

Igneous & Metamorphic Petrology Lab
GLY 4310C | Spring 2015 | Williamson 214

Lecture: Tuesday & Thursday | Periods 6-7 | 12:50-2:45 pm | WM 202 | Dr. Michael Perfit

002B Monday Periods 8-9 3:00-4:55 pm	042G Tuesday Periods 4-5 10:40 am-12:35 pm	177H Wednesday Periods 4-5 10:40 am-12:35 pm	2306 Friday Periods 7-8 1:55-3:50 pm
Iliya Smithka ismithka@ufl.edu WM 273 Office hours: Thursday 3-4:55 pm		Charelle Trim charellestrim@ufl.edu WM 261 Office hours: Friday 11:45 am-1:40 pm	

Contact your TAs any time and ***we'll get back to you within 24 hours***. We can answer questions, arrange a time to meet, etc. It's literally our job and also we're happy to help.

Purpose of lab:

- **GLY 4310C:** This lab section constitutes 25% of your final grade.
- **Lab experience:** To complement lecture meetings with hands-on experience applying lab techniques to understand geologic concepts
- **Lab skills:** To classify and describe igneous and metamorphic rocks based on their mineralogy and texture in thin section and in hand sample
- **Scientific method:** To investigate hypotheses (how do you think these rocks formed) based on observations (what do you see in thin sections, hand samples, and chemistry)
- **Petrology:** To figure out how, where, when, and why igneous and metamorphic rocks form based on their geochemistry, mineralogy, and texture

Learning outcomes: By the end of this course, students will be able to...

- Identify and describe minerals and textures of igneous and metamorphic rocks in hand samples
- Identify and describe minerals and textures of igneous and metamorphic rocks in thin sections using optical petrographic techniques
- Classify/name and describe igneous and metamorphic rocks based on mineralogy and texture observed in thin section and hand sample
- Classify igneous rocks based on modal mineralogy using IUGS classification diagrams
- Classify igneous rocks based on normative mineralogy using CIPW norms
- Classify igneous rocks and describe their chemical evolution based on their geochemical compositions using total alkali silica diagrams, Harker diagrams, spider diagrams, etc.
- Use Microsoft Excel to make plots of geochemical compositions of igneous rocks like total alkali silica diagrams, Harker diagrams, spider diagrams, etc.
- Explain magma crystallization and chemical evolution in different geologic settings to form igneous rocks
- Understand phase diagrams in terms of magma chemical evolution, mineralogy, and texture
- Explain how magma viscosity, silica content, and volatile content control volcanic eruption style to form different extrusive rock types
- Understand how igneous rocks form in different geologic settings (mid-ocean ridge, hot spot, subduction zone, etc.) and explain their petrogenesis based on observed mineralogy, texture, and geochemistry

- Classify/name metamorphic rocks, facies, grades, series, and sequences based on index minerals and textures
- Classify metamorphic rocks and metamorphic facies based on their bulk and mineral chemistries using KFMASH system, AFM system, etc.
- Explain metamorphic chemical reactions and substitutions in terms of mineralogy and texture
- Explain how pressure, temperature, fluids, and stress control metamorphism, chemical reactions, mineral assemblages, and textures
- Understand how metamorphic rocks formed under what conditions in different geologic settings and explain their formation based on observed mineral assemblages and textures

Lab policies:

Attendance:

- Missing lab periods: please inform your TA as soon as possible if you will be late to or absent during a lab meeting. There will be a quiz every lab period. If your TA excuses your absence, you can make up the quiz and an extension may be given for the lab that was due. If you miss the midterm or final, you must arrange a make-up with your TA prior to the original exam date. Examples of excused absences that would allow quizzes and exams to be made up include: another class's field trip, illness, death, etc. If you are absent or tardy and miss an extra credit challenge, you may not may it up.
- Attending another lab: you may attend another GLY 4310C lab section if the TA approves it and you are not disruptive to the scheduled lab or to students in that lab section.

