



## Geology 3401 – Interdisciplinary Geographical Information Systems

Fall, 2023

Class: TR 11:00-12:15, WSB 321

Lab T 2-5, W 2-5 WSB 310

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Office Hours: MWF 10-11, TR 9-11 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, 2<sup>nd</sup> 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	8/29	Introduction		Lab history, Our hardware / software / GIS data
2	8/31	GIS Components		
	9/5	What is GIS?	1	ArcGIS overview
3	9/7			
	9/12	Mapping GIS data	2	Symbology/Features/Classifying Data
4	9/14			
	9/19	Presenting GIS data	3	Creating layouts, now we can have so many
5	9/21	Exam 1		
	9/26			If only the world was flat ...
6	9/28	Coordinate Systems	4	
	10/3			Lab midterm
7	10/5	Managing vector data	5	
	10/10			Vector data: points, lines and polygons
8	10/12	Managing raster data	6	
	10/17			Raster data: look at all of the pretty grid cells
9	10/19	Attribute Data	7	
	10/24			Attribute data: that other part of a feature class
10	10/26	Editing	8	
	10/31			Editing: modify/create your own GIS data
11	11/2	Queries	9	
	11/7	Exam 2		Queries: ask questions about your data
12	11/9			
	11/14	Joins and overlays	10	Joins and overlays: connect, extract look for coincidence
13	11/16			
	11/21	Raster analysis	11	Analyze in the raster world
14	11/23	Thanksgiving break 11/22-11/24 (W-F)		
	11/28	Sharing	12	Share your data
	11/30			
15	12/5	Review		LAB FINAL
	12/11	Final Exam - Monday 12/11 01:15		

### 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 at 432-837-8203 or email [mschwartz@sulross.edu](mailto:mschwartz@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.

### SRSU Distance Education Statement

Students enrolled in distance education courses have equal access to the university's academic support services, such as library resources, online databases, and instructional technology support. For more information about accessing these resources, visit the SRSU website. Students should correspond using Sul Ross email accounts and submit online assignments through Blackboard, which requires a secure login. Students enrolled in distance education courses at Sul Ross are expected to adhere to all policies pertaining to academic honesty and appropriate student conduct, as described in the student handbook. Students in web-based courses must maintain appropriate equipment and software, according to the needs and requirements of the course, as outlined on the SRSU website. Directions for filing a student complaint are located in the student handbook.

## **Libraries**

The Bryan Wildenthal Memorial Library in Alpine 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 logging in with your LoboID and password. 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).

No matter where you are based, public libraries and many academic and special libraries welcome the general public into their spaces for study. SRSU TexShare Cardholders can access additional services and resources at various libraries across Texas. Learn more about the TexShare program by visiting [library.sulross.edu/find-and-borrow/texshare/](http://library.sulross.edu/find-and-borrow/texshare/) or ask a librarian by emailing [srsulibrary@sulross.edu](mailto:srsulibrary@sulross.edu).

New for Fall 2023: Mike Fernandez, SRSU Librarian, is based in Eagle Pass (Building D-129) to offer specialized library services to students, faculty, and staff. Utilize free services such as InterLibrary Loan (ILL) and ScanIt to get materials delivered to you at home or via email.

## **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.

## **Supportive Statement**

I am to create a learning environment for my students that supports various perspectives and experiences. I understand that the recent pandemic, economic disparity, and health concerns, or even unexpected life events may impact the conditions necessary for you to succeed. My commitment is to be there for you and help you meet the learning objectives of this course. I do this to demonstrate my commitment to you and to the mission of Sul Ross State University to create a supportive environment and care for the whole student as part of the Sul Ross Familia. If you feel like your performance in the class is being impacted by your experiences outside of class, please don't hesitate to come and talk with me. I want to be a resource for you.