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GEO 315.01: Structural Geology

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University of Montana
GEO 315; 4 credits
Structural Geology
Jim Sears, X 52512; CHCB 362, james.sears@umontana.edu
Office 2-3 PM MWF

Autumn, 2015

Content: Structures of deformed rocks; field measurements and mapping, graphical interpretation of structural problems; mechanical principles; tectonic principles. We will take advantage of the superb structural setting of our campus in the western Montana Rockies to gain first-hand understanding of structural and tectonic principles.

Two lecture hours per week plus four lab hours per week and one weekend field trip.

During the first seven weeks of the course, we will take a 4-hour field trip each Tuesday, and 1 weekend field trip. Students will keep detailed field notes (using a bound, weatherproof field book) for recording structural measurements and field observations. You will analyze field data using various methods, including stereonet plotting and structural cross-section construction. We will begin our field trips examining near-surface rocks structures, and week by week, proceed to deeper crustal levels.

During the second part of the course we will investigate quantitative aspects of rock strength and deformation in detail, and study geophysical measurements of structures. We will augment classroom lectures and readings with lab exercises.

Recommended Textbook: Davis, Reynolds, and Kluth, 2012, Structural Geology of Rocks and Regions, 3rd ed., Wiley. Additional readings as assigned. Many resources will be posted on Moodle.

Assessment:

Field trips and assignments	40 points
Lab assignments	20 points
Take home final part 1	20 points
Take home final part 1	20 points
TOTAL	100 points

See reverse side for approximate schedule

Approximate schedule:

	<i>Lecture</i>	<i>Field trip/lab</i>
Sep	1/3 Introduction	Blackfoot thrust
	8/10 Kinematic elements	Drummond folds
	15/17 Stereonets	Rattler Gulch transect
	22/24 Thrust belts	Rattler Gulch Map
	29/ Oct 1 Balanced cross-sections	Missoula area
Oct	2, 3, 4 Weekend field trip to Sun River Canyon	
	6/8 Geologic maps	St Regis -Perma
	13/15 Metamorphic rocks	Skalkaho migmatites
	20/22 Extensional systems	Bitterroot mylonite
	27/29 Active tectonics	GPS hz velocity fields
Nov	3/5 Strain	Strain measurement
	10/12 Force, stress and strength	Mohr diagram/brittle
	17/19 Rheology	Mohr diagram/plastic
	24/26 Thanksgiving	
Dec	1/3 Take home final part 1	
	8/10 Take home final part 2	

Learning outcomes: Students will learn to describe, measure, map, graph, and analyze geologic structures of deformed rocks. They will learn mechanical principles of rock deformation.

The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Disability Services for Students. If you think you may have a disability adversely affecting your academic performance, and you have not already registered with Disability Services, please contact Disability Services in Lommasson Center 154 or 406.243.2243. I will work with you and Disability Services to provide an appropriate modification.

Sept 21, 2015 - Last day to withdraw w/o petition.