information and support, contact: Dee Uwono Title IX Coordinator (808) 956- 2299 t9uhm@hawaii.edu.