GG 302    Igneous and Metamorphic Petrology    SPRING, 2015

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Prerequisites: GG 301 and Chemistry 162 and lab (all with C or better grade)


Grading: Igneous part of class (2/3 of total GG302 grade); 4 Quizzes- 60 pts.,
Homework- 60 pts., 9 Labs- 90 pts., class participation- 10 pts., Term Paper- 80 pts:
Total: 300 pts.

Academic Honesty and Expectations: 100% honesty is expected from everyone.
Don’t cheat or plagiarize. Don’t help anyone do either of those illegal acts. You are
encouraged to work together on homework and labs to better understand concepts.
However, copying will NOT be tolerated. You are must attend, and be prepared and
interact during class. Your grade will be lowered if you don’t do both. Late work will
NOT be accepted without prior approved for valid excuse (e.g., illness)!

What is Petrology? Study of rocks; their fabric, mineralogy and relationships to other rocks
in the field. GG 302 is designed to emphasize hand specimens and field aspects of hard
rock petrology. This will make you more adept field geologists! Critical thinking is our goal,
not memorization. To communicate with other geologists you need your tool box of basic
terms: chemistry (common elements and their valances), structure of earth (depths and
composition), igneous minerals and rocks (names and compositions). Memorize these
things now or you will have trouble in this class. Philosophy for class: Develop critical
thinking skills through writing and discussion on igneous and metamorphic topics. We
are not training hard-rock petrologists for grad school or mining jobs.

Lectures provide an overview of selected topics. They are interactive; come prepared to
participate. Socratic method is used to evaluate students’ understanding of class material.
The lectures will build on each other, so it is important that you keep up with the material,
read the assigned reading before class, and complete all your homework and labs on
time. Students are strongly encouraged to ask questions.

Structure of Course. Approximately 65% Igneous: 35% Metamorphic. Within each
section, we will discuss field associations, textures and mineralogy. The labs will provide
examples of the concepts and materials described in lecture. We will try to design the labs
to allow you to finish them in 6 hours of effort (1 hr. preparation. 3 hrs. in lab, 2 hrs.
completing lab on your own). You will work together in groups of two (changed every lab) to
pool your different talents and backgrounds and to meet with other students. Team work is
stressed! You are not graded on a curve. Everyone can get an A if you do well.

Learning outcomes for this course include:

• Understanding of how the Earth’s crust was formed and evolved
• Knowledge of the physical and chemical controls on formation of rocks using the
  scientific method to note fingerprints preserved in rocks
• Important rock-forming processes in a Plate Tectonic context including Convergent
  Margins, Mid-ocean Ridges and Hotspots (Hawai‘i)

Course Goals: To master igneous and metamorphic rock identification and to
discuss the origin of these rocks with confidence.
This course will meet the following GG Student Learning Objectives (SLOs)

1. Students can explain the relevance of rocks 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) 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.