

GEO 358K

Volcanology

Spring 2011

Course Syllabus

Instructors:

James Gardner gardner@mail.utexas.edu
JGB 4.108
Office hours: M 1-3 PM, F 9-10:30 AM
Other hours by appointment, or when door is open

Richard Kyle rkyle@mail.utexas.edu
JGB 3.316D
Office hours: M 2-3 PM, Th 10–11:30 AM
Other hours by appointment, or when door is open

Course Overview: We will study eruptive processes and products of volcanoes, using methods and concepts from mineralogy, petrology, fluid dynamics, depositional processes, geomorphology, stratigraphy, structural geology, field mapping, economic geology, remote sensing, geochemical monitoring, and seismology. We will examine the economic aspects of volcanism, the prediction and reduction of volcanic hazards, and challenges faced by geologists in communicating with the public, decision-makers, and the media. Lectures for the course will be TTh 2-3:30 PM in JGB 3.116.

Required Text: *Volcanoes: Global perspectives*, by J.P. Lockwood and R.W. Hazlett, Wiley-Blackwell, ISBN978-1-4051-6250-0. This text will be used primarily as additional readings for the lectures and laboratory exercises. Other readings will be assigned throughout the course, and those books will be placed on reserve in our geology library.

Prerequisites: GEO 426P, or upper division standing in geological sciences for those in a degree program that does not require GEO 426P.

Laboratory Information: M 10-11 (#27750), or W 1–2 (#27755), JGB 3.114
Lab exercises will be case studies of active and ancient volcanoes and their lithologic and economic products, using samples and petrographic sections, topographic and geologic maps, stratigraphic sections, ground-based and aerial photos, videos, and orbital images.

Teaching Assistant:

Giovani Sosa giovannisosa@mail.utexas.edu
JGB 5.316
Office hours: T 10-11 AM, F 10-11 AM
Other hours by appointment

Grades: Your course grade will be based on the combined results of the lecture and laboratory portions of your class in the approximate proportions: 2 class exams (40%), one final exam (35%), and laboratory score (25%).

Class exams: There will be two full-period class examinations (closed book and notes) during the course, which are listed on the class schedule. We will also announce these exams at least one week in advance. No books or class notes will be permitted. Attendance to these exams is required, and a missed exam will be counted as a zero, unless a written doctor's excuse is provided. If an acceptable excuse is provided, a make-up exam will be given. Anyone caught cheating on the exams will receive a zero.

Final exam: There will be an examination during the Final Exam time allotted for the course (see syllabus). This exam will focus on the final third of the course, but will also be comprehensive. No books or class notes will be permitted. Attendance to these exams is required, and a missed exam will be counted as a zero, unless a written doctor's excuse is provided. If an acceptable excuse is provided, a make-up exam will be given. Anyone caught cheating on the exams will receive a zero.

Laboratory Score: This portion of your grade is based on your weekly laboratory exercises and a lab exam. *The laboratory is a required part of the course, and completion of all exercises is required to pass the course.*

Final grades will involve the plus/minus system

Lecture Protocol: The use of laptops is allowed only to take notes (that use requires approval of instructors).

Academic Integrity: No form of academic dishonesty will be tolerated. Information on this issue can be found at: http://deanofstudents.utexas.edu/sjs/acint_student.php

University Honor Code: "The core values of The University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the university is expected to uphold these values through integrity, honesty, trust, fairness, and respect toward peers and community."

Special Needs: The University of Texas at Austin provides upon request appropriate academic accommodations for qualified students with disabilities. To determine if you qualify, please contact the Division of Diversity and Community Engagement, Services for Students with Disabilities, 471-6259 (link above). After your needs are certified, the instructors will work with you to make appropriate arrangements. Special needs requests must be submitted in writing at least a week prior to the affected event, e.g. a test or assignment.

Course Content and Syllabus

LECTURE SCHEDULE (TTH 2-3:30 PM)		LABORATORY SCHEDULE
Jan.	18 Class Introduction	17/19 <i>no lab</i>
	20 Volcanoes and Magma	
	25 Magmatic Properties	24/26 Petrography of magmas
	27 Volatiles and bubbles	
Feb.	1 Magma ascent rates	31/2 Density/Viscosity of magma
	3 Conduit Flow and degassing	
	8 Two-phase conduit flow	7/9 Textures of volcanic rocks
	10 Magma-water interactions	
	15 Sizes and frequencies of eruptions	14/17 CONFLOW modeling
	17 Lava flows and domes	
	22 Class Exam #1	21/23 ERUPT modeling
	24 Hawaiian Lava Flows	
Mar.	1 Buoyant versus collapsing plumes	28/2 lava flows
	3 Pyroclastic deposits	
	8 Pyroclastic fall deposits	7/9 Tephra deposits
	10 Pyroclastic flow deposits	
SPRING BREAK		
	22 Caldera Eruptions	21/19 <i>no lab</i>
	24 Volcanism through time	
	29 Class Exam #2	28/30 Volumes of eruptions
	31 Volcanic Resources I	
Apr.	5 Volcanic Resources II	4/6 mineral resources
	7 Volcanic Resources III	
	12 Hazards (lahars)	11/13 mineral resources
	14 Hazards (avalanches, tsunami)	
	19 Volcano Monitoring	18/20 IAVCEI video on hazards
	21 Climatic Impacts	
	26 Tectonics of Active Basins	25/27 IAVCEI video on risks
	28 Tectonics of Active Basins	
May	3 Graduate Student Presentations	2/4 Lab Exam
	5 review	

Final Exam: May 11 (Wednesday), 2-5 PM