Geology and Geophysics 454: Engineering Geology (GG454)  
Spring Semester, 2019, 3.0 Units  
MWF 9:30-10:20 POST 703

Instructor: Steve Martel, POST 805, 956-7797, smartel@hawaii.edu  
Office Hours: After class or by arrangement*  
Text: “Engineering Geology” by Perry Rahn, or “Practical Engineering Geology” by Steve Hencher

Class Themes
GG454 emphasizes a modern approach to engineering geology that can be applied to a broad variety of "real-world" problems; it will not be a class in "geology for engineers" or "engineering for geologists." The lectures emphasize the approach as it pertains to a broad variety of geologic phenomena that impact people, engineering structures, and engineering operations. The lectures review selected case histories and the underlying geological phenomena. Specific topics addressed include general characteristics of soils, sedimentary deposits, and rocks; geologic structures; earthquakes; landslides and rockfalls; coastal erosion; and ground subsidence. The course introduces students to the concepts of hazards and risks.

One of the major goals of the class is to give engineers and geologists an appreciation of the advantages and challenges of working with each other; this goal is met through a series of written group projects. The projects provide class members an opportunity to practice the approach developed in the lectures, develop individual and collective writing skills, and to improve their ability to organize and carry out group projects. For many students this will be the first opportunity for thorough scrutiny of your technical writing, both from the instructor and from classmates. Students can expect to write a total of at least 16 pages in this class.

Student Learning Outcomes
In this class students will develop their ability to: (1) recognize, characterize, evaluate, and assess the relevance and significance of geologic conditions and processes of engineering relevance; (2) apply mathematics and physics to problems of common interest to engineers and geologists; (3) apply the scientific method to practical problems in applied geology; (4) communicate in written form through a series of group projects; (5) plan, organize, and complete multi-disciplinary technical projects in a timely manner; (6) develop their ability to understand and apply geologic principles to help explain geologic phenomena that impact the planning, design, construction, and operation of engineering projects. These Student Learning Outcomes directly support the five Student Learning Objectives for undergraduates in the Department of Earth Sciences:

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, field methods, and the supporting disciplines (math, physics, chemistry, biology) 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.

Grading and Assignments
Grading is based on a few homework assignments and three group projects; no exams are given. The grades are based primarily on the written group projects. The homework assignments are intended to give students an opportunity to practice some of the mechanics concepts that we discuss. Students are encouraged to work with other members of the class on the homework assignments but are expected to turn in their own work.
Grading Scheme
Homework I 5%
Written group Project #1 (preliminary outlines + report) 25%
Homework II 5%
Written group Project #2 (preliminary outlines + report) 25%
Homework III 5%
Written group Project #3 (preliminary outlines + report) 25%
Field trip 5%
Class Participation 5%

Writing
Each student will write a total of at least sixteen (16) pages total for the three projects. This averages out to 5 1/3 pages per project. Although the actual amount of writing on each project will vary from an average of 5 1/3 pages, the course instructor will check to ensure that a student satisfies the total requirement of sixteen pages. Each group member typically will be responsible for one or more sections of a given report and will identify the sections they have written. Each group member should not have difficulty meeting the minimum number of pages required given the nature of the projects. Group members are expected and encouraged to critique the writing of other group members on different parts of the reports – this not only helps others but improves an individual's own writing.

The course instructor will assist students in their writing and teamwork by the following actions:
1. Discussing careful use of language in class.
2. Providing examples of good technical writing that can be found online.
3. Identifying good reference books on writing.
4. Providing prompt, constructive, detailed feedback on report outlines and written group projects.
5. Meeting with each group, for each project, to discuss progress on the project, review an outline of the report, and discuss ways to overcome obstacles that have arisen (or that might arise). These meetings will occur about midway through the term of each project.

** GG454 has traditionally been listed as a writing-intensive (WI) course and meets the requirements for a WI course. Unfortunately, GG454 will not be officially listed as a writing-intensive class for Spring term, 2019. Any student who needs WI credit to graduate and takes the course can petition for a waiver of the last WI requirement. The course instructor will support this petition.

Field Trip
One local field trip is planned to examine sites of landslides, rockfall, flooding, and/or coastal erosion.

Educational Environment
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](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.