

GEOLOGY 331 - STRUCTURAL GEOLOGY & TECTONICS

Spring, 2009 - Tim Paulsen

Tentative 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) | |

Instructor: Tim Paulsen
Office: 306 Harrington
Office Hours: W, 12:40-1:40 PM; F, 10:20-11:20 or by appointment

Lectures: M, W; 11:30-12:30; Room 217, Harrington
Attendance required.

Laboratory: F; 1:50-5:10; Room 313, Harrington
Weekly homework exercises will be assigned during lab.
Attendance required.

Exams: Three hourly lecture exams
Two laboratory practical exams

Field Trip: There will be one required field trip to Marquette (MI) leaving Friday, April 24 at 5:00 pm and returning Sunday, April 26. 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.

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Spring, 2009 - LAB SYLLABUS

Tentative Schedule

| <u>LAB</u> | <u>Topic</u> | <u>Reading</u> |
|------------|---|-------------------|
| Feb. 6 | Attitude and Location | M&M Chapter 1 |
| Feb. 13 | To Be Determined | |
| Feb. 20 | Contour Maps | M&M Chapter 2 |
| Feb. 27 | Geometric Methods | M&M Chapter 3&4 |
| March 6 | Geometric Methods II | M&M Chapter 3&4 |
| March 13 | Strain (bring tracing paper) | M&M Chapter 15 |
| March 20 | LAB PRACTICAL I (through Strain) | |
| March 27 | Spring Break | |
| April 3 | Stereonet/Rose Diagrams (bring tracing paper) | M&M Chapters 5&12 |
| April 10 | Poles and Rotations (bring tracing paper) | M&M Chapter 6 |
| April 17 | Equal-area projections (bring tracing paper) | M&M Chapter 8 |
| April 24 | To Be Determined | |
| May 1 | Field Trip Lab | |
| May 8 | LAB PRACTICAL II | |
| May 15 | LECTURE FINAL EXAM | |

The lab is in Room 313 Harrington Hall. The purpose of lab time is to work on the assignments for the day. Therefore, 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 students 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.

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)