

## GY315 Structural Geology









*n.b. Hotlinks to supporting materials to accompany the book chapters are at bottom of this page... help yourself!*

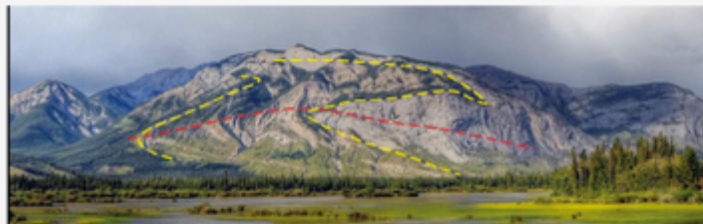
### WEEK ONE

Day	Class	Featured Structure	Reading and Problems
2/15	AM: Intro to Structure, Geometrical Framework PM: Brunton Work and Plotting	Mylonite Zones	READ: 1-4, 15-18, 19-26 Lab - Structure ID and measurements, using big samples in the classroom.
2/16	AM: Rigid Body Deformation I: rotation and translation. Structures: Rotated Bedding, Fractures PM: LAB	Joints	READ: Ch.4, 119-125 Lab handout : <a href="#">In-class worksheet</a> and Prob 4.1 to 4.4 Fossen.
2/17	AM: Strain vs Stress; Pressure v Stress; Brittle Deformation II PM: LAB	Deformation Bands	READ: Ch.5 (up to p.90), 126-138, 141-148 PROBs: <a href="#">In-class worksheet</a> and Prob 7.1 Fossen. <a href="#">Stress Handbook</a>
2/18	AM: Differential Stress, Faults I PM: Stereographic plotting and data management (use Appendix B)	Hi angle brittle faults	READ: 93, 151-161, 263-265 PROBLEMS: <a href="#">stereonet exercise</a> . Explore this <a href="#">visualization tool</a> , and <a href="#">Download stereonet software</a> <a href="#">here</a>
2/19	AM: Faults II, Anderson theory, consequences of mechanical layering PM: Field- Garden of the Gods	Low angle faults	READ: 165-180, 190-193. Prob 8.1 <a href="#">Fossen</a>

### FIELD EXERCISE










## WEEK TWO

Day	Class	Featured Structure	Reading and Problems
2/22	AM: MIDTERM I: BRITTLE STRUCTURES, STRESS, MOHR DIAGRAMS  PM: Field- Local	Front Range architecture	<b>REVIEW</b> all that preceded.
2/23	ALL DAY: Field- Laramide Fault and associated brittle structures, Canon City. <b>Depart 8 a.m.</b>	Reverse faults and associated structures	<b>READ:</b>  Field exercise
2/24	ALL DAY: Field- Continuous deformation, Arkansas River Canyon <b>Depart 8 a.m.</b>	Foliation and Lineation	<b>READ</b> (field-preparation "sampler" :Ch.13, 411-414, 243-248, 254-255  Field exercise
2/25	AM: Strain Theory I: utility of linear algebra    PM: Mathematical description of deformation	Pure shear, simple shear, and subsimple shear	<b>READ:</b> Ch.2: 22-32  Lab:matrix problems   and field data tabulation (with strain quantification)
2/26	AM: Strain Theory II: Matrix approach, Part II    PM: Mathematical description of deformation	Strain Zones,  Microstructures	<b>READ:</b> Ch.2:32-43 and Appendix A  Lab: field data strain analysis and Problem set (worksheet and probs 2.7-2.9, Fossen)



annotated range-profile, from H. Fossen

## WEEK THREE

Day	Class	Featured Structure	Reading and Problems
2/29	AM: Strain Analysis: Eigenvalues & eigenvectors, recap   , and Strain measures in shear zones  PM: Five Points shear zone - synthesis of pod rock data and hypothesis of strain gradient	Kinematic analysis of strain zones	<b>READ:</b> Ch.3, 285-290  <b>EXAM REVIEW</b>  
3/1	AM: MIDTERM II: CONTINUOUS DEFM, SHEAR ZONES, STRAIN. Exam Review material, here   : MidtermReview 2016 strain.pdf    PM: free and open ! woo woo		<b>READ:</b>  <b>PROBLEM SET</b>
3/2	AM: Regional Extension. Information from nature: strain markers and methods (Wellman Method, Ri-Rf method)  PM: Majors Meeting at lunchtime, <b>FIELD EXERCISE</b> , local	continental rift: focus on  West Antarctic rift	<b>READ:</b> Ch.16  <b>Lab: FIELD EXERCISE</b> and stereonet followup, <b>HOGBACK</b> <b>FOLD</b> map  , use for interpretation



## WEEK THREE, *continued*

3/3	<p>AM: Regional Contraction: fold-thrust and foreland styles. Information from nature: Grains, Fossils and Folds as strain markers</p> <p>PM: LAB- short. USE remaining time to READ and prepare for Bilham visit. It's not every day that you get to learn about <a href="#">the Himalayan system</a>, from one who studies it firsthand!</p>	foreland structures	<p>READ: Ch.17</p> <p>in-class PROBLEM SET, analog models</p>
3/4	<p>AM: Wrench systems, regional scale. NOON Pizza Lunch seminar with Prof. Roger Bilham <a href="#">📄</a> <a href="#">🔗</a>, from CU-Boulder: The dangerous southern edge of the EuroAsian plate: earthquakes and corruption</p> <p>PM: Convergence class with Seismology course, with Bilham. 1) seminar, New insights into Himalayan earthquakes following Nepal's 2015 Mw7.8 incomplete rupture. and 2) short local field trip to Front Range seismites (recommended but optional for students)</p>	plate boundary zones	<p>READ: Seeber and Pecher (4-pager); Jessup, 2013 <a href="#">🔗</a> (great figures!!) p. 172-174 &amp; Ch.18</p> <p>Stereonet exercise and experiments: <a href="#">field data</a> <a href="#">🔗</a></p>



## WEEK FOUR

Day Class	Featured Structure	Reading and Problems
3/7	thrust-fold geometry and role of transfer fault(s)	<p>READ: Ch. 20</p> <p>PROJECT: structure cross section and snets (HOGBACK FOLD map <a href="#">🔗</a>)</p>
3/8	Laramide of the Front Range	KINEMATIC AND DYNAMIC ANALYSIS of Keeton area
3/9	Laramide of the Front Range	field practical exam <a href="#">📄</a> <a href="#">🔗</a> and MAP <a href="#">📄</a> <a href="#">🔗</a>

Course Evaluation  , specific to Block 6, GY315

**Hotlinks to structural geology topics follow, after the image of Riedels in SNOW!**



[Intro to Structural Geology \(Ch 1\)](#) 

[Strain \(Ch. 2\)](#) 

[Stress \(Ch. 4 - 5\)](#) 

Handout: [Stress and Shear Failure](#)

LAB: Mohr-Coulomb analysis of Stress - [Problem Set](#)

