

**Mineralogy (51-205)**  
Course Syllabus Fall 2006  
MWF 11:30-12:30 Harrington Room 217  
Lab T 1:50-5:10 Harrington Room 216

**Prerequisites:** Geology 102 OR Geology 150 AND Chemistry 105 OR 109 (may be taken concurrently)

**Instructor:** Dr. Jennifer Wenner, Associate Professor of Geology  
Office: Harrington 107  
Phone: 424-7003  
e-mail: [wenner@uwosh.edu](mailto:wenner@uwosh.edu)  
Office hours T 11:30-12:30, W 12:40-2:40, F 9-10 and by appointment...I'm here most of the time...come by or drop me an e-mail if you need anything.

**Text:** Nesse, W. D., 2000, *Introduction to Mineralogy*, Oxford University Press, New York, 442 p.  
Wenner, J.M., 2006, *Mineralogy Handbook*, Oshkosh Document Services, Oshkosh, WI.

*COURSE GOALS*

**Welcome to Mineralogy!** Minerals are the **basic building blocks of rocks**; therefore, mineralogy and optical mineralogy provide the foundation for many aspects of your future as a geologist. Every sub-discipline of the geosciences relies on an understanding of the physical, chemical and optical properties for basic mineral identification, and as the basis for understanding Earth processes. Mineral varieties you will see both in hand sample and thin section are taken from igneous, metamorphic and sedimentary rocks. Furthermore, this course will draw on, and enhance, what you know (or are learning) from chemistry and physics. After completion of this course, you should feel comfortable identifying minerals on the basis of their physical and optical properties. Furthermore, you should be able to apply this information toward solving problems in any field of geology.

As students in the College of Letters & Science at UWO, you are engaging in a liberal arts education (studies designed to provide general knowledge and *develop intellectual capacities*). The curriculum in COLS is designed to provide you with **the capacity to solve problems and think critically** – skills not specific to a single vocation but important to a variety of careers (including geology). Your courses are also designed to teach you **to communicate important ideas (verbally and in written form)**. Because Mineralogy is a course within the COLS curriculum, I have designed this course to engage your mind in problem solving, critical thinking and a variety of ways to communicate your thoughts and ideas. Collaboration (on most assignments) is encouraged – your job is to engage the minds of the people around you, as well. Mineralogy is a required course for the geology major because it is fundamental to the study of the Earth and applies to many aspects of human life. Minerals are essential in understanding hazards, are key ingredients in some medicines and household items, may help us understand global climate change and understanding them may help us address many other important questions from many other disciplines. Think of mineralogy as a means to understanding and appreciating the world around us!

### *SOME THINGS YOU NEED TO KNOW:*

I expect you to come to class prepared to actively participate in exercises and/or activities that are designed to help you learn. In the “lecture” portion of the class, you will be placed in a group. Please sit with that group during each class period. Because you are expected to participate, attendance and promptness are extremely important (to me AND the members of your group) and mandatory

Collaboration with your fellow students will be an essential part of this course. Collaboration is not the same as copying (plagiarism). I expect you to turn in your own work. Please note: *The Wisconsin Administrative Code states: “Students are responsible for the honest completion and representation of their work, for the appropriate citation of sources, and for respect of others' academic endeavors. Students who violate these standards must be confronted and must accept the consequences of their actions.” (§ UWS 14.01) Plagiarism and other forms of academic misconduct are serious offenses with severe penalties. These penalties may include a failing grade on the assignment or in the course, disciplinary action by the Dean, even expulsion from the university. See the University of Wisconsin Oshkosh Student Discipline Code 2003-2004 for definitions of academic misconduct and details about procedures, sanctions, and other relevant information. Specific questions about the provisions in the Student Discipline Code should be directed to the Dean of Students Office.*

#### **EXAMS:**

There are three exams in this course. All exams on lecture material will be open-book, take-home exams (except for one or two questions that you will know about in advance). The exams are designed to test your knowledge and ability find and utilize information. Although you are encouraged to work together on almost all other assignments, these exams should be completed INDIVIDUALLY. Should I find any evidence that suggests collaboration/plagiarism on these exams, I will not hesitate to bring charges of academic dishonesty (see statement on plagiarism/academic dishonesty above). The Final Exam 3 will include some mineral ID and is worth a bit more. Exams 1 and 2 are worth 10% of your grade, Exam 3 is worth 15%.

