The Earth’s shape, orbit, interior structure, and geological evolution are all the result of the interaction between Earth’s materials and the physical laws of gravity, electromagnetism, and heat flow. In this class we will explore these interactions to understand the basic physics of the Earth and other planets.
Preliminary Schedule:

Week 01  Introduction to Geophysics
Week 01  The Solar System
Week 02  Basic Earth Structure and Geodynamics
Week 02  Earth Material Properties and Plate Tectonics
Week 03  Gravity Fields and Earth’s Gravity, Geoid, Tides
Week 04  Gravity Field Data Processing and Interpretation
Week 05  Magnetic Fields and Geomagnetic Surveying
Week 06  Magnetic Field Data Processing and Interpretation
Week 07  Heat Flow and Planetary Rheology
Week 08  Elasticity, Earthquakes, and Seismology
Week 09  Seismic Refraction Theory and Methods
Week 10  • Spring Break 03/14 - 03/18
Week 11  Seismic Refraction Data and Earth’s Structure
Week 12  Seismic Reflection Theory and Methods
Week 13  Seismic Reflection Data and Earth’s Structure
Week 14  Electric Fields and Geoelectrical Surveys
Week 15  Geoelectrical Data Processing and Interpretation
Week 16  GPR/Geodetic Techniques / Acoustic Mapping Techniques
Week 17  Term Review
Week 18  • Final Exam Week

Course Structure: Two lectures and one lab per week. Lecture: includes class participation; small group activities; problem solving; Lab: Lab and outdoor activities with required report.

Grading: We will have homework, a lab/project report, two in-class midterms, and one final exam. The relative weightings of homework, lab assignments, exams, and class participation are approximately: Exams 25%; Homework Assignments 25%; Class Project Participation 25%; Project Report 25%.

Questions: Questions are welcome and help everyone. Please ask questions freely!

Learning Objectives: The Department of Earth Sciences has established the following undergraduate student learning objectives. All of these objectives are relevant targets for the curriculum of ERTH304.

1. Students can explain the relevance of geology and geophysics to human needs, including those appropriate to Hawaii, and be able to discuss issues related to geology and its impact on society and planet Earth.
2. Students can apply technical knowledge of relevant computer applications, laboratory methods, and field methods to solve real-world problems in geology and geophysics.
3. Students use the scientific method to define, critically analyze, and solve a problem in earth science.
4. Students can reconstruct, clearly and ethically, geological knowledge in both oral presentations and written reports.
5. 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.

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: www.hawaii.edu/kokua

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 ituuhm@hawaii.edu.

Mānoa Career Center
The Mānoa Career Center partners with faculty and employers to empower UH Mānoa students to engage in career life planning. Mānoa Career Center supports students and alumni in their career and personal development through awareness, exploration, experience, and reflection in University and non-university work-based learning opportunities. Some of the major programs and services include: career counseling, career planning sessions and workshops, graduate school planning, Co-operative Education and internships, part-time and full-time employment including Federal Work Study and campus recruitment, information sessions, and career fairs.

For more information, please visit the Mānoa Career Center web site at: http://manoa.hawaii.edu/careercenter/.

Counseling & Student Development Center
Counseling and Student Development Center (CSDC) offers an array of services to meet counseling and testing needs among students, staff, and faculty of the UH Mānoa campus. Our multidisciplinary staff includes psychologists, psychiatrists, graduate-level therapists, and counselor trainees.

It is our mission to uphold excellence in quality of care that is respectful to the socio-cultural diversity of our clientele. We offer walk-in, individual, and group counseling, as well as career and psychological assessments. When a client's needs could be best addressed by providers outside of the CSDC, we offer appropriate referrals in the community. We also provide outreach events to increase awareness on issues relevant to healthy campus lifestyle.

For more information, please visit the Counseling & Student Development Center web site at: http://www.manoa.hawaii.edu/counseling/.
Assignments: Assignments are due at the beginning of class exactly one week after they are assigned (unless otherwise stated). Late assignments receive no points.

Format: Neatness, clarity of expression, and completeness are essential to obtain full credit on exams, reports, and homework. Please make sure to:
(1) Write out the equations, or derive new ones, that you will use to solve the problem, and explain (in words) your reasoning. Specify known and unknown information.
(2) Draw illustrative figures that describe the problem.
(3) Show clearly how you solved the problem.
(4) Check your answer – does your solution make physical sense? Check units. Explain why you think your answer is correct.

Report Write-up: Follow all instructions, and make sure that it is clearly written. Also: (1) with regard to Matlab Codes: Include a copy of your code at the end of your write-up; don’t bury answers/results within the code. What you did should be clear from your write-up – don’t expect a reader to pick through your code. (2) Completeness. How much detail to include? A good rule of thumb is to include enough information so that a reader could take your data and reproduce what you did using the information that you provide. Be concise and complete. (3) Format. Your write-up will consist of neatly written parts, in the order in which they are specified. Present your results in the proper format for scientific writing – with labeled sections “Introduction”, “Methods”, “Results”, and “Discussion and Conclusions” (unless instructions indicate otherwise). (4) Figures: All figures that you include should be clearly labeled (Fig. 1., Fig. 2a, Fig. 2b, etc.) and these labels should be used when referring to the figure in the text. Figures should be clearly labeled on their axes, and multiple lines included in the same plot should be clearly distinguished by labels or legends. Please include units in your labels. Everything should be neat and clear.

Cooperation: Collaboration is encouraged in order to discuss approaches to solving problems. However, work out the problems on your own and write out the solutions yourself. Anyone who shares their homework solutions openly is only inviting others to copy it. Both will be referred to UH’s Office of Student Conduct for disciplinary action.