Instructor: Dr. Sean Regan, HUD 127, sean.regan@plattsburgh.edu
Class Time: MWF 12:00 – 12:50 HUDSON 0130 **Lab Time:** T 1:00 – 3:50 HUDSON 0130
Office Hours: Tuesdays from 9 AM – 11 AM; Wednesdays from 1:00 PM – 3:00 PM; open door policy

Textbooks:

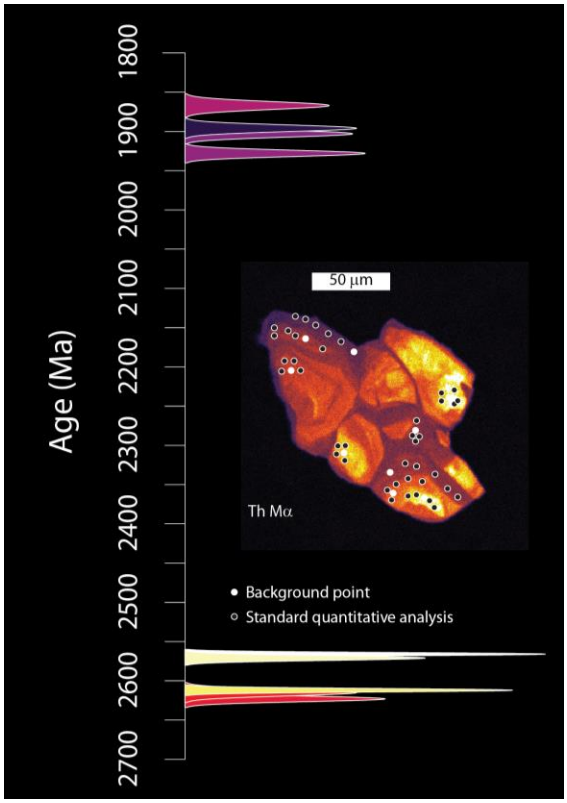
- Perkins, Dexter., 2017, *Mineralogy*, Pearson Press. (**Buy this one only**)

General:

Mineralogy deals with the identification and origin of mineral species. It is a foundation for many branches of geology; a good understanding of mineralogy is essential for **all** geologists. Also, a knowledge of mineralogy is often useful in dealing with environmental and health issues.

In this course, we will look at both the theoretical and practical aspects of mineralogy. We will focus on the rock forming minerals in a variety of contexts. By using the rock forming minerals as our guide, we will also investigate the different branches of mineralogy, like crystal chemistry, optical mineralogy, systematic mineralogy, and provide an introduction to some of the modern tools mineralogist use (SEM, XRD, EPMA).

Lectures and Labs:



Lectures will give the theoretical basis for mineralogy - crystallography, mineral chemistry, optical mineralogy, and systematic mineralogy. As much as possible, the lectures will be coordinated with topics covered in labs. It is important for you to complete assigned readings *before* coming to class. This course was designed to minimize out-of-class assignments to provide you with time to study for weekly quizzes.

However, the bulk of hands-on work will be related to the lab. The main purpose of the lab work is to teach you techniques of mineral identification - in hand sample and under the microscope. Secondarily, as a result of understanding and applying these techniques, you will, of course, learn to identify many minerals. The rock forming minerals will be the main focus of the course - you will learn to identify them and learn about their origins in class and lab

The major project in the lab component of the course is to make your own lab manual in a 3 inch 3 –ring binder. Feel free to include, drawings, descriptions, diagnostic properties, etc. You will be allowed to use your lab manual on the practical part of the final exam and during the 2nd two non-cumulative tests.

Project 1: Detailed report on a mineral, and its application to the broader geologic community

Minerals are used in a wide array of other geology and environmental subdisciplines. We can not cover all, or even a representative fraction, of them. Your job is to choose a mineral and create a PowerPoint presentation with photos of those minerals plus information on their characteristics, origin, and how it is utilized by another field in the geological sciences. This project will be completed the second half of the semester and will culminate with an in-class presentation (10 minute). Some good examples are (zircon, monazite, apatite, tourmaline, columbite, rutile, garnet, quartz, and the list goes on).

Fieldtrip:

I plan a field trip, tentatively on a Saturday or Sunday in late September to early October, to see minerals in their natural setting - in rocks. I have mapped 3 7.5' quadrangles approximately 1 hour south of here and know some fun localities. We are restricted by the season but in early fall, a wonderful place to visit is the Adirondack Mountains in New York. There are excellent mineral localities, as well as great rock exposures.

Grades: •labs (25%) •Quizzes (30%) •non-cumulative tests (30%) •final exam (30%) •projects (15%)

*You will notice that this adds up to over 100 points (130). As the semester progresses you can choose to keep two of the three: 1) quizzes, 2) non-cumulative tests, and 3) the final exam.

