

Introduction to GIS and Cartography (GEOG 3100/6100)

Fall 2023

Class page:

<http://canvas.utah.edu/>

Instructor:

[Dr. Alexander Hohl](mailto:alexander.hohl@geog.utah.edu), alexander.hohl@geog.utah.edu

Office Hours:

MW, 9:30 – 10:30 AM, GC4841

Lectures:

GEOG 3100-001: MW 8:35AM-9:25AM, GC2950

Labs:

GEOG 3100-002: M 9:40am-11:35am, GC1825

GEOG 3100-003: M 12:55pm-2:50pm, GC1825

GEOG 3100-004: W 9:40am-11:35am, GC1825

GEOG 3100-005: W 12:55pm-2:50pm, GC1825

Lab Teaching Assistant:

Makaio Kimbrough, u1214486@utah.edu

Course description and goals:

This course is an introduction to the major concepts and applications of Geographic Information Systems (GIS) and cartography. GIS is a system for management, analysis, and display of geographic information. In this course, you will learn about spatial information, digital data, and how GIS is used as a tool to represent features, examine relationships between features, and display information. In lecture, we will cover principles and concepts and learn about the applications and uses of GIS, as well as covering the principles of cartography/map design and geo-visualization. The labs are designed to apply the concepts with hands on exercises while becoming familiar with, and learning the functionality of, ArcGIS software.

The objective of the class is to learn to solve problems using GIS and display the information in a way that facilitates communication and understanding and follows cartographic principles. We will learn and practice skills by completing exercises in class and labs and completing a final project, with the goal of being able to apply skills to solve real problems. This class fulfills a quantitative intensive (QI) requirement, which means the course content will develop analytic reasoning skills and deepen knowledge of quantitative methods. You will build upon and expand previous knowledge of quantitative method concepts by learning about, and practicing, the underlying quantitative theory behind core GIS concepts. The goal is that you will understand not just the software but also the theory when applying quantitative methods to practical issues and real world problems via spatial analysis.

Learning Outcomes:

- Demonstrate understanding of the fundamental concepts and methods in geographic information science
- Understand the concept of 'thinking spatially' and determine when spatial analysis is appropriate and needed
- Understand common approaches to spatial analysis and their applications
- Ability to effectively display and visualize spatial data and implement cartographic principles

General Information:

Check our CANVAS class page (<http://canvas.utah.edu/>) daily. It includes 17 weekly modules that go live every Sunday at 11:59pm the latest. They include:

- Lectures: Lecture topics and slides.

- Assignments: Instructions and submission pages are found within each weekly module.
- Map Assessment: Maps are effective ways to visualize a variety of topics. You will select a map, from print, popular media, social media, or other source, and write a critical analysis of the maps design and functionality and use of cartographic principles. To be submitted in W13 through the corresponding module on CANVAS. Examples will be given in class.
- Exams: There will be two exams (W7, W15), both administered on CANVAS in their respective modules. You will be tested on contents from lectures, labs and readings. You have the entire week to complete them, but it is recommended you take them in one sitting. The second exam is not cumulative but integrates concepts from first part of semester. *You will be tested on material that was covered during lecture and lab. The books listed below are suggested to supplement what you learn in class. I will not test you on something in the books that has not been covered in lecture/lab.*
- Labs: You will find the lab instructions, data, and submission pages in their corresponding weekly modules.
- Final project: The Final Project module on CANVAS includes detailed information, instructions, examples and submission pages. Graduate students need to present their project in W17 (Finals Week, time limit: 10 minutes).

Helpful Details:

- Don't be shy! Please feel free to ask me as many questions as you can think of either through email or during my office hours. I also welcome feedback about the class, and what you find works or doesn't work for your learning process.
- It is important for me to keep in touch with students. I will do my best to respond to emails within 48 hours, with the exception of holidays and weekends, over which I will still try to respond in a timely fashion- **don't be afraid to email me twice if you think your email may have been overlooked.**
- If you are going to miss an assignment or test, please make arrangement with the instructor or TA ASAP.
- Deadlines: Let your instructor know as soon as possible if you anticipate missing a deadline. If you end up missing a deadline without notifying your instructor first, you will be deducted 10% of the total possible assignment score per day missed (i.e. there are no points left for you to score after 10 days of delay).

