

Introduction to GIS and Cartography

Geography 3100/6100, Spring 2021

Instructor: Chelsea Ackroyd

Lecture: Online (Canvas)

Office Hours: Tuesday and Thursday 11:00 AM – 12:30 PM via ConexED, or by appointment

Email: chelsea.ackroyd@utah.edu

Lab Instructor: Wenqu Chen

Lab: Monday 9:40 – 11:30 AM (Section 02) in GC 1855

Wednesday 9:40 – 11:30 AM (Section 03) in GC 1855

Wednesday 12:55 – 2:50 PM (Section 04) in GC 1825

Office Hours: TBD

Email: wenq.chen@geog.utah.edu

COVID-19

Based on CDC guidelines, the University requires everyone to wear face coverings in shared public spaces on campus. Note that some students may qualify for accommodations through the Americans with Disabilities Act (ADA). If you think you meet these criteria and desire an exception to the face covering policy, contact the Center for Disability and Access (CDA). If you need to miss class because you or a family member have COVID-19, or are experiencing difficulties due to COVID-19, please let me know in advance so we can accommodate for absences and make sure you still have a successful learning experience and semester. **Please remember, you must self-report if you test positive for COVID-19 via coronavirus.utah.edu.**

Course Description

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, including 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 solve problems using GIS and display the information in a way that facilitates communication and understanding while abiding by cartographic principles. We will learn and practice skills by completing assignments, labs, and a final project. 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

- It is expected that you have access to a computer with 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. There are 16 weekly modules that include the following:
 - Lectures: Class content is delivered in an asynchronous fashion: We will not hold live lectures online. Each module includes voice-over PowerPoint presentations, which you can watch at a time you choose. However, since assignments and labs build on knowledge gained during lectures, it is recommended you watch the presentations early in the designated week.
 - 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 map's design, functionality, and use of cartographic principles. This assessment will be due during Week 12 (see the corresponding module on CANVAS). Examples will be given in class.
 - Exams: There will be two exams (Week 7, Week 14) 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 submit a project presentation as a voice-over PowerPoint presentation (time limit: 10 minutes). Instructions to produce a voice-over PowerPoint presentation can be found [here](#). Undergraduates receive extra credit if they choose to submit a project presentation.

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 the lecture is online, it is important for me to keep in touch with students. 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 arrangement with the instructor or TA ASAP.
- Late assignments lose 10% per day. No late tests are allowed.
- Work must be original. While you may work together, each person must turn in their own assignments in their own words. Cheating, copying, and plagiarism will automatically result in a zero on any assignment, lab, or exam.

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

Course Grading and Assessments

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

Important dates:

Last day to add classes without a permission code – Friday, January 22

Last day to add, drop, or audit classes – Friday, January 29

Last day to withdraw from classes – Friday, March 12

Classes End – Tuesday, April 27

Final Exam Period – Thurs-Wed, April 29-May 5

Course Schedule

DATE	TOPIC	READINGS	LAB
JAN 18	Course Plan, Motivation, Introduction to GIS, GIS Examples	Harvey Ch. 1 & 2	Lab 1: Overview of the ArcGIS Software Suite
JAN 25	Nature of Geographic Information; Types of GIS data; Uncertainty	Harvey Ch. 3 & 4	Lab 2: Interacting with Data, Symbology
FEB 1	Map Projections; Geodesy and Datums; Coordinate Systems	Harvey Ch. 5 & 6 Brewer Ch. 1 & 2	Lab 3: Creating a Map, Map Types
FEB 8	Representations/Types; Modeling Databases and Tables	Harvey Ch. 7 Brewer Ch. 3 & 4	Lab 4: Projections, Coordinate Systems

FEB 15	Surveying and GPS; Digitizing, Creating, Editing Data; Metadata	Harvey Ch. 8 Brewer Ch. 5 & 6	Lab 5: Querying Data, Features, Joining and Relating Data
FEB 22	Topology, Buffering, and Overlays	Harvey Ch. 10 Brewer Ch. 7 & 8	Lab 6: Creating/Editing Features, Building Geodatabases, Metadata
MAR 1	Exam #1	---	---
MAR 8	Online GIS/Geocoding	Harvey Ch. 14	Lab 7: Vector Analysis
MAR 15	Introduction to Remote Sensing and Datasets; Terrain Analysis *Final Project Proposal due	Harvey Ch. 9	Lab 8: Advanced Cartography (Labeling, Representations, Map Element Editing, etc.)
MAR 22	Map Algebra; Local, Neighborhood, Zonal, and Global Functions	Harvey Ch. 15	Lab 9: Geocoding/Reverse Geocoding
MAR 29	Spatial Estimations; Spatial Modeling	Harvey Ch. 16	Lab 10: Online Mapping
APR 5	Cartography and Geovisualization *Map Assessment due	Harvey Ch. 11 & 12 Brewer Ch. 9	Lab 11: Raster Analysis
APR 12	Special topics in GIS/Future of GIS	Harvey Ch. 17	Lab 12: Map Algebra

APR 19	Exam #2	---	---
APR 26	Working on Final Projects	---	---
MAY 3	Final Projects due (Final Reports, Maps, Presentations)	---	---

Additional Information

Scheduling Conflicts: Please speak with the instructor within the first two weeks of class regarding any known conflicts you may have with the course schedule.

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. Penalties will include failure of an assignment, or possibly the entire course, and the filing of formal charges with appropriate university authorities. Academic misconduct includes, but is not limited to, cheating, misrepresenting one's work, and plagiarism:

- Cheating involves the unauthorized possession or use of information in an academic exercise, including unauthorized communication with another person during an exercise such as an examination.
- 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 all instructors.
- Plagiarism means the intentional unacknowledged use or incorporation of any other person's work in one's own work offered for academic consideration or public presentation.

Faculty and Student Responsibilities: The class will follow accepted University of Utah policies and procedures. Please refer to the University of Utah Faculty Handbook (<http://www.admin.utah.edu/fhb/>) and Student Code (<http://www.admin.utah.edu/ppmanual/8/8-10.html>).

Specifically: All students are expected to maintain professional behavior in the classroom setting, according to the Student Code, spelled out in the Student Handbook. Students have

specific rights in the classroom as detailed in the Code. The Code also specifies proscribed conduct that involves cheating on tests, plagiarism, and/or collusion, as well as fraud, theft, etc. Students should read the Code carefully and know they are responsible for the content. According to Faculty Rules and Regulations, it is the faculty's responsibility to enforce responsible classroom behaviors, beginning with verbal warnings and progressing to dismissal from class and a failing grade. Students have the right to appeal such action to the Student Behavior Committee.

Disability Accommodation: 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 Services, 162 Olpin Union Building, 581-5020 (V/TDD). CDS 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 Services.

Harassment: 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, 426 SSB, 801-581-7776. To report to the police, contact the Department of Public Safety, 801-585-2677(COPS).

Note: The syllabus is not a binding legal contract. It may be modified by the instructor when the student is given reasonable notice of the modification, particularly when the modification is done to rectify an error that would disadvantage the student.