COMM 7710: Introduction to Social Networks
Monday and Wednesday 9:35 - 10:55
Derby 3116

Instructor: Robert Bond, Derby Hall 3072, bond.136@osu.edu

Office Hours: Monday 11-12:30 and by appointment.

Course Description

This course will focus on the theoretical and methodological bases of social network analysis. The theoretical basis for social network analysis in the social sciences is the interdependence of actors. Our goal will be to understand the nature of the interdependencies and to study regularities within social systems. In this course we will introduce both the substantive and theoretical framework for social network analysis and (some of) the methodological tools by which we can implement network research. By the end of the course, you should (1) know the major theoretical ideas on which network research is based, (2) be able to collect and organize social network data, and (3) be able to analyze and interpret social network data. Because of the dual goals of the course, our time will be split between substantive and theoretical explanations and methodological tools. Each week we will examine readings related to one area of social network analysis and the methodological and statistical applications related to the substantive readings.

Course Materials

- **Textbook:** Kolaczyk and Csárdi (2020). *Statistical Analysis of Network Data with R.* Springer Press.
  – note the ebook version is available free through the library.
- Additional, supplementary readings and PDFs distributed by CARMEN.
- R for Windows or Mac, with the igraph package installed. I will show you how to install R and packages in class.

Course Format

The course will be held in an in-person format as much as possible. We may move to a hybrid or distance learning format only if necessary.

Requirements

The format of this course is *social*. Science is a *social* activity, so there will be an emphasis on working with, soliciting feedback from, and providing feedback to your peers (including the instructor!). That is, you are expected to come to class having completed the assigned readings and prepared to discuss them, to ask questions, as well as to answer questions from your peers or myself.

The main requirement for the course is a research paper that uses the methods or ideas of social network analysis. This may be either an application of social network analysis to data you have already collected or collect for this course, or it may be a research design for a project you intend to complete at a later date. At the end of the course we will reserve time for each student to present their research idea to the class and get feedback. Aside from the research paper, you are required to complete a set of homework assignments intended to ensure that you are becoming familiar with the software and analysis techniques introduced in the course.

Leading discussion one week (25%)

Each student will be designated to lead one class discussion (students may work in teams). The seminar leader(s) will circulate approximately five discussion questions by 2pm the day before the class meeting by e-mail or CARMEN. The seminar leaders will also be charged with introducing the week's topic by starting out class with an approximately 15 minute overview (see attached guidelines). I will be available to discuss your discussion questions – please schedule an appointment and/or send me a draft of them prior to our meeting.

Homework assignments (25%)

In weeks 2 through 7 there will be a homework assignment assigned to be completed. These assignments are designed to help you to become familiar with social network methods and tools. The assignments will be composed of both "paper and pencil" problems as well as exercises using social network software.

In-class presentation of research (25%)

Each student will present their research or proposal idea for approximately 10-12 minutes. These presentations should be designed to give a brief overview of the theoretical background of your proposed research and the data collection methods and analysis you would do. Students are expected to provide feedback on each other's presentations.

Final Paper (25%)

The final paper should be a research proposal for a project that uses social network theory and analysis. The paper should be at least 15 pages, double-spaced. The paper should briefly introduce your topic (1-2 pages), explain the theoretical background you base your research on (4-5 pages), and describe the data collection methods you propose, the analytical methods and tools you would use, as well as what hypotheses you would test. It is important to note that you do not have to actually complete the research you propose. However, I highly recommend that you propose research that is actually feasible to one day complete.

Derivation of Final Grade

My grading system is largely a percentage based system where 93%+ = A, 90% - 92.9% = A-, 87% - 89.9% = B+, 83% - 86.9%+ = B, 80% - 82.9% = B-, 77% - 79.9% = C+, 73% - 76.9%+ = C, 70% - 72.9% = C-, 67% - 69.9% = D+, 63% - 66.9%+ = D, 60% - 62.9% = D-,, less than 60% = E. I reserve the right to modify this system *downward* depending on the distribution of grades. In other words, if only one student exceeds the 90% threshold, but five hit 89%, I may choose to move the cutoff for an A- to 89%.

Attendance

While there is no formal attendance policy for the course, you are expected to attend each class. Attending class will best equip you to complete the homework assignments and to be successful when you present and complete your paper. My goal is that the class will be the academic version of fun and that you will want to attend class anyway, but I suggest that you attend even if you think that I have not been successful.

Given the continued high prevalence of COVID, including breakthrough cases among vaccinated individuals, **students should not attend class if they are feeling sick**. It is very important that individuals avoid spreading the virus to others. Most students should be able to complete a successful semester despite illness-induced absence. If you are absent due to illness, including but not limited to COVID, I will give you a reasonable opportunity to make up missed work. You do not need to provide a physician's document of illness, but you should advise me via email as soon as you are safely able to do so.

Students with Special Needs

Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerene Hall, 1760 Neil Avenue; telephone 292-3307, TDD 292-0901; http://www.ods.ohio-state.edu/.

