



GEOG 2100 – Introduction to Geographic Information Systems (GIS)*

Spring 2025

Lecture: Tuesday and Thursday, 10 – 11:30 am

Lab: Thursday, 11:30 am – 1:30 pm

Instructor: Dr. Guiming Zhang

Office: Boettcher West 240

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Lecture: Tue/Thu, 10 – 11:30 am.

Classroom: BW 126

Office hours: Mon/Wed 1 – 1:50 pm, BW 240

Teaching Assistant: Xuefei Zhang (Ph.D. student)

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Lab: Thu, 11:30 am – 1:30 pm

Classroom: BW 126

Office hours: Thu 1:30 - 3:30pm in BW 125.

Course Description: A Geographic Information System (GIS) is a set of hardware, software and methods for the capture, storage, management, manipulation, analysis, modeling and display of geographic information. As an introductory course to GIS, this class is designed to provide an overview of the basic concepts and fundamental uses of GIS technology so that students can apply the knowledge and skills learned in this course to research and studies where geospatial components are involved.

The content will be covered in this course include:

- Background, development, trends, and prospects in GIS;
- Fundamental geographic concepts implemented in GIS such as coordinate systems, map scale;
- Organization and manipulation of spatial data (e.g. boundaries of counties) and attribute data (e.g. population of counties) in digital formats;
- Principles and issues related to using geospatial data (e.g., data quality);
- Usages of a package of GIS tools for manipulating, analyzing, visualizing and representing geospatial data;

After successfully completing this course, students should be able to:

- Understand the fundamental concepts and principles related to GIS;
- Use basic GIS tools to solve problems in the application areas of students' interests (e.g. identifying the spatial distributions of a type of species using GIS)
- Explore help documentation provided with GIS software and/or online resources to address technical issues of using GIS tools (e.g., troubleshooting);
- Conduct the full cycle of a small-scale GIS project, including identifying data sources, conducting the project using appropriate GIS tools and presenting results in a desired form (e.g. maps);

Textbook and Software:

Recommended Textbook

- Jensen, J.R., and Jensen, R.R. 2013. *Introductory Geographic Information Systems*. Prentice Hall. ISBN-10: 0136147763; ISBN-13: 9780136147763.
- Textbooks are available from the [DU bookstore](#) (DU bookstore offers **free ground shipping** for students).

How to Access ArcGIS Pro (Follow instructions posted on Canvas: Getting Started module).

- Install ArcGIS Pro on your computer. This is highly recommended, if you are using a Windows computer.
- Remote Access to GIS Lab computer. There are two options for remote access: LabStats and VMware. LabStats is preferred over VMware as the former is more stable.

READ ASSIGNED CHAPTERS BEFORE WE COVER THEM IN CLASS and go to lecture knowing what you understand and don't so that you can ask a question while the professor is on the topic

Grading

Final course grades will be determined on the basis of total points, not percentages, thus eliminating questions of rounding. There are 400 total possible points in this course. All grading will be handled through Canvas (<https://canvas.du.edu/>). Following are the scales for corresponding letter grades and a list of grade components. There will be no bartering for grades when the course is complete or near complete (i.e. I will not respond to emails asking me to reconsider grades).

Letter Grade	Total Points	Letter Grade	Total Points
A	368-400	C+	312-319
A-	360-367	C	288-311
B+	352-359	C-	280-287
B	328-351	D	240-279
B-	320-327	F	0-239

40 pts	Quizzes, class participation exercises
60 pts	Project
160 pts	2 exams (80 pts each)
140 pts	7 Lab exercises (20 pts each)
400 pts	TOTAL

Class participation: You are expected to attend lectures, finish exercises/short quizzes and participate in discussions.

Labs: Late assignments past the due date will be assessed a **10%** penalty per day. **Late submissions past a week after the due date will NOT receive credits.**

Project: You will be assigned a final project where you will demonstrate your ability to manipulate and analyze a unique dataset.