Lab equipment and materials:

- Equipment: treat all lab equipment (microscopes, slides, hand samples, etc.) with care. All students use the same equipment so please handle the equipment gently. If a slide is damaged or a microscope is malfunctioning, ***tell a TA immediately in person or via e-mail so we can fix the issue.***
- Microscope key: you are responsible for your microscope cabinet key for the semester. If you forget to bring it to your lab period, your TA will unlock a microscope for you. If you forget to bring it to the lab outside of lab time, a TA may be able to unlock a microscope for you. ***You must return your microscope key during your lab final exam.***
- Written materials: all written lab materials (lab questions, handouts, readings, etc.) will be handed out during your lab period. If you miss your lab, you must contact your TA to get the materials or find them on eLearning. Additional materials may also be e-mailed to the class. We expect you to keep your lab materials with your lecture materials in your Petrology notebook. We may check your Petrology notebook.
- ***Bring to every lab: colored pencils; ruler; hand lens; Petrology notebook; microscope key.***

Recommended resources: some of these will be available in 214

- [Introduction To Optical Mineralogy](#) by W. Nesse
- [Manual Of Mineral Science](#) by C. Klein and B. Dutrow
- [Petrography Of Rocks In Thin Section](#) by H. Williams, F. Turner, and C. Gilbert
- [Petrology Of Igneous & Metamorphic Rocks](#) by A.R. Philpotts
- [Minerals In Thin Section](#) by D. Perkins and K.R. Henke
- [An Introduction To Igneous & Metamorphic Petrology](#) by J.D. Winter
- www.mindat.org
- www.webmineral.com
- serc.carleton.edu/NAGTWorkshops/mineralogy/optical_mineralogy_petrography.html
- serc.carleton.edu/research_education/equilibria/index.html
- www.utdallas.edu/~aiken/SHAKEBAKE/rockclassification.pdf

Deadlines:

- Due dates: all assignments are due at the start of the lab period on the day they are due. We will accept labs throughout the day of your lab section (i.e. we will accept labs due that day even after your lab section meets) -- however we would like you to finish and turn in your last lab before starting a new lab and spend that lab period on the new lab. This is to keep you on track every week of the semester. All due dates will be announced in your lab period and will be posted on eLearning. Any extensions given to the whole class will be announced in class, posted online, and e-mailed to the class.
- Late work: for every day your assignment is late without an extension from your TA, 10% of the total assignment's points will be deducted from whatever score you earn on the assignment. Examples of grades based on when assignment is turned in: early and on time work can receive a 100% if assignment is completed perfectly, work that is one day late can receive a 90% if completed perfectly, work that is two days late can receive an 80% if completed perfectly, ..., work that is ten days late will receive a 0%. Once a graded assignment is returned to your lab section, we may no longer accept your late work unless you have an extension.
- Freebie token: all students have one free (imaginary) token to get a one-day extension on a lab, no excuse needed. You may play your token on any lab of the semester. Tell your TA when you will use it so we know what is going on with you. Playing your token on a lab will allow you to turn in that lab one day after it is due without incurring the 10% late grade penalty. If you do not turn in your lab within that one-day extension, the late penalties will start and continue as described above until you turn it in.
- Turning in work: please turn in your assignments at the start of the lab when they are due. If you are turning in work late or early, please hand it to your section's TA or slide it under their office door or put it on their office desk. If you leave your work in a TA's office, e-mail them. Do not leave work in a TA's mailbox. We will accept labs throughout the day of your lab section (i.e. we will accept work due that day even after your lab meets) -- however we would like you to finish and turn in your last lab before starting a new lab and spend that lab period on the new lab. This is to keep you on track every week of the semester.
- Returning work: we will return labs turned in on time or early at the start of the next lab meeting. Any late work will be returned to you as soon as it is graded.

Class behavior:

- Treat all lab equipment with care so you are safe from any possible injuries and so everyone can use the equipment.
- Treat all students and instructors with respect so we can work together in harmony.
- Keep 214 neat: put away all microscopes, slides, rocks, and books when you leave, throw out any and all trash, etc.

Accommodations:

- If you need accommodations for this class, please tell your TA by Friday, January 16 so we can work with you and the Disability Resource Center.

Honor code:

- All your work will be held to the highest standard of honesty and integrity and must abide by the UF Honor Pledge: "On my honor, I have neither given nor received unauthorized aid in doing this assignment."
- If we suspect you have violated the honor code by cheating, plagiarizing, etc., we will discuss our concerns with you and with Dr. Perfit. We may pursue sanctions for violations against the Honor Code; we will definitely give you a zero for the work you turned in.
- We encourage you to work together in groups but only turn in your own, legitimate, Honor Pledgeable work.

How lab happens every week:

1. TAs return graded work to students.
2. TAs collect assignments due from students.
3. Students ask TAs questions about material, grades, whatever.
4. Students complete quiz or challenge.
5. TAs introduce new lab to students.
6. Students work on lab.
7. TAs may check students' Petrology notebooks at any time.

