Syllabus: Spring 2026 geog 0261

Course Website: https://geog261.github.io

People

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Office hours are posted and updated on the Course website.

Description

How do geographers study spatial interactions between people and the environment? How does socio-economic status relate to spatial patterns of settlement, social organization, access to resources, and exposure to risks? How can geographic information systems (GIS) help geographers explain these spatial patterns and processes? In this course, we apply GIS to a wide range of topics in human geography including urban, environmental, political, hazards, and health. We learn how to gather, create, analyze, visualize, and critically interpret geographic data through tutorials, collaborative labs, and independent work that culminate in cartographic layouts of our results.

Learning Goals

1) Understand, use, and articulate concepts that are fundamental to a geographical perspective, such as location, space, distance, scale, and region.
2) Explore contributions of geography and geographic information systems to understanding, solving, and sometimes exacerbating a range of contemporary problems and themes.
3) Develop and use fundamental geographic skills such as map reading, cartography, and spatial analysis. Critically interpret and evaluate maps and other forms of location-based data.
4) Given geographic questions and data, select and implement appropriate methods to answer the questions. Effectively communicate your methods and findings through diagrams, maps, and narrative.
5) Become familiar with using geographic information systems and learning new GIS techniques.
6) Conduct GIS analysis with appreciation for the importance of error, uncertainty, and ethics.

The learning goals closely resemble those of the Geography major: www.middlebury.edu/academics/geog/goals

The goals are more focused on *competencies* for doing intellectual work with GIS and on *geographic reasoning* and *problem-solving* than they are with specific *software*. GIS and spatial data science are rapidly expanding and evolving fields, requiring us to master the timeless fundamental concepts and develop strategies to teach ourselves trendy new techniques. We will study *fundamental concepts* in this course using *desktop QGIS software* on Windows computers, in a manner designed to translate well to more advanced research in spatial data science or to other commercial software platforms.

Required Materials

1) Purchase a **Course Manual** from the College Bookstore for about $40.
   This is provided *at cost*.
2) **Headphones** to hear audio instructions for many labs.
3) Variety of **colored pencils** for drawing illustrations.
4) Free login to **PrairieLearn** for completing question sets.
5) You may use our computer labs to access GIS software.
   The software is also free to install on your own computer:
   a) https://qgis.org/ (LTR version)
   b) https://posit.co/download/rstudio-desktop/

Expectations

1) Minimize disruptions to other students' learning, including with phones and laptops. **Digital devices are strongly discouraged from lecture,** except for some specific activities.
2) Diversity of interests, experiences, identities, and academic perspectives is welcome. Constructive and respectful debate is encouraged in pursuit of inclusive academic freedom and integrity.
3) Successful and active learning is expected and supported. For assistance seeking additional support, please communicate with the Disability Resource Center (DRC) and myself as soon as possible.
4) Students with a Letter of Accommodation (LOA) are encouraged to contact the professor as early in the semester as possible to ensure that we can make accommodations in a timely fashion. For those without an LOA, assistance is available to eligible students through the Disability Resource Center at email: ada@middlebury.edu and web address https://www.middlebury.edu/disability-resource-center All discussions will remain confidential.
5) The STEM and Quantitative Hub does not support spatial concepts and GIS. We encourage you to use office hours and to contact the ASI or professor as soon as possible if you would like to organize other forms of individual or small group tutoring.

Cumulative Learning Cycle

- **Learn new concepts** in lecture or homework videos, with simple examples
- **Learn new techniques** by completing tutorials using software, typically starting with the same examples as conceptual learning.
- **Review** concepts and techniques in **homework questions**.
- **Workflow** solutions to authentic GIS problems, creating an illustrated roadmap to your analysis **prior to lab** and on **two exams**.
- **Implement** solutions to solve authentic problems in **lab**
- **Visualize** results in maps, graphs, and tables with titles and interpretative captions in **visual essays.**
- Learning is **cumulative** throughout the course. You **must** see an instructor or teaching assistant about any material you are not sure about before proceeding with new learning.

Schedule

On the home page of the course website, you will find a course schedule of topics, deadlines, and hyperlinks to all required materials and submission portals.

Honor Code

Unless otherwise noted on the assignment, the following honor code conditions apply to all course work

	Open Notes	Collaboration	AI / Internet
Labs	Yes!	Yes!	Good luck!
Homework	Yes!	No	No
Visual Essays	Yes!	No	Good luck!
Workflow Exams	No	No	No

Assessment

For the purposes of numerically combining different assignments, we will use a 10-point scale and weights as shown in the table to the right.

Letter	Number	Criteria
A	10	Workflow Exams (40%), Visual Essays (40%), Homework (20%)
A-	9	
B+	8	
B	7	
B-	6	
C+	5	Full Participation
C	4	
C-	3	
D	2	
F	0	

Full participation in the course guarantees a passing grade of *at least* a C+. Conversely, failing to fully participate in the course guarantees a maximum grade of a C.

