

Spring 2017
Earth Sciences 130/130L: Igneous and Metamorphic Petrology
MWF 9:20--10:25 pm, E&MS D236

Instructor: Elise Knittle, Earth & Marine Science C468, email: eknittle@ucsc.edu
Office Hours: Mondays 12-2 pm or by appointment

Class website: <https://ecommons.ucsc.edu> (Your username and password are from your CATS account).

TA: Earl O'Bannon

Text: The text is Loren Raymond: *Igneous Petrology* and L. Raymond: *Metamorphic Petrology*. Please note that these paperback 1st editions are currently out of print and I will be scanning and posting the chapters on the class website. However, if you would like to buy these, they are easily found on the web and I can point you in the right direction.

Lab Text(s): The primary text for the lab is Perkins and Henke, *Minerals in Thin Section* (2nd edition). I also scanned this and posted it on the website. If you want your own copy feel free to buy one from Amazon or try Half.com – used is fine.

The secondary lab text is the open-access Mineralogical Society of American publication: Raith, Rasse and Reinhardt, *Guide to Thin Section Microscope*. This is a very complete and detailed description of every possible aspect of subject – a bit too detailed for us BUT there are fantastic photos showing examples of rock textures etc. These photos might be very useful for you in working through the thin sections.

Basis for Evaluation:

- a) We will have 4 (ish) quizzes, 3 or 4 in-class exercises and 1-2 homework assignments. (70% of grade total – each quiz is worth 10% of the final grade), and a final project (30%). This project will be writing a 3-4 page rock/thin section report which will be due at the end of finals – more on this in a few weeks. We will use the scheduled final exam time **4-7 pm MONDAY JUNE 12th** for some kind of presentation of your projects (probably a poster presentation).
- b) The quizzes are scheduled on the syllabus, the in-class exercises and homework will be more impromptu.

Basis for Evaluation in 130L: In this course you will be evaluated on your lab exercises (70%) and on a Lab Practical Exam (30%) which will be the last week of class/lab.

WEEKLY SCHEDULE
ES 130 and 130L
Spring 2017

WEEK 1: April 3/5/7

Lecture Topics: Intro to igneous rocks. Theory of optical petrography. Identification, classification and textures of igneous rocks.

Reading: Raymond, Chap 1./Chap. 2

Lab 1: LAB STARTS THIS WEEK!!! Introduction to the petrographic microscope and the identification of minerals and rocks. Reading: Perkins and Henke, pages 1-35.

WEEK 2: April 10/12/14: In-class exercise, Monday April 10th

Lecture Topics: Rock major element chemistry, mineralogy, trace elements and isotopes, the formation of plutons, physical and chemical processes in magma.

Reading: Raymond, Chap 3/4

Lab 2: Uniaxial and biaxial minerals. Plutonic rocks in thin section

WEEK 3: April 17/19/21 Quiz Wed April 19th

Lecture topics: Plutonic and Volcanic Rocks

Reading: Raymond, Chapter 5/6/8

Lab 3: Volcanic rocks in thin section.

WEEK 4: April 24/26/28

Lecture topics: Basaltic Rocks

Reading: Raymond, Chap 11/12

Lab 4: Basalts

WEEK 5: May 1/3/5 Quiz Wed May 3rd

Lecture topics: Ultramafic rocks.

Reading: Raymond, TBD

Lab: Ultramafic rocks in thin section.

WEEK 6: May 8/10/12

Lecture topics: Misc. topics in igneous petrogenesis

Reading: Raymond, TBD

Lab: Introduction to metamorphic minerals in thin section

WEEK 7: May 15/17/19 Quiz Wed May 17th

Lecture topics: Introduction to metamorphic rocks: classification, textures, naming of rocks etc.

Reading: Raymond TBD

Lab: Metamorphic rocks.

WEEK 8: May 22/24/26

Lecture topics: Field relationships of metamorphic rocks: orogenic belts

Reading: Raymond TBD

Lab: More metamorphic rocks

WEEK 9: May 31/June2 Quiz Friday June 2 (NO CLASS MAY 29 Memorial Day)

Lecture topics: Field relationships of metamorphic rocks: mylonites and contact metamorphism

Reading: Raymond, TBD

Lab: work on your thin sections for the final project and prep for lab final

WEEK 10: June 5/7/9

Lecture topics: The origin of metamorphism and deformation in the Earth

Reading: Raymond, TBD

Lab: LAB FINAL IS Tues/Thurs in your regular lab

FINAL EXAM is MONDAY JUNE 12th 4-7 pm (we won't have exam but we WILL use this time).

Final Rock/Thin Section Report will be due Thursday June 15th by 5 pm

