Petrology 2010 Syllabus

GEOL 361 Igneous and Metamorphic Petrology

Instructor - F. Zeb Page
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Office Hours - Mondays 11:00-12:00
Thursdays 1:00 - 3:00

Text - An *Introduction to Igneous and Metamorphic Petrology* by John D. Winter

Lecture MWF 10:00 - 10:50, Carnegie 412
Lab F 1:30 - 4:20, Carnegie 412

Course Goals Petrology is the study of the origins of rocks. Emphasis will be placed on the relationships between lithology, geochemistry, and tectonic setting. Topics will include: classification of igneous and metamorphic rocks, thermodynamics and phase equilibria, the origins and differentiation of magmas, and spatial and temporal development of igneous and metamorphic terranes. Laboratory projects will include the use of the petrographic microscope and SEM/EDS for the identification of minerals and their chemistry, the interpretation of rock textures, and quantitative geochemical modeling.

Evaluation - Your grade will be based on the following components:

Labs and homework	50%
Independent Project	20%
Exams (3@10%)	30%

Assignments - Please complete the reading assignments before the class in which we discuss them. Labs are typically due at the following lab period, homework assignments may vary in length. Failure to turn work in on time puts you at risk of loosing points...asking for an extension before the due date can protect you from this.

Tests - Tests in this class are meant to be both an evaluation and a learning experience. Because this is difficult to do in a one-hour period, they will be take-home, open-book exams over a 3-5 day period.

Honor Code - Oberlin students are bound by the honor code, details of which can be found at http://www.oberlin.edu/students/links-life/rules-regs.html#honor. For the purposes of this class exams, quizzes, and research projects should be completed individually unless otherwise indicated at the time. I encourage you to collaborate with your colleagues on lab and homework assignments as long as each one of you works on all aspects of the assignment and your answers are in your own words. Please write and sign the honor pledge on each assignment turned in for evaluation.

Lab Fees - The Geology Department requests, nay, requires each student in lab courses to pay a fee of $10 to help defray lab costs. Please pay Retha Ball (Carnegie 417) by cash or check.

Services for students with disabilities - If you have a documented disability and will require accommodations in this course, please see me or Jane Boomer (Services for Students with Disabilities, Peters Hall G27, x5-8467) in the first two weeks of the semester to develop a plan to address your needs.

Rough outline of our journey together

Date	Day	Topic	Winter Ch. #	Lab
2.8	M	we're off: talking igneous rocks	1	Minerals in thin section
2.1.	W	making basalt from the mantle: thermo	5	
2.12	F	binary phase diagrams & phase rule	6	
2.15	M	Zeb's off a-probin'		mantle rocks & basalt
2.17	W	ternary phase diagrams	7	
2.19	F	making basalt into other things: major element geochemistry	8	
2.22	M	geochemistry 1: majors & minors	8	M&M magma chamber
2.24	W	geochemistry 2a: trace elements	9.1-9.6	
2.26	F	modeling magmatic processes with trace elements		
3.1	M	geochemistry 2b: isotopes	9.7	modeling melt evolution
3.3	W	finish geochemistry		
3.5	F	layered mafic intrusions	12	
3.8	M	MORB	10,13	layered intrusions
3.10	W	OIB (Exam 1: geochemistry due around here)	14	
3.12	F	island arcs	16	
3.15	M	continental arcs	17	field trip
3.17	W	granitoids	18	
3.19	F	field trip		
3.22	M	alkaline magmatism	19	arc rocks& silicic volcanic rocks
3.24	W	anorthosite	20	
3.26	F	metamorphism...a teaser	21	
	3.27 - 4.3 Spring Break			
4.5	M	phase equilibria, composition space	24	granitoids &

Date	Day	Topic	Winter Ch. #	Lab
4.7	W	metamorphic facies	25	alkaline rocks
4.8	F	metamafite phase equilibria in (N)CFMASH	25	
4.12	M	metamorphic reactions (Exam 2 : ig rx due)	26	metamorphic modelling
4.14	W	thermodynamics in metamorphism	27	
4.16	F	thermobarometry and modeling	27	
4.19	M	Barrovian zones & metapelite thermobarometry	28	metapelites
4.21	W	greenschist and amphibolite terranes, clockwise P-T paths	25	
4.23	F	granulite P-T paths, terranes, tectonics, heat sources	25	
4.26	M	buffer		meta-mafites
4.28	W	Barrovian zones & metapelite thermobarometry	28	
4.30	F	Barrovian zones & metapelite thermobarometry	28	
5.3	M	thermobarometry	27	Presentations
5.5	W	granulite P-T paths, terranes, tectonics, heat sources	25	
5.7	F	eclogite and blueschist phase equilibria, thermobarometry	25	
5.10	M	metacarbonate reactions in CMSCH, T-X equilibria	25	calc-silicate rocks
5.12	W	contact metamorphism	30	
5.14	F	Project Paper Due		
5.19	M	Exam 3: metamorphic petrology due at 7:00 PM		