

**AMHERST COLLEGE**  
**Geology 29: Structural Geology**  
**Fall 2009**

**Instructor:** Peter Crowley, ESMNH Rm. 310, x2715, pdcrowley@amherst.edu

**Office Hours:** open door (M-F 9-4)

**Text:** Davis, G.A. & Reynolds, S. J. (1996) Structural Geology of Rocks and Regions, John Wiley and Sons, NY, NY, 776 pp.  
(available at Amherst Books)

**Grading:** 10% Term work & class participation  
30% Term tests *Scheduled for October 5 and November 13*  
25% Labs  
10% Lab exam *Scheduled for Dec. 14*  
25% Final Exam  
100% TOTAL

**Field Trips:** One mandatory field trip is scheduled for Sun Nov. 1

**Lecture schedule**

Tu	8-Sep	Introduction: Structural architecture- dislocations to orogenic belts
Wed	9-Sep	Types of contacts.
Fri	11-Sep	Primary structures in sedimentary rocks.
Mon	14-Sep	Primary structures in igneous rocks.
Wed	16-Sep	Mohr-Coulomb sand experiments
Fri	18-Sep	Faults: Frictional sliding in rocks, Mohr-Coulomb failure
Mon	21-Sep	GIS 1: Digital elevation model
Wed	23-Sep	Experimental deformation: Donath press
Fri	25-Sep	2-d stresses: components of stress, stress ellipse
Mon	28-Sep	Stress: Mohr diagram
Wed	30-Sep	GIS 2: Integrating GPS on a DEM
Fri	2-Oct	Strain I: elongations, shear strain, strain ellipse
Mon	5-Oct	<b>Term test I- Covers all material through Sep-28</b>
Wed	7-Oct	Strain simulations: pure and simple shear
Fri	9-Oct	Rheology: the Donath Press
Mon	12-Oct	Mid-semester break
Wed	14-Oct	Rock mechanics I: elastic, plastic and viscous deformation.
Fri	16-Oct	Rock mechanics II: effects of P,T, & strain rate.
Mon	19-Oct	No Class GSA meeting
Wed	21-Oct	Faulting: fault types, structures associated with faults, fault rocks
Fri	23-Oct	Faulting: fault slip and marker offset.
Mon	26-Oct	Maps and cross-sections: thrust fault geometries, ramp decollement faulting.
Wed	28-Oct	Tectonic setting of thrust faulting.
Fri	30-Oct	Strike-slip faulting: transform systems, pull-apart basins.
<b>Sun</b>	<b>1-Nov</b>	<b>Catskill NY Field trip</b>
Mon	2-Nov	Maps and cross-sections: listric normal and detachment faults.

Wed 4-Nov Stereonet I: stereographic projection, plotting lines and planes.  
Fri 6-Nov Tectonic setting of extensional faulting.  
Mon 9-Nov Pore fluids: The beer can experiment  
Wed 11-Nov Fold types and fold description  
Fri 13-Nov **Term Test II- Covers all material up through November 9**  
Mon 16-Nov Stereonet II: folds on a stereonet.  
Wed 18-Nov Experimental fold formation, parallel and similar folds  
Fri 20-Nov Fold mechanisms, folds and strain.  
Mon 23-Nov Thanksgiving Recess  
Wed 25-Nov Thanksgiving Recess  
Fri 27-Nov Thanksgiving Recess  
Mon 30-Nov Fault-bend folding, fault propagation folding.  
Wed 2-Dec Rheology returns: flow in rocks  
Fri 4-Dec Foliations  
Mon 7-Dec Lineations  
Wed 9-Dec Flow mechanisms in crystals and rocks.  
Fri 11-Dec Dislocations and the atomic level of deformation  
Mon 14-Dec Kinematic indicators & mylonitic fabrics.  
Mon 14-Dec **Lab quiz.**