

Social Network Analysis

POL 491/591
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: 1 – 3 PM Monday

12 – 2 PM Tuesday

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 Objectives

1. Students will be able to explain and calculate important characteristics of networks.
2. Students will demonstrate skill in collecting social network data and then visualizing social networks.
3. Students will be able to identify and apply the appropriate statistical methodology to test theories on social networks.
4. Students will be able to apply network methodologies to contemporary political and social issues to identify the differences in possible solutions.
5. Students will be able to explain the role of social networks in democratic life.

Required Book

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.

Email Policy

I will check email between 8am and 6pm, and will try to always respond to any contact within 24 hours. 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%
Reading Pres/Report	5%
Midterm Exam	25%
Attendance	5%
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. 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.

Late work policy

In order to receive a deadline extension 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 it loses another 5%.

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

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
<ul style="list-style-type: none"> • Checking for grammar or spelling. • Creating catchy titles. • Checking code, asking questions of how code works. • Formatting citation. 	<ul style="list-style-type: none"> • Rewriting whole sections of your paper. • Generating an argument in its entirety. • Writing all the code you need for an assignment. • 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.

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 30 and February 1 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 6 and 8 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 13 and 15 Research Design and Data Collection

How can you collect network data?

Chapter 3 and 4

February 20 and 22 Data and Using R

How do we actually get data into R? What do we do once it is there?

Chapter 5

February 27 and 29 Multivariate Techniques and Visualizing Networks

How can we simplify complex data? How do we visualize networks?

Chapter 6 and 7

March 5 and 7 Centrality within a Network

Who is important within a network?

Chapter 9

March 12 and March 14 Describing a Network and Subgroups

What can we say about a network?

Chapter 10

March 19 and 21 Review and Midterm

March 26 and 28 Spring Break

No Class

April 2 and 4 Clusters and Cliques

Can we find relevant subgroups?

Chapter 11

No Class on April 4

April 9 and 11 Equivalence

How similar are two (or more) nodes?

Chapter 12

April 16 and 18 Affiliation Networks

What happens when people aren't directly connected?

Chapter 13.

April 23 and 25 Testing Hypotheses

How regression fails (and how to do better) on networks.

Chapter 14

April 30 and May 1 Exponential Random Graph Models

Testing theories by modeling a network.

Chapter 15 (through 15.4)

May 7 and 9 Finish, Review and Start Take Home Final

No new readings

Finals Week In-Person Final

Additional Resources

- Howe Writing Center: <http://miamioh.edu/hcwe>
- Students also may occasionally have personal issues that arise in the course of pursuing higher education or that may interfere with their academic performance. If you find yourself facing problems affecting your coursework, you are encouraged to call Student Counseling Service (513-529-4634). For emergencies outside of business hours, the Community and Counseling and Crisis Center (844-427-4747) has a 24-hour hotline.
- 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>