

GEOL 5306

Advanced Structural Geology Syllabus

Dr. Kelsch – Spring 2025

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: 9:30-10:45 TR in WSB 210

Office Hours: Tue Thur 12-2
Wed 1-2

Course Description: This course provides the student with a functional and detailed review of geologic mapping and the construction of geologic cross sections. We will investigate structural geology as it intersects with both hydrogeology, in the case of fractures directing groundwater flow; and with paleontology, in the case of comparing deformation in fossilized bone to deformation in the host rock. The course expands on concepts introduced in GEOL 3402, Structural Geology.

Three required field trips will take place on weekends during the semester, for geologic field data collection. These trips' dates will be decided by the entire class.

Course Learning Objectives: Students will gain confidence in construction of geologic maps and cross sections, and therefore their understanding of geologic processes and ability to visualize the subsurface.

Marketable Skills:

- Ability to construct geologic cross sections and visualize the subsurface.
- Presentation skill in written and verbal form

Methods of Assessment/ Evaluation: Assessment of student learning objectives will be made on the basis of cross sections, geologic maps, collected and analyzed data from field trips, and a topical presentation.

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

- Two cross sections from published geologic maps: 10% ea, 20%
- One field map and cross section 15%
- Second field map and cross section 20%
- One QGIS map and cross section 15%
- Literature research in prep for individual project 10%
- Individual project 20%

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 as one reference.
- Peer-reviewed published papers provided in digital form by your classmates
- The following free software applications: Stereonet, FaultKin, QGIS, Strabospot

Topics:

Week #	week of	lecture topic	Assignments and field trips
1	8/25	Introduction; review of stress, strain, strength	Cross section 1 assigned from published map
2	9/1	Review cross section construction	Field on 9/6; field map and field cross section
3	9/8	Structures formed by magma intrusion	
4	9/15	Fold and thrust belts	Field on 9/19-9/21; field map and field cross section
5	9/22	Fold and thrust belts; balancing cross sections	
6	9/29	Using QGIS as a geologic mapping tool	Digital mapping project assigned
7	10/6	Progressive deformation and syntectonic sedimentation	
8	10/13	GSA West Texas Nexus field trip: no class this week; all students attending	GSA field trip
9	10/20	GSA Connects convention: no class this week; all students attending	GSA convention
10	10/27	Balancing cross sections	(Date TBD: field data collection for fractures from in-situ hadrosaur bone)
11	11/3	Joint systems and fractured rock	
12	11/10	Structural controls on hydrogeology	
13	11/17	Rheologic controls on geologic structures	
14	11/24	Student presentations	
15	12/1	Student presentations	

Field trips:

Based on the availability of students in the class, we will take three field trips to collect structural data for analysis. We will decide on these trip days as a class during the first week.

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. 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), 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 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. Their office is located on the first floor of Ferguson Hall (Suite 112), and their mailing address is P.O. Box C-122, Sul 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).

Policy on use of generative AI:

It is a violation of university policy to misrepresent work that you submit or exchange with your instructor by characterizing it as your own, such as submitting responses to assignments that do not acknowledge the use of generative AI tools. Please feel free to reach out to me with any questions you may have about the use of generative AI tools before submitting any content that has been substantially informed by these tools.

ADA Statement

SRSU Accessibility Services. Sul Ross State University (SRSU) is committed to equal access in compliance with the 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 Mrs. Mary Schwartz Grisham, LPC, SRSU's Accessibility Services Director or Ronnie Harris, LPC, Counselor, at 432-837-8203 or email mschwartz@sulross.edu or ronnie.harris@sulross.edu. Our office is located on the first floor of Ferguson Hall, room 112, and our mailing address is P.O. Box C122, Sul Ross State University, Alpine. Texas, 79832.

Required Student Responsibilities Statement

All full-time and part-time students are responsible for familiarizing themselves with the [Student Handbook](#) and the [Undergraduate & Graduate Catalog](#) and for abiding by the [University rules and regulations](#). Additionally, students are responsible for checking their Sul Ross email as an official form of communication from the university. Every student is expected to obey all federal, state and local laws and is expected to familiarize themselves with the requirements of such laws.