GEOG584: Methods and Applications of Geographic Information Systems
Spring 2025, Units: 3

Instructor

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Teaching Assistant

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or by appointment

Course Schedule

Tue. 09:30-10:45 (SH324, Lecture)
Thu. 09:30-12:10 (SH324, Lab)

Course Description

This course is a follow-up to an introductory GIS course. The course is structured around lectures integrated with computer lab exercises to provide a learning experience about concepts, techniques, and applications of GIS. It is taught at an intermediate level. Consequently, students are expected to have taken GEOG 484 or its equivalent, and have an active interest in studying GIS methods and applications. The fundamental learning objectives for students in this course are to:

- Describe the intellectual benefits and requirements of data processing methods with GIS. These methods include (but are not limited to) vector data analysis, raster data analysis and map algebra, spatial pattern analysis, terrain mapping and analysis, spatial interpolation, geocoding and dynamic segmentation, network analysis, and GIS-based modeling.
- Master the use of GIS data processing strategies as applied through hands-on use of GIS software to complete laboratory assignments as practice in critical enquiry.
- Design and carry out analytical procedures using GIS tools.

The course instructors will facilitate learning objectives through lectures, lab assignments, exams, pop quizzes, and a final project. Each lecture will be accompanied by a lab. The lab assignments will include a scripted part and a challenge part. The scripted part will provide step-by-step instructions on how to solve an analytical task with GIS software. The challenge part will describe a task to be solved without providing step-by-step instructions. The solution of challenge task will be based on techniques introduced during the lecture and practiced in the scripted part of the lab. **Both scripted part and challenge parts will be evaluated**. The lab assignment will be **due prior to the start of next lab session** (students will have up to one week to submit their solutions). There is a one week grace period for all lab assignments, in which students receive up to 50% of the possible points. Late submissions after the grace period **will not be accepted** unless a valid excuse is presented to the lab TA prior of the due date (medical, family emergency, university-related field trip).

Prerequisites

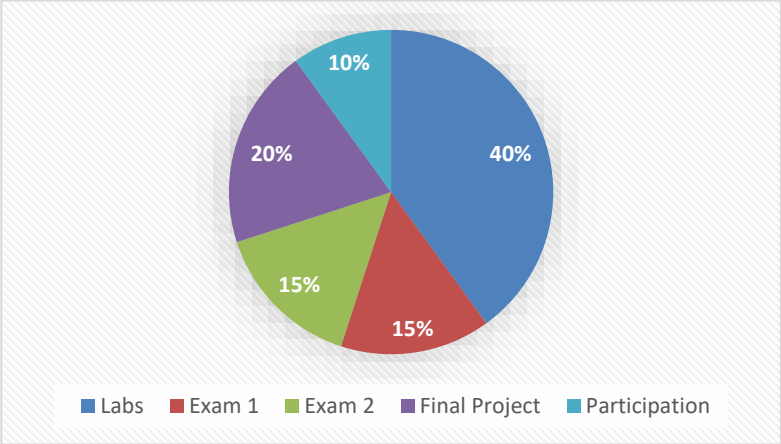
GEOG 484 or equivalent or permission of the instructor.

Books and Materials

Karl Chang, Introduction to Geographic Information Systems, 9th Edition (McGrawHill, 2019).

Grading

There will be two exams containing a combination of multiple choice, short answer, and essay questions. Exams are worth 30% of the final grade (15% each). The first exam covers the first half of the course (Ch.11-14 and Spatial Pattern Analysis), and the second exam covers the second half of the course (Ch.15-18). Final Project is worth 20% of the final grade. There will be 10 lab assignments worth 40% of the final grade. There will be 10% of the final grade for participation in lectures and labs and pop quizzes.



Percent	Letter
97 - 100	A+
93 - 96.99	A
90 - 92.99	A-
87 - 89.99	B+
83 - 86.99	B
80 - 82.99	B-

Percent	Letter
77 - 79.99	C+
73 - 76.99	C
70 - 72.99	C-
67 - 69.99	D+
63 - 66.99	D
60 - 62.99	D-
< 60	F

Letter Grade	Grade	Achievement
A	4.0	Outstanding achievement
B	3.0	Praiseworthy performance
C	2.0	Satisfactory performance
D	1.0	Minimally passing
F	0.0	Failing