#### **MINERAL ID EXAM:**

The sole exception to the take-home exam is the MINERAL ID EXAM. Sometime in middle to late October, you will be asked to ID and write the chemical formula for a number of minerals (without the crutch of determinative tables). The mineral ID exam is worth 5% of your total grade.

#### **D2L QUIZZES:**

In preparation for “lecture” periods and the activities that we will do together, you are expected to do the reading *in advance* of the class period. To encourage you to do this, I have set up some Desire2Learn quizzes based on the reading. These are open book quizzes – in fact some of them ask questions about figures in the text. You are also allowed to retake each quiz as many times as you like (preferably until you get 100%!) – *RIGHT UP UNTIL CLASS STARTS THAT DAY*. The quizzes will disappear once class begins at 11:30 am. These quizzes will account for 5% of your total grade.

## LABS:

*There are several items that you should purchase before arriving in lab on **TUESDAY!***

- 1. A non-spiral-bound lab notebook (I recommend the kind with grid lines)*
- 2. A 10x handlens (you can purchase one from me)*
- 3. The Mineralogy Handbook from the bookstore.*

We couldn't do mineralogy without a significant portion devoted to laboratory work – Mineral ID and so on. Each lab is designed to guide you towards learning as much as you can about MINERALS – the building blocks of most geologic materials! In general, I don't ask for much in the way of memorization – most of these labs will ask you to think about the problem at hand and figure out ways to use mineralogy to solve it. However, there are a few key things that you will be required to regurgitate: **the chemical formulas for the minerals listed in Appendix B (the first two pages) of the Mineralogy Handbook.** You will also be required to be able to **identify those minerals in both hand sample and thin section** by the end of the course. Mineral ID isn't so much memorization as it is figuring out how combinations of mineral properties make up the diagnostic properties of a given mineral. Practice is generally the best way to learn your minerals. Labs are worth 30% of your total grade.

A few notes about LABS:

- Each lab (except Lab 4) can be found in the Mineralogy Handbook, available for purchase at the bookstore. Please take the time to read through the introductory and instructional materials before beginning the lab.
- All observations made during lab (including any sketches) and the answers to lab questions should be recorded in a non-spiral-bound lab notebook.
- All assignments should be finished by the beginning of lab on the date that they are due; however, I will not collect lab notebooks until you leave the lab room.
- I do NOT accept significantly late assignments. There are three reasons for this: 1) You need to keep up with the work because often new assignments build on skills you learned in the previous week, if you haven't finished, you may not be ready for the next assignment. 2) I like to correct and return assignments as soon as I can so that you can learn from them – prompt response from me is difficult with late assignments. 3) Late assignments make more work for me and that means I have less time to help you. Nonetheless, sometimes there are extenuating circumstances – so, it never hurts to ask. The worst I can say is “no”!
- The lab period for this class is 3 hours – please do not expect to be excused early. You are signed up for this course, should have no scheduling conflicts and are expected to stay for the entire three hours. In addition, you should expect to spend time outside of the scheduled lab and class periods working on assignments and learning minerals and their formulas. The ONLY way to learn to recognize minerals is by practicing and practicing.
- Every student should have a 10x handlens at the beginning of the first lab – I have several for sale. Please see me if you would like to purchase one.
- For many labs, you will be collaborating with at least one other classmate (we just don't have enough microscopes); however, you must do your OWN work. EACH partner must turn in her or his own notebook with individual responses. (See the statement about plagiarism above.) Also, please, be considerate of your partner's time and energy.

**MINERAL QUIZZES:**

Each week, we will have a mineral quiz in lab. These will consist of identification of minerals in hand sample and writing out their chemical formulas without the use of determinative tables. That is to say, you will be allowed to use reasonable tools (hand lenses, streak plates, magnets, etc.) but will need to ID minerals based on physical properties that you have learned. Mineral quizzes will be worth 3% of your total grade.

**LAB PROJECT:**

At the end of the semester, you will be given an opportunity to show off what you have learned in Mineralogy (for the entire department). Each student will be assigned to a group (generally of 2 or 3 people) who will examine a suite of rocks for mineralogy. Based on the mineralogy and other information given, you will be asked to write out your observations in your lab notebook, write a short paper, and make and present a poster with your findings. For more details, see *Mineralogy Handbook*. This project is worth 10% of your total grade.

