

GRG 460G  
Spring 2025



## Course Information

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Instructional Mode: Face-to-face

Meeting Times: Mon/Wed 02:30 PM - 04:00 PM; Mon 09:00 AM - 11:00 AM

Meeting Location: RLP 0.130; RLP 1.402

Unique Number: 37390

## Instructor

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Yuhao Kang

Email: [yuhao.kang@austin.utexas.edu](mailto:yuhao.kang@austin.utexas.edu)

## Office Hours and Location

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Instructor Office Location: RLP 3.422

Instructor Office Hours: T 3:30-4:30 pm, W 4:00-5:00 pm

## Teaching Assistants

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Brody Manquen, [manquen@utexas.edu](mailto:manquen@utexas.edu)

Office Location:

Office hours: Monday, 11:30 - 1:30.

Stephanie L Zeller, [stellerzeller@utexas.edu](mailto:stellerzeller@utexas.edu)

Office Location:

Office hours: Tuesday afternoons from 1-3pm.

## Catalog Description

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An introduction to the creation and use of geographic information systems.

## Overview of the Class

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This course is designed to provide students with a solid foundation in the concepts, technology, and methods of GIS and related technologies, including global positioning systems (GPS), cartography, remote sensing, spatial analysis, and programming. Through a series of lectures, hands-on labs, and project-based assignments, students will learn to collect, manage, analyze, and visualize spatial data effectively. The laboratory component introduces students to commonly used GIS software, equipping them with the skills to address real-world geographical challenges. Students will also explore critical issues related to data integrity, legal, privacy, and ethical aspects of GIS use. Upon completion, students will be well-prepared to apply their knowledge and skills in various fields, understanding not only how to operate GIS software but the scientific principles behind the software.

## Pre-Requisites for the Course

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Prerequisite: Upper-division standing.

## Learning Outcomes

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At the conclusion of this course, students will be able to:

- Understand the basic concepts and principles of GIS.
- Collect, map, and analyze geographic data to better understand the dynamics of our physical and social world.
- Think spatially and develop problem-solving skills with a critical understanding of the geographic context for addressing and solving geographical challenges.
- Demonstrate proficiency in using GIS software and basic scientific computing and programming skills to reason and communicate geographic information effectively.

- Understand the scope, significant themes, and current challenges within GIScience.
- Recognize the legal, privacy, and ethical considerations associated with the use and distribution of geospatial data.

## Flag Courses

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This course carries the Quantitative Reasoning flag. Quantitative Reasoning courses are designed to equip you with skills that are necessary for understanding the types of quantitative arguments you will regularly encounter in your adult and professional life. You should therefore expect a substantial portion of your grade to come from your use of quantitative skills to analyze real-world problems.

## Grading Policy

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### Grading policy

Labs	40%	10 labs, 4% each
Exams	20%	2 exams, 10% each
Attendance and Participation	10%	11 attendance checks [lowest grade dropped], 1% each, up to 5% extra points
Post-class quizzes	10%	10 quizzes, 1% each
Final Group Project	20%	1 final group project with a presentation

### Grade Breaks

Grade	Cutoff
A	94%
A-	90%

Grade	Cutoff
B+	87%
B	84%
B-	80%
C+	77%
C	74%
C-	70%
D+	67%
D	64%
D-	60%
F	<60%

## Generative Artificial Intelligence

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The creation of artificial intelligence tools for widespread use is an exciting innovation. These tools have both appropriate and inappropriate uses in classwork. The use of artificial intelligence tools (such as ChatGPT) in this class is permitted for students who wish to use them, **provided the content generated by AI is properly cited and acknowledged.**

## Overview of all Major Course Requirements and Assignments

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**Labs** There are 10 laboratory assignments in the course. Each laboratory assignment is designed to allow students to apply the geospatial technologies covered in both the lectures and the respective lab sessions. These lab tasks offer an opportunity for students to consolidate their understanding and engage in hands-on practice. The submission deadline for labs is typically one week after the assignment, with a 10% penalty per day for late submissions. While collaborative discussions among students regarding lecture materials and lab tasks are encouraged, copying answers is not permitted and will be reported.

**Exams** There will be two exams covering the materials in the course. The exams will cover concepts from the lectures, labs, and readings and will include a combination of multiple choice, matching, fill-in-the-blank, short answer, and/or essay questions. The mid-term exam is scheduled for Feb. 26, 2025, and the final exam is scheduled for April 16, 2025. Notes sheets with typed notes or handwritten notes on both sides of the paper are not allowed and may result in a 0 on the exam.

