Geology 285
Petrology

Spring 2007

Instructor:
Dr. Elizabeth King
440 Felmley Hall Annex
Phone: 438-8922
Email: emking@ilstu.edu

Office hours:
Monday: 11-12
Tuesday: 10-11
Wednesday: 10-11
And by appointment

Lecture: MWF 2:00-2:50 Felmley 434
Lab: T 1-2:50 Felmley 434

Required text:
Igneous and metamorphic petrology, second Edition by Myron Best, Blackwell Publishing

Course web site:
http://www.lilt.ilstu.edu/emking/courses/petrology/index.html
Course postings will appear here throughout the semester. If I get my act together, the lectures will be in PowerPoint and posted on the web site. Some postings will likely be in PDF format. If you do not already have Adobe Reader on your computer, visit www.adobe.com and download this program for free. This is a universal format, less prone to carry viruses, and my small protest against Microsoft domination.

Course Content and Objectives
Welcome to Petrology! This course will introduce you to igneous and metamorphic rocks commonly (and not so commonly) found on the surface of the Earth. By the end of the semester you should be able to identify the major rock forming minerals and assign a rock name. Beyond just naming rocks, this course emphasizes the story behind igneous and metamorphic rocks. What was the source, how deep in the Earth, what happened to this rock, how do we know? These are all important questions petrologists, and any geologist, needs to ask themselves when they pick up a rock.

We will be applying mineralogy concepts and techniques throughout the semester, so there was a reason to endure Geology 280.

Grades in Petrology

Tests (4 of them)	10% each
Lab exams (3 of them)	6% each
Labs	12%
Quizzes	2%
Homework	12%
Term paper	10%
Includes the worksheet preparation, turning things in on time	
Presentations	6%
Extra credit	Added to the homework component

Tests: There will be 4 tests this semester (including the final), and the final will be a take home test.

Lab Exams: There will be three lab exams this semester. The first will be WEEK 3 on silicate mineral identification. This will be exactly like the mineral ID exam last semester, but only on the silicate minerals. You can use your mineralogy text book during this exam and all other notes that may help you. One of the remaining lab exams will focus on igneous rocks and the last exam on metamorphic rocks.

Labs: Weekly labs are due the following week, just like in mineralogy. Labs will stress a type of rock each week with a rock description and sketching minerals in thin section being an important part. All labs are due the following week in lab, just as last semester.

Quizzes: This semester will be structured a bit differently than mineralogy. We will have weekly quizzes in lab. There will be a rock or two, related to the rocks you saw during the **previous week's lab**, that you will have 5 minutes to name. The goal of this is to get you to give your gut instinct answer for rock naming.

Field Trip: There will be a field trip to the St. Francois Mountains of Missouri March 29 (Thursday) to March 31 (Saturday). This will be an opportunity for you to experience petrology in the field and apply what we have learned so far in the semester. This field trip is highly recommended, so if there are conflicts please let me know as soon as possible. You will be expected to turn in your work from the field trip and this work will be graded and added into your lab portion of the course.

Things to think about bringing (that you will need for field camp anyway) are a hand lens, color pencils, and a clipboard. More details as we get closer.

Homework: There will be homework assignments and in-class work to do just like in mineralogy. These will emphasis topics covered in lecture. See the website and/or syllabus for these assignments.

Extra Credit: Extra credit can be earned by attending the weekly GEO lectures, usually Friday at 3 PM. Just make sure I know you attended the lecture in order to get credit.

Term Paper:

In groups, you will be researching a geologic area for which we have rocks and thin sections in our collections here. Your job is to write a paper describing the regional geology of your topic, describe the geologic history of the area. You need to describe the rocks in your suite and use them to enforce the interpretation of the geologic history. Tectonic interpretation is important to petrology so don't stick strictly to mineralogy and petrology. I will have a copy of what I have in mind available for you to see.

I will offer plenty of guidance and help with references throughout the process. You will need to use Georef to find current literature, but there are also some good books available for most topics. I may have some references kicking around my office or some other ideas of where to look.

There will be steps during the process that are due so as to keep you working on it throughout the semester. This will give you enough time to obtain any references that may need to come from Inter Library loan. Do not rely on websites as a primary reference!

The paper should be 5-10 pages in length, not including figures, references, and rock descriptions. Plan on writing about 10 or so rock descriptions for the rocks incorporated into the paper. These should be attached to the end of the paper. Forms for these are on the class website.

The presentations will be in class and cover a synopsis of your paper with regional geologic maps, pictures of your rocks and thin sections and interpretations of the region. These should be 10-15 minutes in length on PowerPoint.

Part of your presentation will be to create a "worksheet" for the rest of the class with the important questions that you want them to answer.

If the deadlines below are not met (without discussing things with me) you will have points deducted from your total score.

February 16: an annotated bibliography is due
March 2: an outline of your paper is due
April 46 a draft of your paper is due. I will edit this paper, return it to you and give you the opportunity to revise your work and turn it back in on the last day of class with the initial version too.
May 2 and 4: in-class presentations and the revised paper are due. Also turn in the draft version of the paper so I can see the changes/improvement that occurred.

Presentations

You will have two presentations during the semester. One will be during the lab period for the "Mineral of the week". For this presentation, you will take over teaching and help your classmates for the important mineral they will be looking at in the weekly lab. You will put together a PowerPoint presentation much like mineralogy. You will present the key identification tools in hand sample and thin section, a bit on formula, mineral family etc. and anything else that will help you and your classmates identify this mineral.
The other will be with your group for your project on the last day of class.