Academic Integrity:

The University of Utah is committed to nurturing academic excellence, truth, honesty, and personal integrity. The faculty expects all students to maintain high ethical

standards. Academic misconduct will not be tolerated. As stated in the Student Code (<https://regulations.utah.edu/academics/6-400.php>): Academic misconduct includes, but is not limited to, cheating, misrepresenting one's work, inappropriately collaborating, plagiarism, and fabrication or falsification of information, as defined further below. It also includes facilitating academic misconduct by intentionally helping or attempting to help another to commit an act of academic misconduct.

- *Cheating* involves the unauthorized possession or use of information, materials, notes, study aids, or other devices in any academic exercise, or the unauthorized communication with another person during such an exercise.
- *Misrepresenting one's work* includes, but is not limited to, representing material prepared by another as one's own work, or submitting the same work in more than one course without prior permission of both faculty members.
- *Plagiarism* means the intentional unacknowledged use or incorporation of any other person's work in, or as a basis for, one's own work offered for academic consideration or credit or for public presentation. Plagiarism includes, but is not limited to, representing as one's own, without attribution, any other individual's words, phrasing, ideas, sequence of ideas, information or any other mode or content of expression.
- *Fabrication or falsification* includes reporting experiments or measurements or statistical analyses never performed; manipulating or altering data or other manifestations of research to achieve a desired result; falsifying or misrepresenting background information, credentials or other academically relevant information; or selective reporting, including the deliberate suppression of conflicting or unwanted data. It does not include honest error or honest differences in interpretations or judgments of data and/or results.

This course has a zero-tolerance policy for academic misconduct. For any coursework in which it is demonstrated that a student engaged in academic misconduct the resulting academic sanction will be a score of zero for the coursework. Additionally, the student will be required to meet with the academic advisor from the Department of Geography and/or their respective major department, the instance of academic misconduct will be entered into a university database, and the student may be subject to further academic sanctions. See the Student Code for additional information on academic sanctions.

AI text generation (e.g. ChatGPT) may not be used for assignments in this course. Taking credit for text generated by AI tools is plagiarism.

Textbooks:

- "Harvey": A Primer of GIS, Fundamental Geographic and Cartographic Concepts, by Francis Harvey (2nd edition). ISBN: 978-1-4625-2217-0
- "Brewer": Designing Better Maps: A guide for GIS Users, by Cynthia Brewer (2nd edition). ISBN: 978-1-5894-8440-5

Student Assessment Activities and Grading:

Item	Points	Quantity	Total
Labs	30	12	360
Assignments	6	10	60
Map Assessment	60	1	60
Exams	150	2	300
Final Project	220	1	220

= 1000 points possible

Grade Scale:

A 940 – 1000

A- 900 – 939

B+ 870 – 899

B 840 – 869

B- 800 – 839

C+ 770 – 799

C 740 – 769

C- 700 – 739

D+ 670 – 699

D 640 – 669

D- 600 – 639

E < 600

Class Schedule (subject to change, with notice):

