STRUCTURAL GEOLOGY - GEOL 345

Instructor: Simon Kattenhorn
Spring Semester 2010: TR 9.30 a.m. - 10.45 a.m., Mines 306 / Lab: W 1.30 p.m. – 3.20 p.m., Mines 306

Course Summary

This course examines the fundamental concepts of deformation of the lithosphere. Due to the mobile nature of the Earth’s lithosphere, rocks are invariably deformed, showing evidence of the effects of large stresses at all scales, from submicroscopic to regional. A long geologic history on Earth has resulted in many regions showing the cumulative effects of multiple deformation events. It is therefore important to be able to distinguish different geologic structures, describe them fully, understand how they formed, and place them in the context of a broader geologic history. There are few aspects of geology that are not directly impacted by the effects of deformation. This course will provide you with a framework to integrate an understanding of structural geology into all aspects of geologic study.

Course Goals

The course will consist of lecture and laboratory components. The lectures will provide the theoretical foundation that will enable you to make the leap to application in the labs. The lectures will involve a topical progression in geologic structure analysis, beginning with brittle deformation (joints, faults, intrusions) and the development of stress and strain theory, then continuing with ductile deformation (folds) and the description of rheological flow laws. All deformation features will be placed into the context of tectonic environments with which they are typically associated. The labs will provide hands-on training in geologic map construction and structural analysis, aided by the use of Google Earth to augment 3D structure visualization.

Prerequisites

The prerequisites for this course are Geol 101 or 111 (Physical Geology), Phys 111 or 211 (General or Engineering Physics I), and Math 144 (Analytic Trigonometry) or equivalent math background.

Please see the instructor if you have any questions regarding these prerequisites.

Course Logistics

Instructor: Simon Kattenhorn (please call me Simon)
I am an Associate Professor in the Dept. of Geological Sciences. My office is in McClure Building (directly opposite the Mines Building), Room 303B. McClure is wheelchair accessible from all entrances and has two elevators (NW and SW corners).

Office hours: Thursdays from 2.30-3.45 p.m. or by appointment. The office hours shouldn’t be regarded as being exclusively a time to address difficulties you are having with the course. You can use it for general discussion, to collect or borrow materials, to clarify issues from class, or to talk about your love of structure!

Office phone: 5-5063 from on campus (else 885-5063). The best time to reach me is during the office hours. I have voice mail - if you would like me to call you back, clearly leave your name, telephone number and a convenient time to call you and I will attempt to return your call ASAP.

Email: simkat@uidaho.edu (this is the most efficient way to get a hold of me).
Mailbox: if you wish to leave items in my mailbox, it is in the room directly opposite the Geological Sciences departmental office (Mines 322).

FAX: you can FAX materials to me at (208) 885-5724. Be sure to include my name on the FAX.

Course Website: http://www.uidaho.edu/~simkat/geol345.html
All electronic materials, including homework and relevant course information, will be provided here.

Required textbook: Robert J. Twiss and Eldridge M. Moores
Structural Geology - 2nd Ed. (available in the UI bookstore)
W.H. Freeman, 2007

Required lab manual: Stephen M. Rowland, Ernest M. Duebendorfer, and Ilsa M. Schiefelbein
Structural Analysis and Synthesis - 3rd Ed. (available in the UI bookstore)
Blackwell, 2007

Handouts: a limited number may be provided. Your student account may be billed for any photocopy charges.

Assignments and Examinations

1) You are required to attend all lectures and lab sessions.

2) Homework assignments will be distributed every 2-3 weeks throughout the semester and will be due 1 week later. All homework answers should be typed and stapled. Hand drawings are fine.

3) The lab grade will be integrated into your final grade for the class. It is your responsibility to read ahead from the lab manual so that you are fully prepared at the start of each lab. Many lab exercises will not be completed during the lab session, requiring you to complete them as homework. All labs must be handed in to the lab TA (Rachel Daly) no later than 5 pm each Monday immediately following the lab session.

4) Your term project will involve reading a paper of your choosing published in the Journal of Structural Geology since January 2009 (having 10 or more published pages) and writing a 2-page summary about the main findings in the paper and how it relates to material learned in class.

5) The midterm examination will be on Tuesday, March 9th in Mines 306 (during the regular class time).

6) The final examination will be on Friday, May 14th from 8.00 – 9.30 a.m. in Mines 306.

Grading

Laboratory exercises: 40%
Homework exercises: 20% (includes term paper)
Midterm exam: 20%
Final exam: 20% (the final exam will not be comprehensive)

Please speak to me if you have any questions about the expectations for this course.

Field Trip

There will be a mandatory field trip during the week of April 12-18th. We will visit the Lake Mead region in Nevada. Some travel costs may be billed to student accounts at the end of the semester. We will be camping during this field trip. Be prepared by obtaining any materials likely to be needed for the field, such as tents and hiking equipment. Daytime temperatures are likely to be in the upper 70s to low 80s with lots of direct sunshine. Nighttime lows should be in the mid-50s to low-60s. More specific information will be provided closer to the time.