

EENS 2120**Spring Semester 2017****Petrology**

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 Office Hours - By Appointment

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I. COURSE GOALS & OBJECTIVES

Since Rocks are the basic building blocks of the Earth, this course is designed to give the student a fundamental background in rocks, necessary to understand the Earth. The student will learn the principles behind rock forming processes and will learn to examine rocks in hand specimen and thin section, both as a means of identifying and describing the rocks and as a means of extracting clues to formulate hypotheses about how the rocks formed in nature.

II. TEXTBOOKS**Required Textbooks:**

An Introduction to the Rock Forming Minerals, 2nd Ed., by Deer, Howie & Zussman (**DHZ**)

Supplementary Textbooks:

Earth Materials by Hefferan and O'Brien (**H&O**)

Petrography, 2nd Edition by H. Williams, F.J. Turner, and C.M. Gilbert: (**WTG**)

III. COURSE GRADING

The course grade will be determined on the basis of the number of points scored out of a possible 1000 points. These points will be apportioned as follows:

Homework and Labs	15%	Lab Midterm	15%
Lecture Midterm	20%	Lab Final	20%
Lecture Final	25%	Field Trip Participation	5%

Field Trip: The Field Trip is scheduled for April 6 -9 (Thursday through Sunday). Make plans now so you won't have any excuses for not attending. (No excuses will be accepted.)

IV. WEB PAGE

A Web site has been developed for this course. It includes course materials, including a copy of this syllabus, lecture notes, announcements from the instructor, and Internet links. The site can be found on the internet at: <http://www.tulane.edu/~sanelson/eens212/>

Be sure to check this web page regularly throughout the course for important announcements and updates.

In addition PDF versions of the actual lectures will be posted on the Blackboard site for this course as they become available.

V. TENTATIVE SCHEDULE OF LECTURES AND LABS

Date	Topic	Readings
Jan 17	Lecture: Textures & Structures of Igneous Rocks	H&O p. 181-197, 227-263
	Lab I: Textures of Igneous Rocks in Hand Specimen	H&O p. 185-197
Jan 19	Lecture: Textures & Structures of Igneous Rocks & General Classification of Igneous Rocks	H&O p. 197-211
	Lab II: Textures of Igneous Rocks in Thin Section	WTG p. 53-67
Jan 24	Lecture: Simple 1 & 2 Component Phase Diagrams	H&O p. 50-65 Lecture Notes
	Lab III: Calculation of Norm & Classification of Igneous Rocks	Handout
Jan 26	Lecture: Ternary Phase Diagrams	Lecture Notes
	Lab IV: Minerals in Igneous Rocks	Handout
Jan 31	Lecture: Ternary Phase Diagrams (cont.)	Lecture Notes
	Lab V: Ternary Phase Diagrams	Handout
Feb 2	Lecture: The Interior of Earth and Formation of Magmas	H&O Ch. 1 & p. 212-216
	Lab V: Ternary Phase Diagrams (Cont.)	Handout
Feb 7	Lecture: Magmatic Differentiation	H&O 216-227
	Lab VI: Basalts & Gabbros in Hand Specimen & Thin Section	WTG p. 94-135
Feb 9	Lecture: Magmatic Differentiation	H&O 216-227
	Lab VII: Variation Diagrams in Petrology	Handout
Feb 14	Lecture: Igneous Rocks of the Oceanic Lithosphere	H&O p. 264-268
	Lab VIII: Andesites & Diorites in Hand Specimen & Thin Section	WTG p. 137-158
Feb 16	Lecture: Igneous Rocks of the Oceanic Lithosphere	H&O p. 264-268
	Lab IX: Trace Elements in Igneous Processes	Handout
Feb 21	Lecture: Igneous Rocks of Convergent Margins	H&O p. 268-278
	Lab X: Siliceous Rocks in Hand Specimen & Thin Section	WTG p.159-192
Feb 23	Lecture: Igneous Rocks of Convergent Margins (cont.) and Igneous Rocks of the Continental Lithosphere	H&O p. 268-278 H&O p. 278-294
	Lab XI: Projected Phase Diagrams	Handout
Feb 28	Mardi Gras No Class	
Mar 2	Lecture: Igneous Rocks of the Continental Lithosphere (cont.)	H&O p. 278-294
	Lab XII: Ultrabasic & Alkaline Rocks in Hand Specimen & Thin Section	WTG p. 193-258
Mar 7	Lecture: Pyroclastic Rocks	Lecture Notes H&O p. 249-262
	Lab XIII: Isotopes in Igneous Processes	Handout
Mar 9	Lecture: Types of Metamorphism	H&O Ch. 15
	Lab XIV: Pyroclastic Rocks	WTG p.260-274
Mar 14	LECTURE MIDTERM EXAM	
	No Lab	
Mar 16	Lecture: Metamorphic Rock Textures	H&O Ch. 16 & 17
	Lab - LABORATORY MIDTERM EXAM	
Mar 21	Lecture: Triangular Plots in Metamorphic Petrology	Lecture Notes H&O p. 526-530
	Lab: XV: Metamorphic Minerals & Textures	WTG p. 438-453
Mar 23	Lecture: Metamorphic Mineral Assemblages	H&O Ch. 18
	Lab XVI: Triangular Plots in Metamorphic Petrology	

Mar 28-30	Spring Break No Class	
Apr 4	Lecture: Metamorphic Mineral Assemblages & Thermodynamics & Metamorphic Reactions	Lecture Notes
	Lab XVI: Triangular Plots in Metamorphic Petrology (cont.)	Handout
Apr 6-9	Field Trip	
Apr 11	Lecture: Thermodynamics & Metamorphic Reactions	H&O Ch. 18 Lecture Notes
	Lab XVII: Thermodynamics and Metamorphic Reactions	Lecture Notes Handout
Apr 13	Lecture: Metamorphic Reactions	H&O Ch. 18 Lecture Notes
	Lab XVIII: Contact Metamorphic Rocks in Hand Specimen and Thin Section	WTG p. 476-499
Apr 18	Lecture: Metamorphic Reactions	Lecture Notes
	Lab XIX: Low - Medium Grade Metamorphic Rocks in Hand Spec.	WTG p. 514-546
Apr 20	Lecture: Contact Metamorphism	H&O p. 450-452 Lecture Notes
	Lab XX: Low to Medium Grade Metamorphic Rocks in Thin Section	WTG p. 514-546
Apr 25	Lecture: Regional Metamorphism	H&O Ch. 16 & 18
	Lab XXI: High Grade Metamorphic Rocks in Hand Specimen	WTG p. 547-571
Apr 27	Lecture: Regional Metamorphism	H&O Ch. 16 & 18
	Lab XXII: High Grade Metamorphic Rocks in Thin Section	WTG p. 547-571
May 2	Lecture: Radiometric Age Dating of Igneous & Metamorphic Rocks	H&O 64-74 Lecture Notes
	Lab XXIII: Radiometric Age Dating of Igneous & Metamorphic Rocks	Handout
May 7	LECTURE FINAL EXAMINATION 8:00 A.M. to 12:00 P.M	
May 10	LAB FINAL EXAMINATION 1:00 P.M. to 5:00 P.M	

Learning Outcomes for this Course

1. The student will gain an understanding of the processes responsible for forming igneous and metamorphic rocks.
2. The student will gain an understanding of how the chemical composition, structure and texture of rocks can be used to interpret past geologic processes and the geologic history of the earth.
3. The student will be able to identify igneous and metamorphic rocks in hand specimen and thin section.
4. The student will learn how to manipulate chemical data using computer programs and spreadsheets.

[Obtain a PDF version of this Syllabus](#)

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