

Syllabus
GEOL 300: Introduction to Petrology
Spring 2011

Please check Blackboard for updates, assignments, readings, and resources.

Instructor:

Dr. Elizabeth (Liz) Johnson

7105E Memorial Hall

e-mail: johns2ea@jmu.edu

phone: 540-568-5527*

Office Hours: You are welcome to stop by and chat at any time I'm around, or you can schedule an appointment by e-mail so you can be sure to catch me. I am generally at work M-F, 9-5. After spring break, I will teach a block course M and W afternoons. We may arrange weekly "lab help hours" that are mutually convenient.

*Please **do not rely on the telephone** as a way to contact me.

Class meeting times and location: TTh 9:30-11:45 AM, 7135 Memorial Hall (includes lab and lecture blocks).

Working on the labs at other times: You are expected to stay for the entire class/lab meeting time each day, unless you are finished with an assignment and turn it in. However, it is very likely that you'll need to come in and work on the petrographic microscopes and hand sample at other times as well to finish the assignment. Please note the class schedule posted next to the door of the room, and plan your work time accordingly to avoid interfering with other classes.

Required overnight field trip: Mar 26-27 SW Virginia (Fries and Galax, VA)

We may have an additional day trip in February depending on weather and other factors.

Attendance of seminars: As upper-level majors, you should be attending the Geology and Environmental Science seminars on a regular basis. There are several nationally-renowned petrology and geochemistry speakers coming to JMU this semester, and I expect you to attend these talks.

Primary Textbook: *Principles of Igneous and Metamorphic Petrology*, **2nd edition**, by John D. Winter. ISBN 13: 978-0-321-59257-6. I will assign readings from the text; Ch. 2-9 are also meant to be used as reference material. The 1st edition of the book is similar to the 2nd edition and is less expensive; however, the page numbers do not match up with the 2nd edition. Every student is expected to do the readings; it's up to you to decide which option is best for you.

Secondary Texts/Readings:

Keep your mineralogy textbooks (both the lecture text and your guidebook to mineral identification in thin section)! These will be very useful for lab work and as a reference.

Other references will be available in the lab and/or posted on Blackboard as needed. These may include: *Atlas of Rock-Forming Minerals in Thin Section* by MacKenzie and Guilford, *Atlas of Igneous Rocks and Their Textures* by MacKenzie et al, *Petrography of Igneous and Metamorphic Rocks* by Philpotts, various petrology and optical mineralogy textbooks, and scientific journal articles.

Other Suggested Materials:

Hand lens (10x)
Ruler (with metric units)
Calculator

Course Description: Igneous and metamorphic processes explained using crystallization theory, phase diagrams, thermodynamics and geochemistry; laboratory study of rocks, their chemical and mineralogical signatures, and their geologic origins. Prerequisite: [GEOL 280](#) and [CHEM 131](#), or consent of instructor.

Here's a general outline of topics and localities we may cover this semester. This will probably be adjusted as we go along, so check for updates on Blackboard/in class for the most up-to-date schedule and assignments. I will try to keep test dates and field trips on the same days unless we have a weather-related or other emergency:

Days	Week	Lecture Topics	Lab Topics
Jan 11, 13, 18, 20	1,2	Granitic rocks: magma sources and whole-rock chemical analyses	Review of igneous minerals; Classification and textures of felsic phaneritic rocks
Jan 25, 27	3	Bowen's reaction series and phase diagrams	Fractional crystallization and mass balance; phase diagrams for crystallization
Feb 1, 3, 8, 10	4,5	Layered mafic intrusions and diversification of magmas	Classification and textures of intermediate to mafic phaneritic rocks
Feb 17, 22 (Feb 15 =Assessment Day)	6	The composition and structure of the Earth	Meteorites and mantle xenoliths; Classification and textures of ultramafic phaneritic rocks
Feb 24, Mar 1	7	Generating magma in different tectonic environments	Classification and textures of volcanic rocks; phase diagrams for melting
March 3		Lecture Test 1	
March 8, 10		Spring Break	
March 15, 17	8	Major and trace element discrimination diagrams and Rayleigh fractionation	Eocene volcanics of Virginia; possible optional field trip
March 22, 24	9	How and why do volcanoes erupt? Age dating and hygrometers	Cascades volcanics, Washington and Oregon State
March 26-27		Required Field Trip to Galax, VA	
March 29, 31	10	Petrography of sedimentary rocks	Petrography of sedimentary rocks
April 5, 7	11	Types of metamorphism and tectonic environments	Classification and textures of metamorphic rocks; metamorphic facies
April 12, 14	12	Chemical zonation and thermobarometry	Isograds and phase diagrams
April 19, 21, 26	13	Connecting metamorphism to tectonics	Prograde and retrograde metamorphism and P-T-t paths
April 28	14	Lecture Test 2	
Finals Week		Lab Practical Exam	

