Modern Tools in Field Geology w/lab – Fall 2023
GEOL 5328 and GEOL 5028
College of Sciences & Mathematics – Stephen F. Austin State University

**Instructor:** Dr. Zach Fleming
Department: Earth Sciences and Geologic Resources
Email: zachariah.fleming@sfasu.edu Office: Miller Science, Room 305
Lecture: 5-7:30 p.m. W; Miller Science 330 Lab: 7:45 – 9:25 p.m. W; Miller Science 330 Office Hours: MW 10 a.m. - 12:30 p.m.

**Class Description:** This class will introduce students to various technologies which can be used to enhance field data collection. These can include, but are not limited to: Structure-from-Motion photogrammetry, GNSS, remote sensing/multi-spectral imagery analysis, and tablet-based geologic mapping. The general structure of the course is to be project-based, with students gaining an understanding of the technologies at work while also applying them in the field.

**Reading Materials:** The readings for this course will be from the literature.

**Class Participation:** Attendance is not taken; however, you are expected to participate in class discussions, paper presentations, and lab exercises.

**Projects:** There will be two projects that have associated presentations and, for one, a paper. The first will involve a project of your choosing which utilizes remote sensing and multi-spectral data techniques we learn in class. The final project will be based on field data collected on our class trip which you will synthesize and interpret. More details will be given during the semester.

**Field Trip:** There is a field trip planned for Nov. 9-12 to the west Texas. See schedule.

**Final Grades:** Your final grade will be determined by summing the weighted averages of your grades in each of the categories below. Letter grades will be assigned as follows: A (90.0–100), B (80.0–89.9), C (70.0–79.9), D (60.0–69.9), F (< 60.0).

- Participation 15 %
- Lab Exercises 20 %
- Exam 20%
- RS Project 20 %
- Final Project 25 %
Class Schedule:

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<tr>
<th>Week of</th>
<th>Topic</th>
<th>Lab Topic</th>
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<tr>
<td>8/28</td>
<td>Intro. &amp; Spatial Thinking</td>
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<tr>
<td>9/4</td>
<td>Coordinate Systems and Projections</td>
<td>Georeferencing</td>
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<td>9/11</td>
<td>Vectors, Rasters</td>
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<td>9/18</td>
<td>Geodatabases</td>
<td>Sea-level rise</td>
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<td>9/25</td>
<td>Geoprocessing</td>
<td>Using Qfield</td>
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<td>10/2</td>
<td>EM Spectrum and Remote Sensing</td>
<td>Mapping w/ Qfield</td>
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<tr>
<td>10/9</td>
<td>Exam</td>
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<td>10/16</td>
<td>Article Presentations</td>
<td>Multi-spectral Project</td>
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<td>10/23</td>
<td>SfM/MVS Photogrammetry</td>
<td>Multi-spectral Project</td>
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<td>10/30</td>
<td>Project Presentations; Creating and Referencing</td>
<td>Point Clouds</td>
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<td>10/6</td>
<td>Field Trip Prep</td>
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<td>10/13</td>
<td>Field Trip Debrief</td>
<td>Field Trip Debrief</td>
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<td>11/20</td>
<td>Fall Break</td>
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<td>11/27</td>
<td>Analysis of FT data</td>
<td>Analysis of FT data</td>
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<tr>
<td>12/4</td>
<td>Final Presentations</td>
<td>Final Report</td>
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Program Learning Outcomes:

**PLO 1.** Demonstrate knowledge of the fundamental core geologic concepts (Mineralogy, Petrology, Structural Geology, Stratigraphy, Geophysics and Geochemistry). (Concepts)

**PLO 2.** Execute geologic procedures and methods accurately, appropriately and efficiently. (Skills)

**PLO 3.** Apply principles of logic and reasoning to develop and analyze geologic problems. (Logical - Reasoning)

**PLO 4.** Demonstrate competence in using various geologic tools, including technology, to formulate, represent, and solve problems. (Critical thinking - Problem Solving)

**PLO 5.** Demonstrate proficiency in communicating geologic information in an appropriate form to the expected audience. (Communication)

Student Learning Outcomes:

**SLO 1.** Demonstrate an understanding of fundamental geologic concepts as they relate to Earth processes and landscape evolution through geologic time (CO 1, 3).