**Class attendance and participation** Attendance and participation are mandatory and collectively account for 10% of your final grade, with an opportunity to earn up to an additional 5% in extra credit points. There will be 11 in-class quizzes at the end of several lectures throughout the semester which will serve as attendance checks. To accommodate occasional absences, the

lowest quiz grade will be dropped. If in an emergency you need to miss a class, please notify Prof. Kang and the TAs via Canvas with a brief explanation before the start of the class period. Attendance is mandatory but we understand that life happens.

During class, the Instructor will occasionally ask questions. Providing a thoughtful and insightful answer that enhances our discussion may earn you an additional 1% extra credit point. Please note that while efforts are made to be objective, this aspect of grading may involve some subjectivity. In addition, throughout the semester, students will have the chance to attend selected GIS and Geography-related events. For each event attended, submitting a one-page reflection with photos will earn an additional 1% extra credit point. In total, up to 5% extra credit points is available per student for the semester.

**Post-class Quizzes** You will have eight take-home quizzes. Each quiz contains 7-15 questions. They will be purely objective (i.e., multiple choice, true/false, or text entry) and will be covering material discussed in the classes. The remaining two quizzes will each provide a problem-solving exercise, asking students to apply their knowledge to practical scenarios.

**Final Group Project** You will have a final group project that applies the geographic knowledge and GIS skills learned from this class to address a geographic challenge. Each group consists of 2-3 team members. A topic and dataset description (2% of final grade) and a project proposal (3% of final grade) will be submitted in the semester. The final project is graded based on two components: presentation (5%) and paper (10%). The last several classes will be used to work on your project (see course schedule below). Each group will present their projects in the last week of class. The final project paper is due **April 30, 2025**. A rubric and more details on the Final Group Project will be posted on Canvas. Only one paper will be submitted per group of students, but all students should contribute to the paper.

## Canvas Assignments

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Due Date	Assignment Name	Points
	<a href="#">Final Exam</a>	100
	<a href="#">Final Project Team -- Find Your TeamMates</a>	0
	<a href="#">Lab_01</a>	20
	<a href="#">Mid-term Exam</a>	100
1/22/25	<a href="#">In-class Quiz 1</a>	2
1/27/25	<a href="#">In-class Quiz 2</a>	2

<b>Due Date</b>	<b>Assignment Name</b>	<b>Points</b>
2/2/25	<a href="#">Quiz 1</a>	10
2/3/25	<a href="#">In-class Quiz 3</a>	2
2/9/25	<a href="#">Quiz 2</a>	10
2/10/25	<a href="#">In-class Quiz 4</a>	2
2/16/25	<a href="#">Quiz 3</a>	10
2/23/25	<a href="#">Quiz 4</a>	10
2/24/25	<a href="#">In-class Quiz 5</a>	2
3/2/25	<a href="#">Post-class Quiz Exercise 1</a>	1
3/2/25	<a href="#">Quiz 5</a>	11
3/5/25	<a href="#">In-class Quiz 6</a>	2
3/9/25	<a href="#">Project Topic and Datasets</a>	3
3/23/25	<a href="#">Quiz 6</a>	9
3/24/25	<a href="#">In-class Quiz 7</a>	2
3/30/25	<a href="#">Quiz 7</a>	8
3/31/25	<a href="#">In-class Quiz 8</a>	2
3/31/25	<a href="#">Final Project Proposal</a>	2
4/6/25	<a href="#">Quiz 8</a>	8
4/20/25	<a href="#">Extra Pts - Activities</a>	5
4/30/25	<a href="#">Final Project Submission</a>	10

## Required Course Materials

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**GIS Fundamentals: A First Textbook on Geographic Information Systems, 7th Ed.**

**Authors:** Paul Bolstad, Steven Manson

## Recommended Course Materials

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Price, M., 2023. *Mastering in ArcGIS Pro*, 2nd Ed.

## Final Exam Date and Time

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The final exam will be held on April. 16, 2025

## Notice of Academic Accommodations from Disability and Access (D&A)

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The university is committed to creating an accessible learning environment consistent with university policy and federal and state law. Please let your instructors know if you experience any barriers to learning so they can work with you to ensure you have equal opportunity to participate fully in your courses.

If you are a student with a disability, or think you may have a disability, and need accommodations please contact Disability & Access (D&A).

Please refer to the [D&A website](#). for more information. If you are already registered with D&A, please deliver your Accommodation Letter to your instructors as early as possible in the semester so you can discuss together your approved accommodations and needs in your courses.

