Geology 3401 – Interdisciplinary Geographical Information Systems

Fall, 2025
Class: TR 11 – 12:15 , WSB 310
Lab M 2-5, W 2-5 WSB 310

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Office Hours: MW 8:30 – 10, TR 8:30-9:30, W 1-2
and by appointment

Course description: A geographic information system (GIS) is a computerized information system that is designed to integrate various types of spatial and nonspatial data for a particular area and application. It is a "thematic" map database in that it allows for various "themes", or layers of data types, to be superimposed upon each other. The resultant thematic map can then be printed, published to the internet, and/or analyzed for specific, generally spatial related, queries.

This class is designed to introduce the fundamental concepts of maps and GIS, and to provide the student with experience in utilizing one of the standard desktop GIS packages: ESRI's ArcGIS. The class is "interdisciplinary" – the application of a GIS is only limited by the imagination and experience of the individual. The only prerequisite is basic computer skills. Typical applications of a GIS include: earth science, range management, ecology, hydrology, geography/urban planning, business management/trend and market analysis, sociology, archeology, and law enforcement.

Texts:
Price, Maribeth, Mastering ArcGIS Pro, 2nd edition, Connect version
By Maribeth Price
  ISBN10: 1264091206
  ISBN13: 9781264091201

Conduct: Students are expected to observe the University's Code of Student Conduct (see Student Handbook, http://www.sulross.edu/pages/3633.asp).
Please turn OFF all cellular phones, IPODs, MP3s, etc.; No tobacco products allowed in class.

Expected Learning Outcomes/Objectives: Upon completion of this course, students will apply critical reasoning and problem solving skills to:

1. Recall the basic concepts of the GIS system
2. Create ArcMap projects using readily available data types
3. Create vector GIS data from GPS and from onscreen editing
4. Manipulate raster-based GIS data
5. Perform spatial analysis using geoprocessing skills
6. Prepare output of these data and analyses

Methods of Assessment/Evaluation: Learning outcome assessment will be made on the basis of the following:

1. Weekly in-class quizzes and/or homework
2. Weekly lab quizzes and exercises: These will be subsets of the textbook lab material and will be done in the lab on the scheduled day. They will be due at the end of lab each week. This also includes a lab midterm exam and a lab final exam. These exams will require practical, hands-on skills to solve GIS problems (see learning outcomes listed above).
3. One lab midterm and one lab final.
4. Two midterm lecture exams and one final exam. The exams will assess the application of critical reasoning and problem-solving skills through short answer questions, multiple choice questions, and essay type questions. The graded exams will be reviewed by discussing the logic of the answers and content of the questions missed.
5. Term project. This project will be a group effort (groups of 3 or 4, to be determined by your instructor) and will require the skills listed in the Learning Outcomes section and the creation of a web-based story map. Project topics will be chosen by the groups. Producing data for the campus or local governments will be an option.

	points	percent
quizzes / HW	50	9%
lab exercises	100	18%
lab midterm	50	9%
lab final	50	9%
exam 1	100	18%
exam 2	100	18%
Term Project	100	18%
	550	100%

The final grade scheme is based upon the standard 90-100 = A, 80-90 = B, 70-80 = C, 60-70 = D, and <60 = F.

week	date	Topic	Lecture Reading	Lab
1	8/26	Introduction	1	Lab history, Our hardware / software / GIS data
	8/28	GIS Components		What is GIS?
2	9/2	What is GIS?	2	Mapping GIS data
	9/4			
3	9/9	Mapping GIS data	3	Presenting: Symbology/Features/Classifying Data
	9/11			
4	9/16	Coordinate Systems	4	Coordinate systems: If only the world was flat …
	9/18	Exam 1		
5	9/23	Managing vector data	5	Managing vector data
	9/25			
6	9/30	Managing raster data		Lab midterm
	10/2			
7	10/7		6	Raster data: look at all of the pretty grid cells
	10/9			
8	10/14	Attribute Data	7	Attribute data: that other part of a feature class
	10/16			
9	10/21	Editing	8	Editing: modify/create your own GIS data
	10/23			
10	10/28	Queries	9	Queries: ask questions about your data
	10/30			
11	11/4	Joins and overlays	10	Joins and overlays: connect, extract look for coincidence
	11/6	Exam 2		
12	11/11		11	
	11/13			
13	11/18	Raster analysis	12	Analyze in the raster world
	11/20			
14	11/25	Presentations		Share your data
	11/27	Thanksgiving break 11/26-11/28 (W-F)		
15	12/2	Presentations		LAB FINAL
		Final Exam - TBD		

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 Schwartze Grisham, LPC, SRSU's Accessibility Services Director or Ronnie Harris, LPC, Counselor, at 432-837-8203 or email mschwartze@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.

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.

AI Statement
Understanding how and when to use generative AI tools (such as ChatGPT, DALL-E) is quickly emerging as an important skill for future professions. To that end, you are welcome to use generative AI tools in this class as long as it aligns with the learning outcomes or goals associated with assignments. You are fully responsible for the information you submit based on a generative AI query (such that it does not violate academic honesty standards, intellectual property laws, or standards of non-public research you are conducting through coursework). Your use of generative AI tools must be properly documented and cited for any work submitted in this course.

Academic Integrity
Students in this class are expected to demonstrate scholarly behavior and academic honesty in the use of intellectual property. Students should submit work that is their own and avoid the temptation to engage in behaviors that violate academic integrity, such as turning in work as original that was used in whole or part for another course and/or professor; turning in another person's work as one's own; copying from professional works or internet sites without citation; collaborating on a course assignment, examination, or quiz when collaboration is forbidden. Students should also avoid using open AI sources *unless permission is expressly given* for an assignment or course. Violations of academic integrity can result in failing assignments, failing a class, and/or more serious university consequences. These behaviors also erode the value of college degrees and higher education overall.

Classroom Climate of Respect
Importantly, this class will foster free expression, critical investigation, and the open discussion of ideas. This means that all of us must help create and sustain an atmosphere of tolerance, civility, and respect for the viewpoints of others. Similarly, we must all learn how to probe, oppose and disagree without resorting to tactics of intimidation, harassment, or personal attack. No one is entitled to harass, belittle, or discriminate against another on the basis of race, religion, ethnicity, age, gender, national origin, or sexual preference. Still, we will not be silenced by the difficulty of fruitfully discussing politically sensitive issues.