

Introduction to GIS and Cartography (GEOG 3100/6100)

Spring 2022

Class page

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

Instructor

Marco Lorenzo Allain, marco.lorenzo.allain@geog.utah.edu

Office Hours

MW, 9:30 – 10:30 AM, GC 4650, or virtually by appointment

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 Assistants

GEOG 3100/6100-002, -003: Ning Xiong, ning.xiong@utah.edu

GEOG 3100/6100-004, -005: Makaio Kimbrough, u1214486@utah.edu

Face coverings

According to the CDC, wearing a mask remains an effective means of preventing infection for both unvaccinated and vaccinated people. Regardless of what someone

chooses (mask or no mask), the university seeks to foster a sense of community and asks everyone on campus to be respectful of individual decisions on mask-wearing.

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 the 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 the 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 the 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

- It is expected that you have access to a computer with an internet connection. Get in touch with your instructor ASAP if that is not the case.

- Check our CANVAS class page (<http://canvas.utah.edu/>) daily. It includes 16 weekly modules that go live every Sunday at 11:59 pm. They include:
 - Lectures: Lecture recordings 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 another source, and write a critical analysis of the map's 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.
 - There will be two exams (W7, W14), 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 the first part of the semester.
 - 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 projects during finals week (time limit: 10 minutes). Undergraduates receive extra credit if they choose to present their projects.

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.
- Since some students might join us remotely, it is important for me to keep in touch. I will do my best to respond to emails within 24 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 arrangements 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).

- Work must be original, while you may work on things together, for individual assignments each person must turn in their own assignments in their own words. Cheating, copying, and plagiarism will automatically result in a zero on the test or assignment.

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	Jan 10 — Jan 16	Harvey Ch. 1 & 2	Course Plan, Motivation Introduction to GIS, GIS examples	Lab 1: Overview of the ArcGIS Software Suite,
	Jan 17	MLK Day no Class		
2	Jan 23	Harvey Ch. 3 & 4	Nature of geographic information/Types of GIS data/Uncertainty	Lab 2: Interacting with Data, Symbology
3	Jan 24 — Jan 30	Harvey Ch. 5 & 6 Brewer Ch. 1 & 2	Map Projections Geodesy and Datums Coordinate Systems	Lab 3: Creating a Map, Map Types

4	Jan 31 — Feb 6	Harvey Ch. 7 Brewer Ch. 3 & 4	Representation/Types/Modeling Databases and Tables	Lab 4: Projections, Coordinate Systems
5	Feb 7 — Feb 13	Harvey Ch. 8 Brewer Ch. 5 & 6	Surveying and GPS Digitizing, Creating, Editing Data, Metadata	Lab 5: Querying data, features, joining and relating data
6	Feb 14 — Feb 20	Harvey Ch. 10 Brewer Ch. 7 & 8	Topology, Buffering, and Overlays	Lab 6: Creating/Editing Features, Building Geodatabases, Metadata
7	Feb 21 — Feb 27	Exam #1, no lecture, no lab		
8	Feb 28 — Mar 6	Harvey Ch. 14	Online GIS/Geocoding	Lab 7: Vector Analysis
9	Mar 7 — Mar 13	Harvey Ch. 9	Introduction to Remote Sensing and Data Sets Terrain Analysis	Lab 8: Advanced Cartography (labeling, representations, map element editing, etc.)

10	Mar 14 – Mar 20	Harvey Ch. 9	Introduction to Remote Sensing and Data Sets Terrain Analysis	Lab 8: Advanced cartography (labeling, representations, map element editing, etc.)
	Final Project Proposal due			
11	Mar 21 – Mar 27	Harvey Ch. 15	Raster Analysis: Map Algebra, Local, Neighborhood, Zonal and Global Functions	Lab 9: Geocoding/Reverse Geocoding
12	Mar 28 – Apr 3	Harvey Ch. 16	Spatial Modeling, Interpolation, Prediction	Lab 10: Online Mapping
13	Apr 4 – Apr 10	Harvey Ch. 11 & 12 Brewer Ch. 9	Cartography and Geovisualization	Lab 11: Raster Analysis
	Map Assessment due			
14	Apr 11 – Apr 17	Harvey Ch. 17	Special topics in GIS/ Future of GIS	Lab 12: Map Algebra

15	Apr 18 — Apr 24	Exam #2, no lecture, no lab
16	Apr 25 — May 1	Working on Final Projects
17	May 2 — May 8	Final Projects due (Final Reports, Maps, Presentations)

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 an 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.) (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.

Mental health resources. Please find a summary of campus and community mental health resources [here](#).

Course Summary:

Date	Details	Due
Sun Jan 16, 2022	Assignment W1 Assignment	due by 11:59pm
Sun Jan 23, 2022	Assignment ESRI Account Assignment	due by 11:59pm

Date	Details	Due
	Assignment W2 Assignment Discussion	due by 11:59pm
Sun Jan 30, 2022	Assignment Lab1	due by 11:59pm
	Assignment Lab2	due by 11:59pm
	Assignment Lab3	due by 11:59pm
	Assignment Lab4	due by 11:59pm
Sun Feb 6, 2022	Assignment W3 Assignment	due by 11:59pm
	Assignment W4 Assignment	due by 11:59pm
	Assignment W5 Assignment	due by 11:59pm
Sun Feb 13, 2022	Assignment Lab5	due by 11:59pm
	Assignment W6 Assignment Discussion	due by 11:59pm
Sun Feb 20, 2022	Assignment Lab6	due by 11:59pm
	Assignment Test #1	due by 11:59pm
Sun Mar 6, 2022	Assignment W9 Assignment	due by 11:59pm
Sun Mar 13, 2022	Assignment Final Project Proposal	due by 11:59pm

Date	Details	Due
	Assignment Lab7	due by 11:59pm
Sun Mar 20, 2022	Assignment Lab8	due by 11:59pm
	Assignment Lab9	due by 11:59pm
Sun Mar 27, 2022	Assignment W11 Assignment	due by 11:59pm
	Assignment W12 Assignment	due by 11:59pm
	Assignment Lab10	due by 11:59pm
Sun Apr 3, 2022	Assignment Map Assessment	due by 11:59pm
	Assignment W13 Assignment Discussion	due by 11:59pm
Sun Apr 10, 2022	Assignment Lab11	due by 11:59pm
	Assignment W14 Assignment	due by 11:59pm
Sun Apr 17, 2022	Assignment Lab12	due by 11:59pm
	Assignment Test #2	due by 11:59pm
Fri Apr 29, 2022	Assignment Final Project (Report, Maps, Presentation)	due by 11:59pm