Policy for late work
No late work will be accepted. All labs are due the following week. All assignments (labs, homework, exercises etc.) are due at the start of class or lab. If there are extenuating circumstances preventing the on-time completion of work, please do talk to me about alternative arrangements.

Academic honesty: Any form of academic dishonestly will result in a zero for that assignment, quiz, or exam, as well as possible disciplinary action. See your student handbook for University guidelines. I do not mind group work. In fact I encourage it, but if I see two identical papers I will have to think it is plagiarism.

Petrology GEO 285 Tentative Syllabus Spring 2007

Week	Date	Topic	Topic	Chapter	Assignments
1					
	Lab		*From the Earth to the Moon/Rock descriptions*		
	Jan. 17		Intro to petrology/review of silicate minerals	1	silicate ID sheet due Jan 22
	Jan. 19		Classification of rocks	2	
2	Jan. 22		Magma ascent and emplacement	9	Question 2.2, 2.3, 9.5, and 9.10 Due Jan 24
	Lab		*Classification of igneous rocks*		
	Jan. 24		Binary Phase diagrams, phase rule, Clapeyron Eq.	5	peritectic worksheets due Jan 26
	Jan. 26		Ternary Phase diagrams	5	Ternary Phase diagram due Jan 29
3	Jan. 29		Chemical Petrology & norms	2	Norm calc and Question 2.5 Due Feb 2
	Lab		***Silicate Mineral ID exam***		
	Jan. 31		Diversification of magmas/M&M's	12	
	Feb. 2		Diversification of magmas/M&M's	12	
4	Feb. 5		Generation of magmas - melting the mantle	11	M&M due/hand out take home exam
	Lab		*Ultramafic rocks/layered mafic intrusions*		
	Feb. 7		Trace Elements	2	
	Feb. 9		Diversification of magmas/mixing	12	Dinkey Creek exercise in class
5	Feb. 12		**Igneous Lecture Exam thru magma mixing**		turn in take home part of exam
	Lab		*Ultramafic rocks/layered mafic intrusions*	12&13	ultramafic rock desription/pallisades
	Feb. 14		Mid-ocean ridge volcanism		
	Feb. 16		Ocean island basalts	13	Annotated Bibliography due
6	Feb. 19		Extrusive Igneous structures & volatiles	10	Question 10.1, 10.2, 4.9, 4.10, Due Feb. 21
	Lab		*Gabbroic/basaltic rocks*	12.5 and 13.5	
	Feb. 21		Convergent margins - island arcs		worksheet due Feb. 26
	Feb. 23		Convergent margins - continental volcanic rocks	13	
7	Feb. 26		Cabonitites, Anorthosites, Alkaline Rocks	13	
	Lab		*Felsic volcanism*	11	
	Feb. 28		Generation of magmas - melting the crust		
	Mar. 2		Convergent margins - continental plutonic rocks	11&13	Term Paper Outline due
8	Mar. 5		Granites of Idaho	13	
	Lab		*Granites of Idaho lab*		Granite exercise due March 21
	Mar. 7		Granites of Idaho continued		
	Mar. 9		**Igneous Lecture Exam**		
9		**Spring Break**			
10	Mar. 19		Intro to Metamorphism	14	met worksheet due March 21
	Lab		***Igneous Lab exam***		
	Mar. 21		Structures and Textures and Classification	14&15	protolith handout due March 26
	Mar. 23		Structures and Textures and Classification	14, 15&17	
11	Mar. 26		Stable Mineral Assemblages	15	Plotting comp.pdf Due March 28
	Lab		*Intro to metamorphic rocks/protolith*		
	Mar. 28		Missouri intro lecture		
	Mar. 30	***Field Trip to Missouri***	no class, field trip		
12	Apr. 2		Metamorphic Facies and P-T-t paths	14&18	
	Lab		Mafic and Ultramafic rocks (lecture, start lab)	18	Question 14.3, 14.17 (not kimberlite part) Due April 9
	4-Apr		*Mafic/ultramafic rocks (lab pt 2)*		
	6-Apr		*Mafic lab part 3*	16	Draft of Term Papers Due
13	9-Apr		Metamorphic Reactions 1	16&14	
	Lab		*Marbles/quartzites/granulites*		
	Apr. 11		Metamorphic Reactions 2	16	
	Apr. 13		**Met. Lecture Exam thru Met. Reactions**		
14	Apr. 16		Intro for calcareous rocks	14&18.3	Contact Metamorphism, Due April 18
	Lab		*Contact metamorphism*		
	Apr. 18		Geothermobarometry	16	Cation chemistry problem due April 23
	Apr. 20		Pelites	16	
15	Apr. 23		Pelites	16.11.2	Question 18.1, 18.3, Due April 25
	Lab		*Pelites*		
	Apr. 25		Geothermobarometry	16	UHP problem due April 27
	Apr. 27	**Strat Trip**	The Hard Rock Game		due in class
16	30-Apr		The Hard Rock Game for those on strat trip		due in class
	Lab		*Lab exam*		final exam handed out
	2-May		Student Presentations		
	4-May		Student Presentations		course evals
	TBA	Final Exam	Due 5 PM at Dr. King's house		