Exams: Two exams will be given. The exams will assess your knowledge of GIS concepts and are non-cumulative. **No questions will be given on the labs.** Students who are unable to take the exam at the scheduled time should contact me at least one week before the exam date. Otherwise, make-up exams will not be given.

Course Policies

AI use policy:

AI is an important new tool that will undoubtedly be playing a role in the workplaces of the future. However, the use of AI is not appropriate in this class, given its learning goals. In this class, you are expected to develop reading, writing, and technical skills that will be essential to your future careers, as well as your ability to wisely use AI tools in the future. As such, **we expect that all work students submit for this course will be their own. We specifically forbid the use of ChatGPT or any other generative artificial intelligence (AI) tools at all stages of the work process, including preliminary ones.** Violations of this policy will be considered academic misconduct and will be subject to the DU Honor Code.

Late assignment submissions: Late assignments (short quizzes, graded discussions, labs, etc.) past the due date will be assessed a **10%** penalty per day. **Late submissions past a week after the due date will NOT receive credits.**

Attendance: Lectures will require your attendance. Labs on Thursday (11:30 am -1:30 pm) will require your attendance.

E-mail Policy: Your Professor and TA will correspond with you via your DU e-mail account. You must arrange to check this account regularly. You can also set up the DU account to forward to another account that you use regularly.

Drop Policy: The deadline to drop a class via MyDU and without a signature is **May 11th**. Dropping after this date will not be approved except in cases of extreme extenuating circumstances. See <http://www.du.edu/registrar/calendar/> for additional dates and information.

Missed Class, Lab & Assignment Policy: Page 3 of your syllabus contains a description of the University and Geography & Environment Department policy for acceptable reasons to miss and make-up an assignment or exam. If you miss class, you should review the Lecture Notes for the class on Canvas and try to get missed notes from a classmate. You must attend your assigned lab section. If you must miss lab due to one of the acceptable reasons, you must notify your TA **prior** to missing the lab. If something happens that will affect your attendance in more than one class (such as a prolonged illness or death in the family), it is recommended that you contact the **Academic Advising office**. They can be reached at 303-871-2455 and can help to notify your professors of the situation. They can also help steer you to resources to help with a variety of issues including test anxiety, study skills, time management, etc. See: <https://academicaffairs.du.edu/academic-advising>.

Accommodations: Students in need of accommodation based on the impact of a disability must notify the instructor no later than the **end of the first week of classes**; accommodations are to be coordinated through the Student Disability Services Program (<https://studentaffairs.du.edu/disability-services-program>). Please read the accompanying policy statement concerning acceptable reasons for missing exams and assignments.

Academic Expectations: Plagiarizing, using sources without documentation, cheating, fabrication and falsification, multiple submission, and misuse of academic materials represent intellectual theft, violate DU's Academic Honor Code and may result in an F in the class. Please be sure that you understand the Academic Honor Code. Collaborating in pairs during lab is acceptable, but each student must complete and submit their own written work. Cheating, submitting the work of others, in total or in part, or providing work to others to be submitted as their own will result in a zero for the assignment and reporting to the Office of Student Conduct. Please visit www.du.edu/honorcode for additional information.

Acceptable Reasons for Missing Assignments, Examinations or Laboratory Sessions

Questions often arise concerning what is an acceptable reason for missing assignments, exams, or lab sessions. In general, something must happen that is beyond your control that results in your absence from a scheduled class activity. The University policy concerning this matter is that opportunities will be provided to make up or substitute for missed work for students who are absent for any of the following reasons given that arrangements are made or notice is given prior to the absence.

1. Illness. If you are too ill to attend class or lab, it is best that you stay home and recuperate. If you miss any class work, labs or exams due to illness, **it is your responsibility to notify the Instructor or Teaching Assistant PRIOR to your absence**, visit a physician, and provide a dated letter from your physician stating that your illness prevented you from attending class and completing the assigned work. If you have an extended illness or injury that interferes with your ability to attend class and/or complete assignments, you should contact your instructor and the Center for Academic Advising (303.871.2455).