Once you have completed **full participation**, we can assess your achievement in three categories: workflow exams, visual essays, and homework questions. The scores from each category will be combined in a weighted average and assigned to the nearest letter
(e.g. a 6.51 will become a B, as it is closer to 7 than to 6).

Full Participation is achieved by**:**

- ❑ Complete all **workflow exams**, **visual essays**, and **homework** on time with an honest effort.
  An honest effort means you're at least 50% to 60% of the way there without violating the honor code, even if you feel like you are not meeting your own expectations at the moment.
- ❑ Completing all **labs** on time. If you miss a lab or are unable to complete it within the lab period, "on time" includes checking in with an instructor during office hours any time before the next lab begins.
- ❑ Completing the **course manual** on time. This means that you have watched the instructional videos, and brought your completed hard copy with you to lecture and lab. We will occasionally check course manuals during lecture or lab.
- ❑ **Attendance** in lecture and in lab. Of course, excused absence is sometimes necessary (communicate and make a plan for it!), and sometimes we make mistakes.

Homework questions: Conceptual lectures and techniques tutorials will culminate in homework questions due on the PrairieLearn platform by 9:00 am before lectures. Homework reinforces particularly important points and starts practicing your spatial analysis abilities. Homework results will be translated into the numerical scale by multiplying the proportion of total points earned by 10.

Visual essays: These are short visual stories told through maps, graphs, and captions and supported with references. There will be two required visual essays and one optional visual essay.

Workflow exams: These written in-class exams involve drawing a workflow diagram to communicate a plan for solving a spatial problem. There will be three required workflow exams.

Optional assignments / extra credit:

- There will be an optional final homework question set during finals week.
  If you improve on the final compared to the in-semester homework questions, the final will count 10% and the in-semester questions will count 10%.
- There will be an optional final visual essay at the end of the semester.
  If you improve on the final visual essay compared to the prior two, the final will count 14% and the prior two will count 13% each.

Important Dates

- February 26, 11:00 am Visual Essay Due
- March 12, 7:30 pm Exam
- April 9, 11:00 am Visual Essay Due
- April 30, 7:30 pm Exam
- May 15, 12:00 noon EST Optional Visual Essay Due
- May 19, 12:00 noon EST Optional Final Exam Due

Missing Expectations

What if I miss something? Accidents and unanticipated emergencies do happen.

- **Visual essays** and **workflow exams** require **prior arrangements** for modified deadlines, **Temporary Medical Leave** through the Center for Health and Wellness, or **Dean's excuses** for unanticipated emergencies.
  - Missing these without prior arrangement or Dean's excuse results in automatically **losing one grade overall in the course (e.g. C+ to C) each time**.
  - Missed exams cannot be made up, resulting in no credit (`0 points`).
  - Late visual essays **lose one grade per day**.
- Sometimes you will miss a **class**, have an incomplete **course manual**, or miss a deadline to complete **homework questions** or a **lab**.
  - You get **two opportunities** to catch up on any of these, no questions asked.
  - Beyond these two opportunities, you'll start automatically **losing one grade overall in the course (e.g. C+ to C) each time**.
  - However, because homework questions will be discussed in class, **late homework** is only worth `50%`

Artificial Intelligence

ChatGPT says that AI can accomplish tasks of object recognition, 3D modelling, navigation and pathfinding, and spatial reasoning in games like Go and Chess. Further, "AI can perform tasks that involve spatial thinking, but its capabilities are generally task-specific and lack the holistic, embodied understanding that humans possess."

AI may be helpful for finding common explanations for terms or synthesizing advice found online, but it is unlikely to give completely correct solutions to spatial problems, and it cannot create accurate maps. Its troubleshooting advice is often inaccurate. AI is still incapable of spatial analysis and geographic reasoning. In other words, I suggest that you forget that AI exists for the purposes of this course.

AI is, however, becoming integral to some specific GIS tasks, like digitizing and tracing maps. You should definitely use features like this if you need them in your own work! For example, see: buntinglabs.com/ These AI-supported tasks are beyond the scope of this course and not allowed in this course.

Optional Materials

If you like to have a book to reference, one excellent option is Paul Bolstad and Steven Manson's *GIS Fundamentals*. The concepts we cover have not changed, so cheap used previous editions are still relevant. Also see these great open access resources:

- *GIS Dictionary* support.esri.com/en/other-resources/gis-dictionary
- *GIS&T Body of Knowledge* gistbok.ucgis.org
- *Geospatial Analysis* by de Smith, Goodchild and Longley www.spatialanalysisonline.com
- *Nature of Geographic Information* by David DiBiase ecampusontario.pressbooks.pub/natureofgis