

# GEOSCIENCES 214: PETROLOGY

SPRING 2006

Instructor: Mary Keskinen (NSci 340 - X 7769)

Teaching assistants: Shelley Hicks (NSci 149 - X 7933) &  
Mariah Tilman (NSci 312 - X 7585)

Class meetings: Lecture Monday & Wednesday, 11:45-12:45 (NSci 235)

Lab Monday/Wednesday, 2:15-5:15 p.m. or 6-9 p.m. (NSci237)

MK Office Hours: Monday 9:30-10:30; Tuesday 3-4.

	<u>LECTURES</u>	<u>READING ASSIGNMENTS</u>	
January	23 Structure and composition of the earth, general characteristics of igneous rocks	Winter, 2-15.	
	25 Mineralogical classification of igneous rocks	Winter, 17-45.	
	30 Field characteristics of igneous rocks	Winter, 46-74.	
February	1 Phase rule and phase diagrams	Winter, 75-91.	
	6 Binary systems & fractional crystallization	Winter, 92-104; 181-198.	8
		Winter, 105-127.	
	13 Dealing with a more complex system: the real world	Winter, 200-241.	
	15 Chemical classification of igneous rocks	Winter, 128-151; 636-643.	20
		Winter, 155-178.	
	22 Basalts, tectonics, and ophiolites	Winter, 242-276.	
	27 Continental volcanism	Winter, 277-292.	
March	1 Subduction and volcanism	Winter, 293-342.	
	6 Granites and batholiths	Winter, 343-407.	
	8 Very cool and cutting edge topics in igneous petrology	Guest lecturer	
	<b>** SPRING BREAK **</b>		
	20 Metamorphic Processes	Winter, 410-476.	
	22 Igneous Petrology Exam		
	27 Facies and Facies Series	Winter, 496-500; Miyashiro 19-31.	
	29 Graphical Methods for Metamorphism	Winter, 477-495; Best 401-8.	
April	3 Metamorphic Reactions	Winter, 513-534.	
	5 Quantitative Metamorphic Petrology	Winter, 535-559.	
	10 Contact Metamorphism and Low P/T Facies Series	Winter, 562-584.	
	12 Regional Metamorphism: Mod P/T Facies Series	Winter, 586-605.	
	17 - as above -		
	19 High P/T Facies Series: Blueschists & Eclogites	Winter, 500-512.	
	24 Ocean-floor and Geothermal Metamorphism		
	26 Isotopes etc. in Metamorphic Systems		
May	1 Petrotectonics	Hyndman, 657-664.	
	3 Review and Overview of Metamorphism		
	FINAL EXAM: Wednesday, May 10 - 10:15-12:15		

READING ASSIGNMENTS MUST BE COMPLETED BEFORE THE CLASS FOR WHICH THEY ARE ASSIGNED!

GRADING: The course is divided into two units: the first section dealing with igneous rocks, then metamorphic rocks will be covered. The homework assignments and lecture exams will constitute about 60% of your final grade. The laboratory grade is worth approximately 40% of the final grade.

REQUIRED TEXTBOOK:

Winter, J. D. (2001) An Introduction to Igneous and Metamorphic Petrology. Prentice- Hall.

TEXTS FOR SUPPLEMENTARY READING ASSIGNMENTS:

Best, M.G. (1982) Igneous and Metamorphic Petrology. W.H. Freeman, San Francisco.  
Hyndman, D.W. (1985) Petrology of Igneous and Metamorphic Rocks. McGraw-Hill, N.Y.  
Miyashiro, A. (1972) Metamorphism and Metamorphic Belts. John Wiley, New York.

Assigned reading from books other than Winter will be xeroxed and made available in the classroom (235).

### **LAB SCHEDULE FOR IGNEOUS AND METAMORPHIC ROCKS**

January	23	Review of Optical Mineralogy		
	25	Minerals in Thin Section		
	30	Igneous minerals and textures		
February	1	Igneous minerals and the microscope		
	6	M&M lab exercise, thin section preparation and the electron microprobe	8	Plutonic
		rocks I		
	13	Plutonic rocks and microscopes I		
	15	Plutonic rocks II		
	20	Plutonic rocks and microscopes II		
	22	Volcanic rocks in hand specimen		
	27	Volcanic rocks and microscopes		
March	1	Pyroclastic rocks and volcano movies		
	6	- continuation of pyroclastic rocks -		
	8	Unusual igneous rocks in hand sample and thin section		
		<b>** SPRING BREAK **</b>		
	20	Metamorphic Minerals		
	22	Metamorphic Textures and Structures		
	27	Regional Metamorphic Rocks I - pelitic & carbonate rocks		
	29	Regional Metamorphic Rocks I - microscopic features		
April	3	Regional Metamorphic Rocks II - mafic & ultramafic rocks		
	5	Regional Metamorphic Rocks II - microscopic features		
	10	Contact Metamorphism and Unfoliated Metamorphic Rocks		
	12	Rocks of High Pressure Metamorphism		
	17	Metamorphic Facies		
	19	Igneous, sedimentary, and metamorphic rocks		
	24	Metamorphic Mini-project		
	26	Field Trip		
May	1	Igneous and Metamorphic Rock Lab Exam		

NOTE: There may be a MANDATORY all-day field trip later in the semester, probably on Saturday, April 22. Keep that day available, as attendance will count 5% of your lab grade!