Assessment:**15% Test 1*****15% Test 2*****15% Lab Practical Exam*****20% Quizzes[#]****35% Assignments: Labs, In-class Activities, Homework, Field Trips**

*Tests will cover concepts from lecture and lab. The final lab test will be a practical exam involving hand sample and thin section description, identification, and interpretation

[#]Quizzes will be short and focused on lecture material or a specific skill or skill set.

Professional Behavior: Everyone is expected to behave in a professional and respectful manner towards the instructor, other students, and equipment. I reserve the right to dock points from a student's course grade for unprofessional, disrespectful, or dangerous behavior. I understand that accidents sometimes happen; if you break something you must let me know as soon as possible, and no points will be deducted because you acted professionally and honestly. I expect and hope that I won't have to think about this at all- let's all have fun and learn in a safe and pleasant manner.

Grades: The grades received at the end of the semester will reflect your understanding, application, and communication of the concepts we examine in this course.

A = demonstrated a superior understanding of the material, including excellent application and integration of material to new situations, all assignments completed in an outstanding way, exemplary effort made, excellent communication.

B = demonstrated a solid understanding of the terms and concepts with some integration and application, assignments completed correctly, good effort made, clear communication.

C = completed the material, but demonstrated lack of understanding and application, assignments contain some errors or are incomplete, fair to good effort made, communication adequate.

D = poor understanding of the material, many missing assignments or wrong answers, minimal effort made, communication poor.

F = no understanding of material, many missing assignments, no effort made.

Academic Honesty: We will follow the JMU Honor Code policy

(<http://www.jmu.edu/honor/code.shtml>) at all times. If you have a question about how the policy is applied to a particular assignment, please ask me **before** the assignment is due. The guidelines for each type of assignment are as follows, unless otherwise stated for a particular assignment:

Labs/class activities: You will often be working with a partner or in a group, sharing ideas and observations. Each person should turn in their own work, using your own words, unless a group report is specifically requested.

Homework/readings: Each person should do their own work, using your own words. It is OK to work together on homework in the same way as the labs; however, remember that you are ultimately responsible for this material as an individual on quizzes and tests.

Tests and quizzes: Students will work independently on tests and quizzes, including the lab practicum.

Referencing ideas: If you use an idea or figure from a website, book, article, or another person, you must reference the source! Copying text directly from a website, book, article, another student's paper, or any other source is a violation of the Honor Code.

Attendance: There's no required attendance policy, but you are responsible for all material covered in lectures, labs, field trips, and other assignments. It will be extremely difficult to keep up in this class if you aren't physically and mentally present every day.

Make-ups: If you must miss a test or field trip, you must notify me **before the event** with an acceptable excuse (e.g., severe, documented illness or documented family emergency). Make-up exams and quizzes must be taken within one week of the scheduled test. If you miss a lecture, it is your responsibility to find out what material was covered and if any schedule changes were announced.

Late work: Work turned in more than 24 hours late without an acceptable excuse will be docked one letter grade. Late assignments will not be accepted more than one week past the due date except under extreme (and pre-arranged) circumstances.

Disability Statement: If you are a student with a documented disability, please make sure you are registered with the Office of Disability Services, Wilson Hall, Room 107, 568-6705 and provide me with an Access Plan letter outlining your accommodations. I will be glad to meet with you privately to discuss your needs.

Inclement Weather: In case of bad weather, we will follow JMU's inclement weather policy (<http://www.jmu.edu/JMUpolicy/1309.shtml>). Check the JMU homepage or listen to the radio for the latest updates. I will e-mail you (if possible) to confirm that class is cancelled and provide information about changed due dates for assignments, etc., if necessary.