

GEOLOGY 331
Structural Geology & Tectonics
Spring, 2011

Instructor: Tim Paulsen
Office: 306 Harrington
Office Hours: M,W, 3:00-4:00 or by appointment

Lectures: M, W; 1:50-2:50; Room 217, Harrington
Attendance required.

Laboratory: F; 1:50-5:10; Room 217, Harrington
Weekly homework exercises will be assigned during lab.
Attendance required.

The purpose of lab time is to work on the assignments for the day. I will not give a long lecture at the beginning of lab; my purpose will be to answer questions during the lab time. Because of this arrangement, it is imperative that you complete the reading assignments *before* coming to labs. To encourage this practice, there will be a five to ten minute quiz at the beginning of most labs that will cover the concepts and terminology presented in the assigned reading. Lab assignments are due the following Monday in lecture. Lab attendance is required, which means that if you are absent or leave lab early you will not receive credit for that lab. However, you will still be responsible for the material covered in lab.

Laboratory Materials: You should always bring the following to lab: paper, pencil, eraser, scale, protractor, calculator, lab book, thinking cap, onion skin/tracing paper (when doing stereonet and strain work)

Exams: Three hourly lecture exams
Two laboratory practical exams

Field Trip: There will be one required field trip to Marquette (MI) leaving Friday, April 29 at 5:00 pm and returning Sunday, May 1. We will discuss this in more detail as the date of the trip approaches.

Other Assignments: Field notebooks will be collected and graded. A written report on the field trip geology will be required. This will be discussed in more detail in class.

Grading: Lecture = 65% of total grade
•2 hourly lecture exams, homework, field trip assignment, & participation=50%
•final lecture exam (cumulative)=50%

Laboratory = 35% of total grade
•lab exams=40%
•quizzes=10%
•weekly lab assignments & participation =50%

Required Texts: Van der Pluijm, B., and Marshak, S., 2004, *Earth Structure: An Introduction to Structural Geology and Tectonics* (2nd edition), W.W. Norton, & Co., 656 p.

Marshak, S., and Mitra, G., 1988, *Basic Methods of Structural Geology*, Prentice-Hall, Englewood Cliffs, NJ, 446p.

Tentative Lecture Schedule

<u>Lecture Topic</u>	<u>Suggested Reading</u>
1) Primary and nontectonic structures	V&M-Chapters 1 & 2
2) Contact Relations	
3) Stress	V&M-Chapter 3
4) Deformation and strain	V&M-Chapter 4
5) Rock Rheology	V&M-Chapter 5
**EXAM I	
6) Fracturing	V&M-Chapter 6
7) Joints and veins	V&M-Chapter 7
8) Faults and brittle fault rocks	V&M-Chapter 8
9) Ductile deformation mechanisms	V&M-Chapter 9
10) Folds and folding	V&M-Chapter 10
11) Foliations and lineations	V&M-Chapter 11
12) Shear zones and transposition	V&M-Chapter 12
**EXAM II	
13) Deformation, metamorphism, and time	V&M-Chapter 13
14) Whole earth structure	V&M-Chapter 14
15) Plate tectonics and plate boundaries	V&M-Chapter 14
16) Causes of earth movements	V&M-Chapter 14
17) Contractional tectonics	V&M-Chapters 17&18
18) Extensional tectonics	V&M-Chapter 16
19) Strike-slip tectonics	V&M-Chapter 19
20) Structural provinces of the USA	To be announced
** FINAL EXAM (Cumulative; during last lab period)	

Tentative Lab Schedule

<u>LAB</u>	<u>Topic</u>	<u>Reading</u>
Feb. 4	Attitude and Location	M&M Chapter 1
Feb. 11	Contour Maps	M&M Chapter 2
Feb. 18	Geometric Methods	M&M Chapter 3&4
Feb. 25	Geometric Methods II	M&M Chapter 3&4
March 4	Strain (bring tracing paper)	M&M Chapter 15
March 11	LAB PRACTICAL I (through Strain)	
March 18	To be determined	
March 25	Spring Break	
April 1	Stereonet/Rose Diagrams (bring tracing paper)	M&M Chapters 5&12
April 8	Poles and Rotations (bring tracing paper)	M&M Chapter 6
April 15	Equal-area projections (bring tracing paper)	M&M Chapter 8
April 22	To Be Determined	
April 29	Field Trip Lab	
May 6	LAB PRACTICAL II	
May 13	LECTURE FINAL EXAM	