POL/GTY 491/591: Social Network Analysis

Kevin Reuning

POL/GTY 491

Social Network analysis

Spring 2025

Harrison Hall 202

Tues & Thurs 2:50 PM – 4:10 PM

Instructor:	Dr. Kevin Reuning (ROY-ning)
Email:	reunink@miamioh.edu
Course Website:	Canvas
Office:	Harrison Hall 222
Office Hours:	Monday: 1:00 – 3:00 PM
	Tuesday: 12:00 – 2:00 PM
Schedule appointments:	https://calendly.com/reuning

Course Description

In this course we will learn how to ask questions about, collect data on, and analyze social networks. The study of networks spans many fields, from social science to physics to mathematics. Because of this we will often move from sociological theories of why networks are important to methodological questions about how to manipulate matrices. By the end of the semester though you will be able to investigate a social network, explain what its important characteristics are, and relate it back to social theories.

Student Learning Outcomes

By the end of this course you will be able to:

- Explain and calculate important characteristics of networks.
- Demonstrate skill in collecting social network data and then visualizing social networks.

- Identify and apply the appropriate statistical methodology to test theories on social networks.
- Apply network methodologies to contemporary political and social issues to identify the differences in possible solutions.
- Explain the role of social networks in democratic life.

Required Books

Borgatti, Stephen P., Martin G. Everett, Jeffrey C. Johnson and Filip Agneessens. 2022. *Analyzing Social Networks Using R*. Sage.

Course Policies

Respect

In this course we will learning how to test social scientific theories and evaluate public policy. At times this will require discussing issues that touch many of us personally. In these discussions our aim is to understand what the evidence implies about the world. In these discussions we will treat everyone with respect.

Preparation

This course builds on itself and so students need to come to class everyday ready and willing to learn. Most weeks we will spend one day in a lecture and another day working on assignments. On working days students are expected to bring a laptop and be prepared to actively engage in the assignment.

Technology

In the class you are expected to be focused on what is going on within the class. Laptops will be required on some days. On those days that laptops are not required you may bring one to take notes, etc. If the laptop becomes a distraction to those around you we will look at reevaluating this policy.

Generative AI (ChatGPT, etc)

The basic question to ask over when you can and cannot use AI is whether your use of AI supplements what you have done or if it replaces what you have done. Below I provide some examples of **good** and **bad** uses of AI and a philosophical explanation of why this distinction is important. **For this course, bad uses of AI count as academic integrity violations.**

Good use of AI	Bad use of AI
Checking for grammar or spelling.	Rewriting whole sections of your paper.
Creating catchy titles.	Generating an argument in its entirety.
Checking code, asking questions of how code works.	Writing all the code you need for an assignment.
Formatting citation.	Generating citations.

Philosophy

Generative AI is a powerful tool but there are two important reasons for why you shouldn't use AI for the "bad uses" above. First, in order to learn you need to actually complete tasks. By completing these tasks you can build up basic skills that you can then use to do things that AI tools cannot do. For example, I can find information online that AI tools cannot find because I have a lot of experience finding more basic things.

Second, AI tools have a lot of flaws. These flaws are noticeable to experts but not to beginners. You will only be able to work past these flaws though if you practice things on your own without using AI. For example, AI is very good at making confident claims without any real evidence or support for those claims. You need to learn how to provide evidence for a claim so you don't fall for this.

As a final note, Generative AI often makes mistakes. It can generate fake citations, make impossible claims, and simply write vague nonsense. These are all things that will lead you to lose points whether or not AI is the source of the writing.

Email Policy

I will check email between 8am and 6pm, and will try to always respond to any contact within 24 hours (excluding the weekend). Although I do not expect formality in email communications, I do expect you to respect that emails are not a costless act.

Grade Distribution and Assignments

Item	Percentage
Weekly Homework	35%
Attendance	5%
Reading Pres/Report	5%
Midterm Exam	25%
Final Exam	
Take home	15%
In-Person	15%

Attendance

You are expected to come to class. You are given 2 unexcused absences without loss of credit. Additional unexcused absences will lead to lost points:

- 0-2 unexcused absences: 5%
- 3 unexcused absences: 4%
- 4 unexcused absences: 3%
- 5 unexcused absences: 2%
- 6 unexcused absences: 1%
- 7 or more unexcused absences: 0%

Excused Absences

In accordance with Miami University policy, I must be notified in writing prior to any excused absence as a result of religious observations, military service or university sanctioned events (those with a formal letter). These will not count against your unexcused absences. You will still be expected to complete any in-class assignments.

Weekly Homework

Throughout the semester we will work on weekly homework assignments. These assignments often will require that you apply the concepts we are working on to the data at hand. Homework assignments will be due before class on Tuesday. Note, that some of the homeworks will have a graduate student only section.