## University Policies and Resources for Students Canvas Page

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This Canvas [page](#) is a supplement to all UT syllabi and contains University policies and resources that you can refer to as you engage with and navigate your courses and the university.

## How Will You Learn?

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### Teaching Modality Information

This course is primarily conducted in person, requiring attendance at scheduled class times as published in the Course Schedule. All lectures and laboratory sessions will take place in

designated classrooms and labs. Students are expected to be present physically for each class to participate in interactive discussions, group learning projects, and hands-on activities. Please note that this course does not offer remote participation options, and attendance is mandatory for successful completion.

### **Communication**

The course Canvas site can be found at [utexas.instructure.com](https://utexas.instructure.com). Please email me through Canvas. You are responsible for ensuring that the primary email address you have recorded with the university is the one you will check for course communications because that is the email address that Canvas uses.

### **Asking for help**

If you have questions or need assistance with course materials, please ensure you direct your inquiries to the appropriate person for timely and effective support. For lecture-related questions, contact the Instructor directly either by email or during office hours. For lab-related inquiries, please reach out to one of the two designated Teaching Assistants (TAs). We strongly encourage you to make use of office hours to discuss course content, seek clarification on assignments, and engage in further discussions about GIS topics.

### **Artificial Intelligence**

The creation of artificial intelligence tools for widespread use is an exciting innovation. These tools have both appropriate and inappropriate uses in classwork. The use of artificial intelligence tools (such as ChatGPT) in this class is permitted for students who wish to use them, **provided the content generated by AI is properly cited and acknowledged.**

### **Late Work and Making up Missed Work**

Students are expected to complete all assignments by the due dates. However, if you anticipate or encounter situations such as serious illness, family emergencies, or other valid reasons that prevent you from submitting on time, please notify Prof. Kang and the TAs via Canvas for extensions. Late work will be accepted with a penalty. Assignments submitted late will incur a grade reduction of 10% per day past the due date.

## **Sharing of Course Materials is Prohibited**

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No materials used in this class, including, but not limited to, lecture hand-outs, videos, assessments (quizzes, exams, papers, projects, homework assignments), in-class materials, review sheets, and additional problem sets, may be shared online or with anyone outside of the class without my explicit, my written permission. Unauthorized sharing of materials may facilitate cheating. The University is aware of the sites used for sharing materials, and any materials found online that are associated with you, or any suspected unauthorized sharing of materials, will be reported to [Student Conduct and Academic Integrity](#) in the Office of the Dean of Students. These

reports can result in initiation of the student conduct process and include charge(s) for academic misconduct, potentially resulting in sanctions, including a grade impact.

## Course Outline

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This is a tentative schedule and may change based on progress.

Week	Date	Day	Lecture	Lab
1	13-Jan	M	Introduction	No Labs
	15-Jan	W		
2	20-Jan	M	No Class	Harry Ransom Visit, Jan. 21-23, 27
	22-Jan	W	Data Models	
3	27-Jan	M	Coordinates & Geodesy	Lab 1: Introduction to ArcGIS Pro
	29-Jan	W	Projection	
4	3-Feb	M	Digitizing I	Lab 2: Projecting GIS Data
	5-Feb	W	Digitizing II	
5	10-Feb	M	Maps	Lab 3: Digitizing
	12-Feb	W	Remote Sensing I	
6	17-Feb	M	Remote Sensing II	Lab 4: Topology
	19-Feb	W	Digital Data & Tables	
7	24-Feb	M	Spatial Analysis I	Lab 5: Digital Data & Tables
	26-Feb	W	Mid-term Exam	
8	3-Mar	M	Spatial Analysis II	Lab 6: Spatial Selection & Analysis
	5-Mar	W	Careers in GIS	
9	10-Mar	M	Spatial Analysis III	Lab 7: Raster Analysis
	12-Mar	W	Raster Analysis	
10	17-Mar	M		Spring Break
	19-Mar	W		
11	24-Mar	M	Terrain Analysis I	AAG - No Lab
	26-Mar	W	Terrain Analysis II	
12	31-Mar	M	Terrain Analysis III	Lab 8*: Viewshed & Watershed
	2-Apr	W	Spatial Estimation I	
13	7-Apr	M	Spatial Estimation II	Lab 9: Interpolation & Module Builder
	9-Apr	W	Programming	

14	14-Apr	M	Guest Lecture	Lab 10: Programming
	16-Apr	W	Final Exam	
15	21-Apr	M	Project Presentations	
	23-Apr	W	Project Presentations	
16	28-Apr	M	No Class **	
* Final project proposal due: March 31, 2025				
** Final project due: April. 30, 2025				