**SLO 2.** Use quantitative reasoning to interpret geologic data (tables, figures, graphs) from primary research, data assimilation, and models to assess the differences in competing scientific theories associated with rock formation (CO 1, 3).

**SLO 3.** Demonstrate knowledge of the interdependence of science and technology and the influences on geologic reasoning associated with identifiable and testable hypotheses of geologic processes (CO 1, 4).

**SLO 4.** Critically assess the interrelationships between geologic phenomena and communicate the resulting conclusions in oral, visual, and written formats (CO 1, 3, 4).

**SLO 5.** Demonstrate an understanding of the skills and attitudes necessary for effective teamwork in collaborative learning activities (CO 3, 4).
**Attendance:** You are expected to attend all course meetings.

**Statement on AI Usage:** Any use of AI assistance will be considered cheating and handled as such.

**Workload:** A unit of credit is the semester hour, defined by the federal government as one class meeting per week (or its equivalent) for one 15-week semester. For each semester hour, you are expected to spend at least 2 hours per week in preparation and study. To complete this 3-credit course successfully, you are expected to spend 9+ hours per week on class readings, attending the course, and completing your final paper.

**Mental Health:** SFASU values students’ mental health and the role it plays in academic and overall student success. SFA provides a variety of resources to support students' mental health and wellness. Many of these resources are free, and all of them are confidential.

**On Campus:**
- **SFASU Counseling Services**
  - [www.sfasu.edu/counselingservices](http://www.sfasu.edu/counselingservices)
  - 3rd Floor Rusk Building
  - 936-468-2401
- **SFASU Human Services Counseling Clinic**
  - [www.sfasu.edu/human/services/139.asp](http://www.sfasu.edu/human/services/139.asp)
  - Human Services Room 202
  - 936-468-1041

**Crisis Resources:**
- Burke 24-hour crisis line: 1-800-392-8343
- Suicide Prevention Lifeline: 1-800-273-TALK (8255)
- Crisis Text Line: Text HELLO to 741-741

**Academic Integrity:** Abiding by university policy on academic integrity is the responsibility of all university faculty and students. You are encouraged to ask questions about completing your coursework with academic integrity. Academic dishonesty includes both cheating and plagiarism.

Articles IV, VI, and VII of the new Code of Student Conduct and Academic Integrity outline the violations and procedures concerning academic conduct, including cheating, plagiarism, collusion, and misrepresentation. Cheating includes, but is not limited to: (1) Copying from the test paper (or other assignment) of another student, (2) Possession and/or use during a test of materials that are not authorized by the person giving the test, (3) Using, obtaining, or attempting to obtain by any means the whole or any part of a non-administered test, test key, homework solution, or computer program, or using a test that has been administered in prior classes or semesters without permission of the Faculty member, (4) Substituting for another person, or permitting another person to substitute for one’s self, to take a test, (5) Falsifying research data, laboratory reports, and/or other records or academic work offered for credit, (6) Using any sort of unauthorized resources or technology in completion of educational activities.

Cheating includes, but is not limited to: (1) using or attempting to use unauthorized materials on any class assignment or exam; (2) falsifying or inventing of any information, including citations, on assignment; and/or (3) helping or attempting to help other student(s) in an act of cheating or plagiarism. Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism include: (1) submitting an assignment as if it were one’s own work when it is at least partly the work of another person; (2) submitting a work that has been purchased or otherwise obtained from the Internet or another source; and (3) incorporating the words, ideas, or images of an author into one’s paper or presentation without giving the author credit. Read the full University
policy, including penalties, procedures for addressing student academic dishonesty, and student appeals: Policy 4.1: https://www.sfasu.edu/policies/student-academic-dishonesty-4.1.pdf

**Withheld Grades**: At my discretion and with the approval of the chair of the department, a grade of WH will be assigned only if you cannot complete the course work because of unavoidable circumstances. You must complete the work by the deadline I set, which is not to exceed one calendar year from the end of the semester in which you receive a WH, or the grade automatically becomes an F, except as allowed through policy [i.e., Military Service Activation (6.14)]. If you register for the same course in future semesters, the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average. Policy 5.5.