Reading Presentation and Report

Throughout the semester there will be readings that apply the concepts we learn in class. You will select one to read, summarize, and present to the class. These presentations will be short (less than 5 minutes) and will focus on how they used the topics we learned in class. Your summary will also be due that day. You will have to sign up for the reading and presentation by the end of the second week of the semester.

Midterm

The midterm will take place on March 21st. We will discuss details prior to it (tl;dr: in-class, no direct R use)

Final Exam

The final exam will have two components. One component will be an in-person exam that will consist mainly of multiple choice and short answer questions. The second component will be a take home assignment that will require you to analyze data and apply some of the methods we have worked on in class. Each component is worth the same.

Extra Credit

I will provide several extra credit opportunities throughout the semester and will announce them in class and on Canvas.

Late work policy

In order to receive a deadline extension on parts of the project, you should contact me more than 24 hours before the deadline. If an assignment is turned in late without an extension but within 24 hours of the due date, your grade will decrease by 5 percentage points (a 95% would become a 90%). For every additional 24 hours after this you lose another 5% point.

Letter Grade Distribution

>= 93.00	A	73.00 - 76.99	C
90.00 - 92.99	A-	70.00 - 72.99	C-
87.00 - 89.99	B+	67.00 - 69.99	D+
83.00 - 86.99	B	63.00 - 67.99	D
80.00 - 82.99	B-	60.00 - 62.99	D-
77.00 - 79.99	C+	<59.99	F

Academic Integrity

Miami University is a scholarly community whose members believe that excellence in education is grounded in qualities of character as well as of intellect. We respect the dignity of other persons, the rights and property of others, and the right of others to hold and express disparate beliefs. We believe in honesty, integrity, and the importance of moral conduct. We defend the freedom of inquiry that is the heart of learning and combine that freedom with the exercise of judgment and the acceptance of personal responsibility.

Miami demands the highest standards of professional conduct from its students, faculty, and staff. As a community of scholars, our fundamental purpose is the pursuit of knowledge. Integrity in research and creative activities and in academic study is based on sound disciplinary practices and expectations, as well as a commitment to the values of honesty and integrity.

Any student caught committing academic dishonesty will, at a minimum, receive a 0 for the assignment at hand. For more information on academic dishonesty and potential punishments visit http://MiamiOH.edu/integrity.

Disability Services

If you are a student with a physical, learning, medical and/or psychiatric disability and feel that you may need a reasonable accommodation to fulfill the essential functions of the course that are listed in this syllabus, you are encouraged to contact the Office of Student Disability Services at 529-1541 (V/TTY), located in the Shriver Center, Room 304.

Course Outline

- **January 28 and 30:** Introduction to Social Networks
  - Why do we care about social networks?
  - Granovetter, M. S. 1973. "The Strength of Weak Ties." *Journal of Sociology* 78(6):1360-1380.
  - Chapter 1
- **February 4 and 6:** What is a social network?

  - Nodes, Edges and Matrices
  - Chapter 2
  - Healy, Kieran. 2013. "Using Metadata to find Paul Revere." https://kieranhealy.org/blog/archives/2013/06/09/using-metadata-to-find-paul-revere/

- **February 11 and 13:** Research Design and Data Collection
  - How can you collect network data?
  - Chapters 3 and 4
- **February 18 and 20:** Data and Using R
  - How do we actually get data into R? What do do once it is there?
  - Chapter 5
- **February 25 and 27:** Multivariate Techniques and Visualizing Networks
  - How can we simply complex data? How do we visualize networks?
  - Chapters 6 and 7
- **March 4 and 6:** Centrality within a Network
  - Who is important within a network?
  - Chapter 9
- **March 11 and 13:** Describing a Network and Subgroups
  - What can we say about a network?
  - Chapter 10
- **March 18 and 20:** Midterm
  - March 18: Midterm
  - March 20: Refresher on regression
- **April 1 and 3:** Clusters and Cliques
  - Can we find relevant subgroups?
  - Chapter 11
- **April 8 and 10:** Equivalence
  - How similar are two (or more) nodes?
  - Chapter 12
- **April 15 and 17:** Affiliation Networks
  - What happens when people arne't directly connected?
  - Chapter 13
- **April 22 and 24:** Testing Hypotheses

  - How regression fails (and how to do better) with network data
  - Chapter 13

- **April 29 and May 1:** Exponential Random Graph Models
  - Testing theories by modeling network generation
  - Chapter 14 (through 15.4)

- **May 6 and May 8:** Finishing ERGMs, Review and Starting Take Home
  - No new readings

Additional Resources

- Howe Writing Center: http://miamioh.edu/hcwe
- If you are a student who may be experiencing mental or emotional distress, you are encouraged to call Student Counseling Service (513-529-4634). For emergencies outside of business hours, the H.O.P.E. Line is available at all times for Miami students at 855-249-5649.
- Students come to Miami from a variety of economic backgrounds. If you are having financial trouble I urge you to make use of the services available through Miami Cares Resources: https://www.miamioh.edu/emss/offices/student-success-center/miami-cares/index.html