Structural Geology Seminar

GEOL 425

Fall 2016 Monday 1 – 3 p.m.

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Preamble

Tremendous forces within the Earth cause rocks to be stretched, rotated, buckled, and twisted. In this seminar we will study deformed rocks and attempt to quantify the distortion (strain) that these rocks have experienced (*well, enjoyed as rocks clearly enjoy being deformed*). Our main focus will involve collecting data for a number of new research projects: we'll start with a project on campus examining fractures in James Blair Hall, we'll study a magnificent outcrop in the Virginia Piedmont, and draw cross sections of some distinctively folded rocks in the Valley & Ridge province. Some of our projects may develop into research presentations for professional conferences, and possibly serve as the kernel of a Senior Research project. In the process, we'll also deepen our knowledge base by reading a suite of articles from the professional literature and discussing their significance in class.

#	Date	Topics & Assignments
1	Aug. 29 th	Structural Geology Reintroduced- Setting Our Research Agenda Fossen- Ch. 1 & 2
2	Sept. 5 th	Fractures are Fabulous- Mapping James Blair Hall's cracked 1 st floor, from field data to digital data <i>Fossen- Ch. 7 & 9</i>
3	Sept. 12 th	Strain on the Brain- 2D and 3D strain Fossen- Ch. 2 & 3, Hatcher & Bailey Article 1(Bailey presents) – Pebble deformation and thrusting in the Bygdin area (Southern Norway)- Hossack, 1968, Tectonophysics Chose your article to present
4	Sept. 19 th	Microstructures 1- A Little World of Mystery Fossen- Ch. 10 Article 2- Evidence for non-plane strain flattening along the Moine thrust Strine and Wojtal, 2004, Journal of Structural Geology James Blair project due (5%)
5	Sept. 26 th	NO Class- GSA meeting in Denver, Colorado Geology of Virginia review articles Nottoway Falls sample analysis due (5%), Friday, Sept. 30 th
	Saturday, Oct. 1 st	FIELD TRIP to Nottoway Falls (rain date Sunday, Oct. 2 nd) Nottoway Falls field notes due (5%)
6	Oct. 3 rd	Field Review and Cross Section Construction: A Primer *Article 3- Deformation mechanisms: recognition from natural tectonites- Knipe, 1989, Journal of Structural Geology

	Oct. 10 th	NO CI	L ASS! Enjoy Fal	l Break		
7	Oct. 17 th		and Kinemation - Ch. 11			
				Choose researd Valley & Ridge cross section o		
8	Oct. 24 th	Strain on the Brain 2- progressive deformation, vorticity, and strain facies **Article 4-* Three-dimensional reference deformations and strain facies Tikoff and Fossen, 1999, Journal of Structural Geology				
9	Oct. 31 st	The Emplacement of Plutons Hatcher & Bailey, Ch. 20, Petford, et al., 2000				
10	Nov. 7 th	Balancing Geological Cross Sections				
			Article 5- (rustal scale geometry of the Zagros fold-thrust McQuarrie, 2004, Journal of Structura Pluton analysis	l Geology	
11	Nov. 14 th	Microstructures 2- Understanding crystallographic axes and the stories they tell *Article 6- Quartz C-axes are Amazing and Useful *Law, 2012, Journal of the Geological Society*				
12	Nov 21 st	Collaborative work on the research projects *Research report due (10%), Tuesday, Nov. 22nd				
13	Nov. 28 th	Rounding out the research projects				
Tues., Dec. 6 th @ 2 p.m. FINAL PR		FINAL PRESE	NTATIONS & FINAL RESEARCH REPORT DU	JE (23%)		
Grading- Fracture map and rose diagram Nottoway Falls sample analysis/field Valley & Ridge cross section Pluton analysis		5% 10% 10% 5%	Article discussion leader Reading & Comprehension Quiz-a-roos (5) In-class participation Research Project	15% 12% 10% 33%		

Text & Readings-

There is no official textbook for this course, however, the Fossen, *Structural Geology* textbook (remember, the text for GEOL 323) will be a reference companion. We will read 6 articles throughout the semester as well as numerous other offerings. These materials will be available on the class Blackboard website.

Article Discussion Leader-

You will team up with another student and be discussion leaders for one of the 6 articles we will read during the semester. The discussion leaders will send out discussion questions to guide the rest of us as we read the articles, will have a presentation prepared for class, and facilitate the in-class discussion.

The Research Project-

The crux of this class is a research project that you'll complete during the latter part of the semester, the details of the project will be discussed on our first day.