**FIELD TRIP:**

In Early October, we will be embarking on a field trip to Central Wisconsin. This trip is a day trip (expect to spend your entire Saturday) to the Wolf River Batholith and the Wausau Syenite. The date for the trip this year is **October 7, 2006**. We will go whether it's raining or sunny and at the end of the day, we'll end up at Jen's for a pizza dinner. This trip is worth 5% of your total grade.

**HOMEWORK/IN-CLASS ASSIGNMENTS:**

My philosophy is that in order to learn something, you need to do it! So, unlike many "lecture courses", you will be asked to be active in your own education by participating and completing in-class assignments. Sometimes, these assignments will continue as homework assignments or you will have homework assignments to complete in addition to what we do in class. These, when graded, will count for 7% of your total grade.

<i>GRADING</i>	<i>GRADING SCALE</i>
EXAM 1 (Ch. 1-4).....	A .....
EXAM 2 (Ch. 6-7).....	AB.....
EXAM 3 (comprehensive with min ID).....	B.....
MINERAL ID EXAM .....	BC.....
Online quizzes (posted on D2L).....	C.....
Labs.....	CD.....
Mineral quizzes.....	D .....
Lab project.....	F .....
Field trip (Saturday, October 7, 2006) .....	
Homework, in-class assignments.....	

EXAM 1 (Ch. 1-4).....	10%
EXAM 2 (Ch. 6-7).....	10%
EXAM 3 (comprehensive with min ID).....	15%
MINERAL ID EXAM .....	5%
Online quizzes (posted on D2L).....	5%
Labs.....	30%
Mineral quizzes.....	3%
Lab project.....	10%
Field trip (Saturday, October 7, 2006) .....	5%
Homework, in-class assignments.....	7%

A .....	92-100%
AB.....	87-92%
B.....	82-87%
BC.....	77-82%
C.....	72-77%
CD.....	67-72%
D .....	60-67%
F .....	< 60%

## LECTURE AND LAB SCHEDULE (tentative)

**Bold typeface indicates lab topic – *OLQ* indicates a quiz due before class**

<b>Wk</b>	<b>Date</b>	<b>Topic(s)</b>	<b>pages in Nesse</b>
1	W 6-Sep-06	organizational meeting; course philosophy; mineral properties	pp. 3-5
	F 8-Sep-06	crystallography: 2D translational symmetry I ( <i>OLQ</i> )	pp.6-12
2	M 11-Sep-06	crystallography: 2-D symmetry II ( <i>OLQ</i> )	pp. 12-20
	<b>T 12-Sep-06</b>	<b>mineral properties and rock-forming minerals I (<i>HW</i>)</b>	
	W 13-Sep-06	Crystallography: point symmetry and groups	20-29
	F 15-Sep-06	Practice with 3D crystallography ( <i>OLQ</i> )	20-29
3	M 18-Sep-06	Miller indices – forms ( <i>OLQ</i> )	29-38
	<b>T 19-Sep-06</b>	<b>Rock-forming minerals II</b>	
	W 20-Sep-06	Miller Indices	
	F 22-Sep-06	More Miller Indices ( <i>OLQ</i> )	
4	M 25-Sep-06	crystal chemistry: periodic table, elements and minerals ( <i>OLQ</i> )	39-46
	<b>T 26-Sep-06</b>	<b>Miller Indices and rock-forming minerals III</b>	
	W 27-Sep-06	crystal chemistry: bonding ( <i>in-class exercises</i> ) ( <i>OLQ</i> )	46-56
	F 29-Sep-06	crystal structure controls, Pauling's Rules ( <i>in-class exercises</i> ) ( <i>OLQ</i> )	57-65
5	M 2-Oct-06	crystal structure: polymorphism, classification and compositional variation ( <i>native element worksheet</i> )( <i>OLQ</i> )	65-73 Ch. 20
	<b>T 3-Oct-06</b>	<b>Minerals IV</b>	
	W 4-Oct-06	mineral properties, composition and bonding ( <i>OLQ</i> )	97-113
	F 6-Oct-06	light ( <i>OLQ</i> ) ( <b>EXAM 1 HANDED OUT</b> )	114-116
	<b>SAT 7-Oct-05</b>	<b>FIELD TRIP TO WOLF RIVER BATHOLITH AND WAUSAU</b>	<b>Handout</b>
6	M 9-Oct-06	refraction of light; Snell's law ( <i>OLQ</i> )	117-121
	<b>T 10-Oct-06</b>	<b>light – Snell's law an introduction to the petrographic microscope</b>	
	W 11-Oct-06	Isotropic and anisotropic materials (the indicatrix) ( <i>OLQ</i> )	121-122, 130
	F 13-Oct-06	interference phenomena and colors ( <i>OLQ</i> ) ( <b>EXAM 1 DUE</b> )	122-129
7	M 16-Oct-06	important anisotropic optical properties	136-139
	<b>T 17-Oct-06</b>	<b>The petrographic microscope – optical props (<i>OLQ</i>)</b>	<b>136-139</b>
	W 18-Oct-06	Uniaxial indicatrix ( <i>OLQ</i> )	130-133
	F 20-Oct-06	In-class exercise – uniaxial and intro to biaxial	130-136
8	M 23-Oct-06	NO CLASS - GSA	
	<b>T 24-Oct-06</b>	<b>MINERAL ID EXAM</b>	
	W 25-Oct-06	NO CLASS - GSA	
	F 27-Oct-06	Biaxial indicatrix ( <i>OLQ</i> )	133-136