Weekly Topics

Week	*Date*	*Lecture & Lab Topics*	*Due*
1	01/21	Course Introduction	
	01/23	Lab Introduction & Guest Speaker	
2	01/28	Spatial Autocorrelation – Lec	
	01/30	Spatial Autocorrelation – Lab & A1	
3	02/04	Vector Data Analysis – Lec	
	02/06	Vector Data Analysis – Lab & A2	A1 Due @ 9:30 am
4	02/11	Raster Data Analysis – Lec	
	02/13	Raster Data Analysis – Lab & A3	A2 Due @ 9:30 am
5	02/18	Terrain Mapping and Analysis – Lec	
	02/20	Terrain Mapping and Analysis – Lab & A4	A3 Due @ 9:30 am
6	02/25	Viewsheds and Watersheds Analysis – Lec	
	02/27	Viewsheds and Watersheds Analysis – Lab & A5	A4 Due @ 9:30 am
7	03/04	Exam 1 Review	
	03/06	Exam 1: 9:30 am – 12:10 pm @ SH324	
8	03/11	Spatial Interpolation Method I – Lec	
	03/13	Spatial Interpolation Method I – Lab & A6	A5 Due @ 9:30 am
9	03/18	Spatial Interpolation Method II – Lec	
	03/20	Spatial Interpolation Method II – Lab & A7	A6 Due @ 9:30 am
10	03/25	AAG Week - Final Project Preparation & FP Proposal	
	03/27	AAG Week - Final Project Preparation & FP Proposal	A7 Due @ 9:30 am
11	04/01	Spring Recess	
	04/03	Spring Recess	
12	04/08	Least Cost Path and Network Analysis – Lec	
	04/10	Least Cost Path and Network Analysis – Lab & A9	FP Proposal (A8) @ 9:30 am
13	04/15	Geocoding/GIS Modeling – Lec	
	04/17	Geocoding/GIS Modeling – Lab & A10	A9 Due @ 9:30 am
14	04/22	Final Project Preparation	
	04/24	Final Project Preparation	A10 Due @ 9:30 am
15	04/29	Final Project Preparation & Exam 2 Review	
	05/01	Final Project Presentation 1	
16	05/06	Final Project Presentation 2	
	05/08	Exam 2: 9:30 am – 12:10 pm @ SH324	Final Project Due: Friday, 5/13 @ 23:59:59

Final Project

The final project is built upon the material covered in lectures and labs. The final project is an individual-based project. Undergraduate students can complete the final project with a group of 2-3 students. In this case, a group should clearly present individual effort. The final project will be evaluated based on a project presentation using Microsoft PowerPoint or similar presentation styles and a final report (20%). ***While undergraduate students can submit the presentation slides as a final report, graduate students are required to submit a five-page final report***.

Copyright Policy

SDSU respects the intellectual property of others and we ask our faculty and students to do the same. It is best to assume that any material (e.g., graphic, HTML coding, text, video, or sound) on the Web is copyrighted unless specific permission is given to copy it under a Creative Commons License. More information about the use of copywritten material in education as part of the TEACH Act and Copyright Fair Use Guidelines. Whenever possible, you should attribute the original author of any work used under these provisions.

Course Materials

All lecture slides, lab exercises, quizzes, and assignments created by the course instructor available via Canvas are copyrighted. ***These course materials are for the student's academic use only and should not be distributed in any manner to any other individual (No Redistribution Policy)***.

Audio/Video Recordings

Students may not record (audio or video) in this class except in accordance with ADA accommodations. Any recordings made in connection with a disability accommodation are for the student's personal academic use only and may not be distributed in any manner to any other individual.

Academic Honesty

The University adheres to a strict policy prohibiting cheating and plagiarism. Examples of academic dishonesty include but are not limited to:

- Copying, in part or in whole, from another's test or other examination;
- Obtaining copies of a test, an examination, or other course material without the permission of the instructor;
- Collaborating with another or others in coursework without the permission of the instructor;
- Falsifying records, laboratory work, or other course data;
- Submitting work previously presented in another course, if contrary to the policies of the course;
- Altering or interfering with grading procedures;
- Assisting another student in any of the above;
- Using sources verbatim or paraphrasing without giving proper attribution (this can include phrases, sentences, paragraphs and/or pages of work);
- Copying and pasting work from an online or offline source directly and calling it one's own;
- Using information found from an online or offline source without giving the author credit;
- Replacing words or phrases from another source and inserting one's own words or phrases.

Unauthorized recording or dissemination of course instruction or materials by students, especially with the intent to disrupt normal university operations or facilitate academic dishonesty, is a violation of the Student Conduct Code. *This includes posting exam problems or questions to online platforms.* Violators may be subject to discipline.