Course Policies and Miscellaneous

I will only give incompletes for compelling, unanticipated, and nonacademic reasons. Late assignments will be marked down the equivalent of a full letter grade for each 24 hour period in which they are late (one hour late = -1 letter, 25 hours late = -2 letters, and so on). I will only make an exception to this policy if 1) you contact me in writing a week in advance to discuss a conflict, or 2) you provide documentation of a severe illness or family emergency that prevented you from completing the assignment on time.

Academic Misconduct

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct http://studentlife.osu.edu/csc/

School of Communication Diversity Statement

The School of Communication at The Ohio State University embraces and maintains an environment that respects diverse traditions, heritages, experiences, and people. Our commitment to diversity moves beyond mere tolerance to recognizing, understanding, and welcoming the contributions of diverse groups and the value group members possess as individuals. In our School, the

faculty, students, and staff are dedicated to building a tradition of diversity with principles of equal opportunity, personal respect, and the intellectual interests of those who comprise diverse cultures.

Mental health statement

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing.

If you are or someone you know is suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life's Counseling and Consultation Service (CCS) by visiting ccs.osu.edu or calling 614–292–5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on-call counselor when CCS is closed at 614-292-5766.

If you are thinking of harming yourself or need a safe, non-judgmental place to talk, or if you are worried about someone else and need advice about what to do, 24 hour emergency help is also available through the Suicide Prevention Hotline (Columbus: 614-221-5445 / National: 800-273-8255); or text (4hope to 741741); or at suicidepreventionlifeline.org

Each of the first 13 weeks, we will meet and spend part of our time discussing readings about that week's topic, and spend part of our time working with data. This first part of the classes focused on data (most Tuesdays) will be part demonstration, part lab, so come prepared with questions, ideas, and (if you can) your own data as soon as possible.

Course Schedule:

Week 1 - Course Introduction

Monday, January 6
- Course introduction, syllabus, meet and greet each other

Wednesday, January 8
- Dalgaard, Introductory Statistics with R, Chapters 1 & 2

Week 2 - Networks in the Social Sciences I and Computing in R

Monday, January 13
- Kolaczyk & Csárdi (2020) Chapter 1 – "Introduction"
- Kolaczyk & Csárdi (2020) Chapter 2 – "Manipulating Network Data"

Wednesday, January 15
- Borgatti et al. (2009) "Network Analysis in the Social Sciences," Science
- Lazer et al. (2009) "Computational Social Science," Science
- Butts (2009) "Revisiting the Foundations of Network Analysis," Science
- Granovetter (1973) "The Strength of Weak Ties," American Journal of Sociology

Week 3 - Visualization

Monday, January 20 – NO CLASS

Wednesday, January 22
- Tufte (2001) "The Visual Display of Quantitative Information" (selected pages, posted on CARMEN)
- Freeman (2000) "Visualizing Social Networks," Journal of Social Structure
- Read through this documentation and the examples - `https://kateto.net/network-visualization`

- Kolaczyk & Csárdi (2020) Chapter 3 – "Visualizing Network Data"

Week 4 - Network Measurement and Description

Monday, January 27

- Kolaczyk & Csárdi (2020) Chapter 4 – "Descriptive Analysis of Network Characteristics"

Wednesday, January 29
- Song & Eveland (2015) "The Structure of Communication Networks Matters: How Network Diversity, Centrality, and Context Influence Political Ambivalence, Participation, and Knowledge," Political Communication
- González-Bailon & De Domenico (2021) "Bots are less central than verified accounts during contentious political events," Proceedings of the National Academy of Sciences
- Melamed & Simpson (2016) "Strong ties promote the evolution of cooperation in dynamic networks," Social Networks

Week 5 - Mathematical Models

Monday, February 3
- Kolaczyk & Csárdi (2020) Chapter 5 – "Mathematical Models for Network Graphs"

Wednesday, February 5
- Pomeroy et al. (2020) "Dynamics of social network emergence explain network evolution," Scientific Reports
- Fowler, Dawes & Christakis (2009) "Model of genetic variation in human social networks," Proceedings of the National Academy of Sciences
- Song, Nyhuis & Boomgaarden (2019) "A network model of negative campaigning: The structure and determinants of negative campaigning in multiparty systems," Communication Research

Week 6 - Statistical Models

Monday, February 10
- Kolaczyk & Csárdi (2020) Chapter 6 – "Statistical Models for Network Graphs"

Wednesday, February 12
- Srivastava and Banaji (2011)"Culture, Cognition, and Collaborative Networks in Organizations," American Sociological Review
- Lee and Monge (2011) "The Coevolution of Multiplex Communication Networks in Organizational Communities," Journal of Communication
- Twyman et al. (2022) "Teammate invitation networks: The roles of recommender systems and prior collaboration in team assembly," Social Networks

Week 7 - Group Structure

Monday, February 17
- Kolaczyk & Csárdi (2020) Chapter 7 – "Network Topology Inference"

Wednesday, February 19
- McPherson, Smith-Lovin & Cook (2001) "Birds of a Feather: Homophily in Social Networks," Annual Review of Sociology

- Lewis et al. (2008) "Tastes, ties, and time: A new social network dataset using Facebook.com," Social Networks
- Newman (2001) "The structure of scientific collaboration networks," Proceedings of the National Academy of Sciences