Wk	Date	Topic(s)	pages in Nesse	
9	M	30-Oct-06	Uniaxial interference figures ( <i>OLQ</i> )	139-143
	T	<b>31-Oct-06</b>	<b>interference figures</b>	
	W	1-Nov-06	uniaxial interference figures in class assignment	139-143
	F	3-Nov-06	Biaxial interference figures ( <i>OLQ</i> )	143-151
10	M	6-Nov-06	Biaxial minerals (in class exercise)	Ch 11
	T	<b>7-Nov-06</b>	<b>mineral identification in thin section</b> ( <i>Lab project assignments given out</i> )	
	W	8-Nov-06	Framework silicates (quartz/arkose rocks) ( <i>OLQ</i> )	Ch 12
	F	10-Nov-06	Sheet Silicates <i>(EXAM 2 Handed out)</i>	Ch 13
11	M	13-Nov-06	Chain-, sheet- and framework silicates: felsic minerals	Ch 14
	T	<b>14-Nov-06</b>	<b>Igneous mins in thin section and hand sample</b> ( <i>OLQ</i> )	<b>186-190</b>
	W	15-Nov-06	Ring- and disilicates: Felsic minerals 2	Ch. 15
	F	17-Nov-06	Chain and orthosilicates: Mafic minerals (igneous and metamorphic minerals) <i>(EXAM 2 DUE)</i>	Ch.16
12	M	20-Nov-06	Weathering and alteration minerals	Ch. 18
	T	<b>21-Nov-06</b>	<b>Sedimentary minerals in thin section and hand sample</b> ( <i>OLQ</i> )	<b>190-194</b>
	W	22-Nov-06	<i>NO CLASS – THANKSGIVING HOLIDAY</i>	
	F	24-Nov-06	<i>NO CLASS – THANKSGIVING HOLIDAY</i>	
13	M	27-Nov-06	Carbonates and Evaporites	Ch. 17
	T	<b>28-Nov-06</b>	<b>Metamorphic minerals in thin section and hand sample</b> ( <i>OLQ</i> )	<b>194-200</b>
	W	29-Nov-06	Pelitic minerals	
	F	1-Dec-06	VMS deposits and accessory minerals	Ch. 19
14	M	4-Dec-06	Lab project	
	T	<b>5-Dec-06</b>	<b>Lab project</b>	
	W	6-Dec-06	Lab project	
	F	8-Dec-06	<b>Lab Project Session (presentations)</b> <i>(EXAM 3 handed out)</i>	
15	M	11-Dec-06	TBA	
	T	<b>12-Dec-06</b>	<b>TBA</b>	
	W	13-Dec-06	TBA	
	F	15-Dec-06	<i>Lab Project papers and lab notebooks and EXAM 3 due by 12:30 pm</i>	