Assignments:

- Labs: labs will be due in one or two weeks throughout the semester (see attached schedule). We recommend you to complete as much of the lab as possible during your scheduled lab period when we and your peers are there to answer your questions and work together, respectively. All labs will require you to spend time outside of class to finish them. Labs will be collected at the start of a lab period and accepted afterward that day. Late penalties start the next day (10% per day) unless you play your freebie token.
- Midterm and final exam: the midterm and final exam will be like labs and will involve identifying minerals and textures to answer questions about petrology. Each test may include any content covered in lab so far. Your higher grade on whichever test will be weighted more (15% of your total lab grade) than the other (10% of your total lab grade).
- Quizzes: quizzes will be given throughout the semester to gauge your understanding of content covered in both lab and lecture. If you are absent or tardy and miss a quiz, you will be able to make it up if your TA excuses your absence.
- Extra credit challenges: challenges will be given throughout the semester to gauge deeper understanding of content covered in both lab and lecture. They will count as extra credit, up to 2-3% of your final lab grade. If you are absent or tardy and miss a challenge, you will not be allowed to make it up.
- Notebooks: keep your lab materials with your lecture materials in your Petrology notebook. We may check your Petrology notebook. Your Petrology notebook will keep you organized in this class and succeed. We want you to be organized and to succeed in this class. We may check your Petrology notebook.
- Study guides: the midterm and final exam study guides will be comprehensive, covering all topics covered so far in lab. They will be available the week before the exam review. Exam reviews will be held outside of lab meeting time and thus are optional. You may complete the study guide and turn it in before the review session to be graded. If your graded study guide has a higher grade than a lab turned in during that half of the semester, we will replace that lower lab grade with this higher study guide grade. You do not need to attend

the review session to have your study guide graded and you do not need to complete the study guide to attend the review session. However, we will be going over the study guide in its entirety and answering any and all questions you may have about the exam so we recommend you both complete the study guide and attend the review sessions prepare for the exams.

Assignment	Percentage
Labs (may replace up to 2 lab grades with study guides)	50%
Midterm & Final Exam	25% (low=10%, high=15%)
Quizzes	25%
Challenges	up to 2-3% possible extra credit

Grading:

- Late work: for every day your assignment is late (without an extension from your TA), 10% of the total assignment's points will be deducted from whatever score you earn on the assignment (unless you play your freebie token). Examples of graded assignment based on when turned in: early and on-time work will receive a 100% if assignment is completed perfectly, work that is one day late will receive a 90% if completed perfectly, work that is two days late will receive an 80% if completed perfectly, ..., work that is ten days late will receive a 0%. Once a graded assignment is returned to your lab section, we may no longer accept your late work unless you have an extension.
- Curving: there will be no curves in this class. If the TAs deem a question on an assignment was unfair to ask, we will not include the points it was worth in the total points possible for that assignment.
- Grade questions: if you have a question about your grade on an assignment, ask your TA about it. We are happy to answer your questions about content any time but we will only revisit grades in the half of the semester the assignment was due (before vs. after spring break). We will be working together to grade all students in all lab sections consistently, fairly, and objectively. Examples of questions about assignments' grades that may result in a grade change: miscalculated grades, missed points on a question, etc.

Schedule: any changes to this schedule will be announced during lab, over e-mail, and on eLearning.

Lab	Dates	Topic
1	January 12-16	Classification & Textures I
1.5	January 19-23 Mon. Jan. 19	Classification & Textures II No class
2	January 26-30	Layered Mafic Intrusions & Crystallization (Labs 1 & 1.5 due)
3	February 2-6 <i>Thurs. Feb. 5</i>	Mid-Ocean Ridge Basalt (Lab 2 due) <i>Lecture Exam 1</i>
3.5	February 9-13	Mid-Ocean Ridge Basalt
4	February 16-20 Date TBD	Ocean Island Basalt (Hot Spots) & Mafic Arc Volcanics (Subduction Zones) (Labs 3 & 3.5 due) Midterm Review (Study guide due)
February 23-27		Midterm (Lab 4 due)
March 2-6		Spring break
5	March 9-13	Intermediate-Felsic Arc Volcanics (Subduction Zones)
6	March 16-20	Granitoids (Lab 5 due)
7	March 23-27 <i>Tues. Mar. 24</i>	Metamorphics I (Lab 6 due) <i>Lecture Exam 2</i>
8	March 30-April 3	Metamorphics II (Lab 7 due)
9	April 6-10 Date TBD <i>Thurs. Apr. 9</i>	Metamorphics III (Lab 8 due) Final Exam Review (Study guide due) <i>Lecture Exam 3</i>
April 13-17		Final Exam (Lab 9 due)
<i>Thurs.-Fri. Apr. 23-24</i>		<i>Reading Days</i>
<i>Tues. or Thurs. Apr. 28 or 30</i>		<i>Lecture Final Exam</i>