GEOG 4/5/7 9073: Environmental Analysis in R

Week 01.01: Introduction

Dr. Bitterman

Today's schedule

- Open discussion
- Course welcome
- Introductions
- R basics and practice

Anything to discuss? Questions?

My approach to this course

- Geography matters
- Concepts and independent thinking are important, trivia is not (or at least not always)
- It’s important to solve problems or complete tasks, but understanding HOW you do so is more important

What this class is

- Collaborative
- Flexible
- **Student-led**

What else it is

- Mis-named
- My first time teaching it at KSU… so we'll experiment a bit

Class introductions

Pair up (with appropriate distance) – and don't leave anyone behind

Share:

- Name
- Where you're from
- Major/program, year
- Why are you taking this course? Why are you in your major? Why UNL?
- Previous GIS experience
- Previous programming experience (or maybe experience with R)?
- Imagine it's May 2025 – what would make you feel like you were successful in this course?

My introduction

- Dr. Patrick Bitterman
- Independence, IA -> Ulowa -> UVM -> UNL -> KSU
- Assistant Professor in Geography Department, 1st/6th year
- Goals: teach a successful course, build my research program
- GIS experience? Programming experience? Extensive, but I don't use ArcGIS much...
- Success in this course:
    - students reach *their* learning objectives
    - students are able to use R to make their work faster and more consistent
    - students improve methods related to their other research or career interests
    - students develop an appreciation for programmatic spatial analysis

Time to share

- Present your partner to the class
- Who wants to go first?

Share:

- Name
- Where you're from
- Major/program, year
- Why are you taking this course? Why are you in your major? Why KSU?
- Previous experience: GIS, programming, R?
- Imagine it's May 2025 – what would make you feel like you were successful in this course?

Course basics

Instructor (me)

- Dr. Patrick Bitterman
- Geography Department
- Office: 436 McGilvrey Hall
- Office hours: M 2:30 – 4pm, W 9-11am, or by appointment
- Email: pbitterm@kent.edu

Materials

- Brundson, C., Comber, L. 2019. An Introduction to R for Spatial Analysis and Mapping (Spatial Analytics and GIS). SAGE. https://us.sagepub.com/en-us/nam/an-introduction-to-r-for-spatial-analysis-and-mapping/book258267
- Optional: Wickham, H. 2017. R for Data Science: Import, Tidy, Transform, Visualize, and Model Data. O'Reilly Media. (if you are unfamiliar with R or other programming language) (https://r4ds.had.co.nz/index.html)

Learning objectives

By the end of the term, students will be able to successfully:

- Demonstrate a familiarity with the R programming language in the context of geospatial analysis
- Write self-contained functions to automate geospatial tasks
- Analyze model workflows and describe computer code and algorithms in plain language
- Create small-scale programs that interface with web-based tools
- Practice good programming practices
- Plan, develop, and execute a programmatic analysis of a dataset

Course policies

Assignment submission:

- All assignments due on their due date
- All assignments will be posted on Canvas, but turned in via GitHub (we'll talk more)
- Late items will be accepted, but will be penalized 20% of the potential points for each day they are late
- All changes to the syllabus will be communicated via Canvas announcement
- Students are expected to attend all class meetings, but attendance is not graded

Collaboration

- Feel free to discuss labs, etc. with your classmates
- However...
  - All lab reports, papers, and other work should be your own, individual thoughts
  - Students who do not follow these policies will be reported to the College for academic dishonesty

Other tips

- Read relevant materials before class
- Attend class – understanding theory and concepts will help you with practical applications
- If there are topics, news stories, blog posts, tweets, etc. that you find interesting or want to know more about, let me know
- Before you start coding, think through the process and sketch out the workflow. This is called *pseudocode*
- Labs build on each other, so don't get behind
- Take advantage of office hours
- Do not leave assignments until the last minute
- Have fun!

Assessment

- Lab assignments
- 5 labs, 2-3 weeks to complete each one
- Final project
  - Proposal
  - Update presentation (in-class)
  - Final presentation (in-class)
  - Final report
- Participation

Graduate students

For graduate students, the requirements of the final project will be expanded to include:

1. an additional 3-4 pages in your report
2. code documentation
3. an additional 5 minutes in your final presentation to the class.
4. required to produce a cover page for your GitHub page/portfolio

Course format

- Project-based
- Student-led
    - I am not going to recap the readings (much)
    - You are expected to be ready to participate in discussion
    - We will spend most of our time doing, not lecturing
- Tuesdays: discussion, examples, and activities
- Thursdays: wildcard day (coding challenges, group work, seminar)

Course inspiration and source material

- My own experience
- Your textbook
- Lovelace, R. *Geocomputation with R* https://geocompr.robinlovelace.net/index.html

University policies

- Learning accommodations
  - Contact Services for Students with Disabilities
  - Let me know
- Academic integrity
  - Don’t cheat
  - Don’t plagiarize
- Health and safety
  - Student support services (https://www.kent.edu/studentsupportservices)

Last thing

- Questions?
- Let's look at the Canvas and GitHub sites

Let's talk coding

SA and Programming in R

- Experience? In what setting?
- Experience with a version control system (e.g., git)?
- What about experience with spatial analysis, GIS?

Review and next class

- Any questions on course policies?
- On anything else?
- This week’s readings/tasks:
    - Chapter 1 in textbook
    - Review Hadley's book/site
    - Practice on your own
- Next session: basics of R and GIScience