

# GEOL 5306

## Advanced Structural Geology Syllabus

### Dr. Kelsch – Spring 2024

Sul Ross State University, Department of Biology, Geology and Physical Science

**Instructor:** Dr. Jesse Kelsch **Office:** WSB 316 **Email:** jkelsch@sulross.edu

**Class day and time:** 12:30-1:45 TR in WSB 210

**Office Hours:** Mon Tue Wed Thur 11-12

Mon Tue 2-3

other times by appointment

**Course Description:** The objective of this course is to provide the student with a functional understanding of the methods of geologic structural analysis and experience in using these methods plus analysis of peer-reviewed work using the same. The course expands on concepts introduced in GEOL 3402, Structural Geology.

Advanced structure concepts will be applied to regional geology of the southern Rio Grande rift and Laramide orogeny, features of which are exposed within day trips of Sul Ross State University. We will collect structural-geologic data from outcrops in these field areas and apply advanced methods of analysis in the classroom.

#### **Methods of Assessment/ Evaluation:**

Assessment of student learning objectives will be made on the basis of problem sets, collected and analyzed data from field trips, concept sketches, and a topical presentation.

#### **Grading:**

Final course grade for GEOL 5306 will be based on a percentage of the total points as follows:

- Concept sketches and in-class exercises totaling 50%
- Field-based exercises totaling 20%
- Two exams (midterm and final) totaling 20%
- One in-class presentation 10%

#### **Required materials:**

- The same textbook that was used in any GEOL 3402 class is usable in this class. Students will be expected to cursorily review topics to be presented in lecture from their undergraduate structural geology textbook, and to use that resource for their in-class presentations (to be assigned.)
- Peer-reviewed published papers provided in digital form by your instructor
- The following free software applications: Stereonet, FaultKin, QGIS, Strabospot

**Topics:**

Week #	week of	lecture topic	Reading or program	
1	Jan 18	detailed structural analysis; Dynamic analysis; stress vs strain; vocabulary	Price & Henry 1984	
2	Jan 23	Riedel shears	Section on Riedels in your textbook	
3	Jan 30	Stereographic analysis of folds	<i>Stereonet</i> program manual	Field: Old Ore Rd
4	Feb 6	"		
5	Feb 13	Vein & joint analysis	Imrecke et al. 2017	
6	Feb 20	Kinematic analysis of fault surfaces	<i>FaultKin</i> program manual	Field: On trail to Devils Den
7	Feb 27	"		
8	Mar 5	In-class exercise (Cedro Peak); Fission track thermochronology	Ricketts et al. 2016	
9	Mar 19	Student presentations; In-class exercise (remote mapping)	<i>QGIS</i>	
10	Mar 26	Construction and balancing of structural cross sections; in-class exercise		
11	Apr 2	Contractional systems	TBA	
12	Apr 9	Extensional systems	TBA	No class 4/11, 4/16 while prof and one student in field
13	Apr 16	Extensional systems	TBA	
14	Apr 23	Oblique-strain systems	TBA	
15	Apr 30	Oblique-strain systems continued		

**Field trips:**

Based on the availability of students in the class, we will take 2 single-day field trips to collect structural data for analysis to Big Bend National Park. We will decide on these trip days as a class.

Selected Sul Ross State University Policies:

**SRSU Library Services**

The Sul Ross Library offers FREE resources and services to the entire SRSU community. Access and borrow books, articles, and more by visiting the library's website, [library.sulross.edu](http://library.sulross.edu). Off-campus access requires your LoboID and password. Check out materials using your photo ID. Librarians are a tremendous resource for your coursework and can be reached in person, by email ([srsulibrary@sulross.edu](mailto:srsulibrary@sulross.edu)), or by phone (432-837-8123).

**Software availability for Sul Ross Students:**

Enrolled students have license to use Microsoft Office programs on their own computers, for free download through the SRSU website. From [sulross.edu](http://sulross.edu) go to MySRSU → Resources → Office 365 and follow the instructions using your Sul Ross ID.

**Student Accommodations**

Sul Ross State University (SRSU) is committed to equal access in compliance with Americans with Disabilities Act of 1973. It is SRSU policy to provide reasonable accommodations to students with documented disabilities. It is the student's responsibility to initiate a request each semester for each class. Students seeking accessibility/accommodations services must contact Mary Schwarze, SRSU's Accessibility Services Coordinator at 432-837-8203 (please leave a message and they'll get back to you as soon as they can during working hours), or email [counseling@sulross.edu](mailto:counseling@sulross.edu). Their office is located on the first floor of Ferguson Hall (Suite 112), and their mailing address is P.O. Box C-122, SUI Ross State University, Alpine. Texas, 79832.

**Academic Integrity:**

Academic dishonesty hurts everyone and reduces the value of college degrees. Doing someone else's work, presenting the ideas and work of others as your own, submitting the same paper for multiple classes, and/or failing to cite your sources when you utilize the ideas of others, are all examples of academic dishonesty. It is your responsibility to read and understand the university's policy on academic dishonesty in the SRSU Student Handbook, as all violations will be taken seriously and handled through the appropriate university process. The Student Handbook can be found at: <https://www.sulross.edu/page/2454/student-handbook> (page 80).

If you have any questions about this, please ask!