The California State University system requires instructors to report all instances of academic misconduct to the Center for Student Rights and Responsibilities. Academic dishonesty will result in disciplinary review by the University and may lead to probation, suspension, or expulsion. Instructors may also, at their discretion, penalize student grades on any assignment or assessment discovered to have been produced in an academically dishonest manner.

Use of AI Generative Tools for "written" assignments

Any use of generative AI (like ChatGPT) for written assignments (i.e., Final Project Proposal & Final Report) may constitute academic dishonesty and be subject to discipline under the terms of the SDSU Student Code of Conduct.

Use of AI Generative Tools for "lab" assignments

For lab assignments in this course, the use of AI-based assistance, such as ChatGPT, is **allowed**; however, you should be aware of the concerns regarding *privacy* (e.g., link) and *veracity* (e.g., link). We treat AI-based assistance the same way we treat collaboration with other people: you are welcome to talk about your ideas and work with other people, both inside and outside the class, as well as with AI-based assistants. Nevertheless, ***all work you submit must be your own***. You should never include in your assignment anything that was not written directly by you without proper citation (including quotation marks, in-line citation for direct quotes, and your prompt messages used in AI-based assistance tools). Including anything you did not write in your assignment without proper citation will be treated as an academic misconduct case.

Online resources and AI-based assistance tools citation examples:

```
# Adapted codes generated by OpenAI (2023)
# OpenAI. (2025, Jan. 21). "List 5 GIS applications"
# ChatGPT [GPT-4]. https://chat.openai.com
```

Furthermore, please do not copy the entire assignment questions/problems and paste them directly as your prompt message in the AI-assistance message box. Instead, identify the specific part of the questions you need assistance with and ask the question using your own words, which helps you improve your understanding of the subject. In addition, as your messages may be stored in the AI-based assistance database, this can facilitate academic dishonesty and violate the "***No Redistribution Policy***".

If you are unsure where the line is between collaborating with AI and copying from AI, we recommend the following heuristics:

- Never hit "Copy" within your conversation with an AI assistant. You can copy your own work into your conversation, but do not copy anything from the conversation back into your

assignment. Instead, use your interaction with the AI assistant as a learning experience, then let your assignment reflect your improved understanding.

- Do not have your assignment and the AI agent itself open on your device at the same time. Similar to above, use your conversation with the AI as a learning experience, then close the interaction down, open your assignment, and let your assignment reflect your revised knowledge. This heuristic includes avoiding using AI assistants that are directly integrated into your composition environment: just as you should not let a classmate write content or code directly into your submission, so also you should avoid using tools that directly add content to your submission.

Deviating from these heuristics does not automatically qualify as academic misconduct; however, following these heuristics essentially guarantees your collaboration will not cross the line into misconduct.

In addition, ***if a student's work is substantially identical to another student's work, that will be grounds for an investigation of plagiarism regardless of whether the prose was produced by an AI assistant or not***.

Turnitin

Students agree that by taking this course all required papers may be subject to submission for textual similarity review to Turnitin.com for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. You may submit your papers in such a way that no identifying information about you is included. Another option is that you may request, in writing, that your papers not be submitted to Turnitin.com. However, if you choose this option you will be required to provide documentation to substantiate that the papers are your original work and do not include any plagiarized material.

Classroom Conduct Standards

SDSU students are expected to abide by the terms of the Student Code of Conduct in classrooms and other instructional settings. Violation of these standards will result in referral to appropriate campus authorities. Prohibited conduct includes:

- Willful, material, and substantial disruption or obstruction of a University-related activity, or any on-campus activity.
- Participating in an activity that substantially and materially disrupts the normal operations of the University or infringes on the rights of members of the University community.
- Unauthorized recording, dissemination, or publication (including on websites or social media) of lectures or other course materials.
- Conduct that threatens or endangers the health or safety of any person within or related to the University community, including:
    - Physical abuse, threats, intimidation, or harassment.
    - Sexual misconduct.

Land Acknowledgement

For millennia, the Kumeyaay people have been a part of this land. This land has nourished, healed, protected, and embraced them for many generations in a relationship of balance and harmony. As members of the San Diego State University community, we acknowledge this legacy. We promote this balance and harmony. We find inspiration from this land, the land of the Kumeyaay.

Notes

The course syllabus and schedule may change due to various circumstances. You are responsible for any announcement made during class, even if you were absent.