Percentage	***Grade***	***Percentage***	***Grade***	***Percentage***	***Grade***
>90.0	4.0				
87.5	3.75	77.5	2.75	67.5	1.75
85.0	3.5	75.0	2.5	65.0	1.5
82.5	3.25	72.5	2.25	62.5	1.25
80.0	3.0	70.0	2.0	60.0	1.0
				<60.0	0.0

Academic Dishonesty/Accommodations Policy

- Please review the University's academic dishonesty policy. Cheating, fraud, and plagiarism are not allowed and will result in academic censure through appropriate University procedures.
- I will do anything within my power, that is legal, to help you succeed and thrive. If you have any type of learning disadvantage, consider meeting with Student Support Services staff to figure out the best actions to take.

Pyritic gneiss in the eastern Adirondack Mountains, Graphite 7.5' quadrangle, Essex County, NY. Mined for graphite in early 1900s. Note the color of the water- very low pH resulting in high dissolved metal (Acid Mine drainage).

Possible project ideas:

Sm-Nd/Lu-Hf garnet geochronology
Zircon/rutile/ apatite U-Pb geochronology
Fission track analysis of apatite
U/He analysis of zircon and apatite
Hf isotopic analysis of zircon
U-Th-total Pb analysis of monazite
Oxygen isotopes of various minerals
Ti in quartz thermometry
Ti in biotite barometry
Carbon isotopes in graphite
EBSD analysis of silicate phases
U/Pb Baddeleyite geochronology
Oxygen isotopes in oxides
*Other interests? We can think of something

Monday	Wednesday	Friday
08/28 Introduction *(Text ch 1)* ***LAB*:** intro to rock forming minerals	08/30 **Physical Properties of Minerals** *(ch 3)*	09/01 **Physical Properties of Minerals** *(ch 3)*
09/04 **Symmetry, Lattices, Unit Cells** ***LAB*:** IOA-deposit (*p.210-229)*	09/06 **Q1 ; Crystal Systems** *(p. 229-232)*	09/08 **Crystal Classes** (p. 240 – 248)
09/11 **Chemistry of Earth's crust** ***LAB***: Marcy Massif (p. 17-23)	09/13 **Q2; Review of Chemistry** *(p. 4 -16)*	09/15 **Bonding in Minerals** *(p. 276-281)*
09/18 **Crystal Structure** ***LAB***: Wollastanite (p. 281-288)	09/20 **Q3; Crystal Growth** *(p. 100-107)*	09/22 **Review, project assignments** *Geochron Reading*
09/25 **Intro to optical mineralogy** ***LAB***: intro to scopes (p. 64 – 73)	09/27 **How to identify minerals in thin Section** (p. 74- 87)	09/29 **TEST 1** *(not including optics)*
10/02 **Oxides and hydroxides** *(handout)* ***LAB***: Mineral guide 1	10/04 **Q4; Sulfides and sulfates** *(handout)*	10/06 **Phosphates and Carbonates** *(handout)*
Fall break. Take it easy.	10/11 **Q5; Neso and Tectosilicates** *(handout)*	10/13 MW **Neso and Tectosilicates** *(handout)*
10/16 **Inosilicates** ***LAB:*** Mineral guide 2 *(handout)*	10/18 **Q6; Inosilicates** *(handout)*	10/20 **Inosilicates** *(handout)*
Geological Society of America Meeting – No Class **Prepare for 2nd Test**		10/27 **TEST 2** (not including soro/cyclo)
10/30 **Phyllosilicates** ***LAB:*** Mineral guide 3 *(handout)*	11/01 **Soro and cyclosilicates** Ring Silicates *(handout)*	11/03 **Finish Systematic Mineralogy**
11/06 **Analytical Mineralogy** ***LAB:*** Data reduction *(p. 253-269*)	11/09 **Q8; Analytical Mineralogy** *(p. 269-275)*	11/11 **Geochronology** **Work on project**
11/13 **Economic Mineralogy** ***LAB:*** Ore associations *(p. 157-174)*	11/15 Q9; **work on project**	11/17 **Environmental Mineralogy** *(handout)*
11/20 **Project presentations**	**Break**	

Monday	Wednesday	Friday
11/27 **Minerals in Igneous Rocks** ***LAB*:** Mineral ID in rocks *(p. 89- 118)*	11/29 **Minerals in sedimentary rocks** *(p. 119-134)*	12/1 **Minerals in metamorphic rocks** (*p. 135-156*)
12/04 **TEST 3**	12/06 **Q10; Jeopardy**	12/09 **Class wrap up and Questions**