2. Death in the immediate family. If a death in the family should occur, it is understood that you will be in no frame of mind to complete any assigned coursework. It is best that you attend to your family responsibilities. Should you find yourself in this unfortunate situation, call the Center for Academic Advising (303.871.2455) as soon as possible, inform an advisor of your situation, and request that they notify all of your professors of your

impending absence. In order to make up missed work under these circumstances, you will need to provide a letter from a family member explaining the absence. You may also wish to visit the Counseling Center for emotional support.

3. Participation in University sponsored team activity. If you are a member of a varsity team that must miss class due to scheduled competitions, arrangements will be made to accommodate your absences. Absences are excused for **varsity** athletes only. You must provide the instructor with a note from your coach or director of your travel schedule during the first week of class and notify the instructor no less than one week in advance of any absence to make arrangements for making up any work missed. **Participants in club sports and intramural activities are not included in this category** and are therefore expected to complete all class work as it is assigned. Unacceptable reasons for missing class include doctor, optometrist, or dental appointments, personal travel schedules, changes in work schedules, weekend trips home, appointments with other professors, weddings, extracurricular activities (such as club sports, Greek activities, intramural sports) and so on. In general, any activity in which you voluntarily participate or have control over the schedule should not interfere with completing assigned work on time. Extracurricular activities are scheduled outside of the regular instructional hours and will therefore not interfere with scheduled class activities. We appreciate your understanding and cooperation with these policies.

4. Religious holy days. University policy grants students excused absences from class or other organized activities for observance of religious holy days, unless the accommodation would create an undue hardship. Students should examine the course syllabus for potential conflicts with holy days and notify the instructor by the end of the first week of classes of any conflicts that may require an absence (including any required additional preparation/travel time). The student is also expected to remind the faculty member in advance of the missed class, and to make arrangements in advance (with the faculty member) to make up any missed work or in-class material within a reasonable amount of time.

Schedule (Subject to change)

Wk	Date	Day	Content	Readings	Notes
1	Apr 1	T	Course Overview and		
	Apr 3	R	Intro to GIS	Ch1	Lab 1: Getting familiar with ArcGIS Pro
2	Apr 8	T	Georeferencing	Ch 2: 25-33	Lab 2: Basic cartography, Coordinate Systems, Projections
	Apr 10	R	Map Projections	Ch 2: 33-53	
3	Apr 15	T	Vector data models	Ch 5: 125-134	Lab 3: Vector and Raster Data
	Apr 17	R	Raster data models	Ch 5: 135-139	
4	Apr 22	T	Data collection: field data and remote sensing	Ch 3: 55-67, 76-106	Lab 4: Digitizing and Basic Editing
	Apr 24	R	Data collection: digitizing and scanning	Ch 3: 70-76	
5	Apr 29	T	Storing attribute data and metadata	Ch 4	No lab
	May 1	R	Exam 1		
6	May 6	T	Attribute Operations: Joins and Relates	Ch 5: 135-143	Lab 5: Attribute Data Operations
	May 8	R	Attribute Operations: Queries	Ch 5: 143-147	
7	May 13	T	Vector analysis: Buffer	Ch 6: 149-155	Lab 6: Spatial Data Analysis
	May 15	R	Vector analysis: Overlay	Ch 6: 155-165	
8	May 20	T	Raster data manipulation: Map algebra	Ch 6: 165-168	Lab 7: Raster processing and Analysis
	May 22	R	Scope of raster analysis: from local to global	Ch 6: 168-193	

9	May 27	T	Introduction to 3D geospatial data	Ch 9: 257-261 Ch 3: 94-99	Final Project Work
	May 29	R	3D GIS cont'd		
10	Jun 3	T	Data Sources	Ch 12	Final Project Work
	Jun 5	R	Future of GIS	Ch 12	
11	Jun 10	T	Exam 2		Final Project Due