W	Dates	Reading	Lecture Topic	Lab Exercise Topics
1	8/21	Harvey Ch. 1 & 2	What is GIS?	Lab 1: First steps with ArcGIS Pro
	8/23			
2	8/28	Harvey Ch. 3 & 4	GIS Data	Lab 2: Interacting with Data, Symbology
	8/30			
3	9/4	Labor Day, no lecture, no lab		
	9/6	Harvey Ch. 5 & 6 Brewer Ch. 1 & 2	Map Projections and Coordinate Systems	Lab 3: Creating a Map
4	9/11	Harvey Ch. 7 Brewer Ch. 3 & 4	Databases	Lab 4: Projections and Coordinate Systems
	9/13			
5	9/18	Harvey Ch. 8 Brewer Ch. 5 & 6	GPS/GNSS and Digitizing	Lab 5: Querying data
	9/20			
6	9/25	Harvey Ch. 10 Brewer Ch. 7 & 8	Topology, Buffering, and Overlays	Lab 6: Creating/Editing Features, Building Geodatabases, Metadata
	9/27			
7	10/2	Exam #1, no lecture, no lab		
	10/4			
	10/8	Exam #1 due		
8	10/9	Fall Break, no lecture, no lab		
	10/11			
9	10/16	Harvey Ch. 14	WebGIS/Geocoding	Lab 7: Vector Analysis
	10/18			
10	10/23	Harvey Ch. 9	Introduction to Remote Sensing and Data Sets Terrain Analysis	Lab 8: Geocoding/Reverse Geocoding
	10/25			
	10/29	Final Project Proposal due		
11	10/30	Harvey Ch. 15	Raster Analysis: Map Algebra, Local, Neighborhood, Zonal and Global Functions	Lab 9: Terrain Analysis
	11/1			
12	11/6	Harvey Ch. 16	Spatial Modeling, Interpolation, Prediction	Lab 10: Map Algebra
	11/8			
13	11/13	Harvey Ch. 11 & 12 Brewer Ch. 9	Cartography and Geovisualization	Lab 11: Advanced cartography (labeling, representations, map element editing, etc.)
	11/15			
14	11/20	Harvey Ch. 17	Special topics in GIS/ Future of GIS,	Lab 12: ArcGIS Online
	11/22			

	11/26	Map Assessment due
15	11/27	Exam #2, no lecture, no lab
	11/29	
	12/3	Exam #2 due
16	12/4	Working on final projects, no lecture, no lab
	12/6	Reading Day, no lecture, no lab
Final	12/11	Final Project presentations (graduate students only)
	12/15	Final Projects due (Final Reports, Maps)

The Americans with Disabilities Act:

The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability & Access, 162 Olpin Union Building, 801-581-5020. CDA will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in alternative format with prior notification to the Center for Disability & Access.

Addressing Sexual Misconduct:

Title IX makes it clear that violence and harassment based on sex and gender (which includes sexual orientation and gender identity/expression) is a civil rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, color, religion, age, status as a person with a disability, veteran's status or genetic information. If you or someone you know has been harassed or assaulted, you are encouraged to report it to the Title IX Coordinator in the Office of Equal Opportunity and Affirmative Action, 135 Park Building, 801-581-8365, or the Office of the Dean of Students, 270 Union Building, 801-581-7066. For support and confidential consultation, contact the Center for Student Wellness, SSB 328, 801-581-7776. To report to the police, contact the Department of Public Safety, 801-585-2677(COPS).

Diversity and Inclusivity:

It is my intent that students from all diverse backgrounds and perspectives be well served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength and benefit. It is my intent to present materials and activities that are respectful of diversity: gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and

culture. Your suggestions are encouraged and appreciated. Please let me know ways to improve the effectiveness of the course for you personally or for other students or student groups. In addition, if any of our class meetings conflict with your religious events, please let me know so that we can make arrangements for you.

Preferred Names and Pronouns:

Class rosters are provided to the instructor with the student's legal name as well as "Preferred first name" (if previously entered by you in the Student Profile section of your CIS account, which managed can be managed at any time). While CIS refers to this as merely a preference, I will honor you by referring to you with the name and pronoun that feels best for you in class or on assignments. Please advise me of any name or pronoun changes so I can help create a learning environment in which you, your name, and your pronoun are respected. If you need any assistance or support, please reach out to the LGBT Resource Center.

https://lgbt.utah.edu/campus/faculty_resources.php (Links to an external site.)

Undocumented Student Support:

Immigration is a complex phenomenon with broad impact—those who are directly affected by it, as well as those who are indirectly affected by their relationships with family members, friends, and loved ones. If your immigration status presents obstacles to engaging in specific activities or fulfilling specific course criteria, confidential arrangements may be requested from the Dream Center. Arrangements with the Dream Center will not jeopardize your student status, your financial aid, or any other part of your residence. The Dream Center offers a wide range of resources to support undocumented students (with and without DACA) as well as students from mixed-status families. To learn more, please contact the Dream Center at 801.213.3697 or visit dream.utah.edu.