Week 8 - Experiments in Networks

Monday, February 24
- Kolaczyk & Csárdi (2020) Chapter 10 – "Networked Experiments"

Wednesday, February 26
- Nickerson (2008) "Is voting contagious? Evidence from two field experiments," American Political Science Review
- Aral and Walker (2012) "Creating Social Contagion through Viral Product Design: A Randomized Trial of Peer Influence in Networks," Management Science
- Bond et al (2012) "A 61-Million-Person Experiment in Social Influence and Political Mobilization," Nature

Week 9 - Dynamic network processes

Monday, March 3
- Kolaczyk & Csárdi (2020) Chapter 11 – "Dynamic Networks"

Wednesday, March 5
- Aral, Muchnik & Sundararajan (2009) "Distinguishing influence-based contagion from homophile-driven diffusion in dynamic networks," Proceedings of the National Academy of Sciences
- Centola (2010) "The Spread of Behavior in an Online Social Network Experiment," Science
- Fowler et al (2011) "Causality in Political Networks," American Politics Research

Week 10 - Online social networks

Monday, March 17
- Lazer et al. (2021) "Meaningful measures of human society in the twenty-first century"
- Zhang et al. (2021) "Assembling the Networks and Audiences of Disinformation: How Successful Russian IRA Twitter Accounts Built Their Followings, 2015?2017," Journal of Communication
- Kramer, Guillory and Hancock (2014) "Experimental evidence of massive-scale emotional contagion through social networks," Proceedings of the National Academy of Sciences
- Mosleh et al. (2021) "Shared partisanship dramatically increases social tie formation in a Twitter field experiment," Proceedings of the National Academy of Sciences

Wednesday, March 19
- Bail et al. (2018) "Exposure to opposing views on social media can increase political polarization"
- Cinelli et al (2020) "The COVID-19 social media infodemic," Scientific Reports

- Green et al (2020) "Elusive consensus: Polarization in elite communication on the COVID-19 pandemic," Science Advances

Week 11 - More on experiments, lab and field

Monday, March 24
- Fowler and Christakis (2010) "Cooperative Behavior Cascades in Human Social Networks," Proceedings of the National Academy of Sciences
- Rand, Arbesman and Christakis (2011) "Dynamic social networks promote cooperation in experiments with humans," Proceedings of the National Academy of Sciences
- Melamed, Harrell & Simpson (2018) "Cooperation, clustering, and assortative mixing in dynamic networks," Proceedings of the National Academy of Sciences

Wednesday, March 26
- Centola et al. (2021) "The reduction of race and gender bias in clinical treatment recommendations using clinician peer networks in an experimental setting," Nature Communications
- Traeger et al. (2020) "Vulnerable robots positively shape human conversational dynamics in a human-robot team," Proceedings of the National Academy of Sciences
- Stewart et al. (2019) "Information gerrymandering and undemocratic decisions," Nature

Week 12 - Affiliation networks & Information Flow

Monday, March 31
- Song, Eberl & Eisele (2020) "Less fragmented than we thought? Toward clarification of a subdisciplinary linkage in communication science, 2010-2019," Journal of Communication

- Fowler & Jeon (2008) "The Authority of Supreme Court Precedent," Social Networks
- Bond & Sweitzer (2018) "Political Homophily in a Large-Scale Online Communication Network," Communication Research

Wednesday, April 2
- Ognyanova (2020) "Contagious politics: Tie strength and the spread of political knowledge," Communication Research
- Carlson (2019) "Through the Grapevine: Informational Consequences of Interpersonal Political Communication," American Political Science Review
- Alt et al. (2022) "Diffusing Political Concerns: How Unemployment Information Passed between Social Ties Influences Danish Voters," Journal of Politics

Weeks 13 and 14 and last day - Student presentations

Monday, April 7
- Student presentations

Wednesday, April 9
- Student presentations

Monday, April 14
- Student presentations

Wednesday, April 16
- Student presentations

Monday, April 21
- Student presentations

Monday, April 28
- Final paper due.

Guidelines for Leading Discussion

One or two students will introduce the topic each week. This entails critically summarizing the readings and proposing a set of questions or issues that will help structure the discussion. The presentations, approximately 15 minutes in length, are meant to develop seminar communication skills and to encourage participation by all members.

The following "template" provides a sense of what is required.

- Begin your presentation by introducing and motivating the topic. The heading in the syllabus is a good clue but try to go beyond it, indicating, for example, why the topic is important. For example, why is it relevant to discuss visualization of networks? What are the key issues and questions the authors are grappling with? Are there important issues the authors ignore but should also consider? How do these readings relate to/challenge our "standard" views of the topic at hand?

- Review the readings of the week. *Succinctly* state each author's main argument and findings. What outcomes is each author trying to explain? What variables do they use in explaining these outcomes? How does the article relate to the main themes of the week? Avoid summarizing the details – stick to the most central points. These summaries should be very brief and to the point. They should focus on providing a road-map of the readings – not a definitive review of them.

- Slides are extremely useful, but not necessary. At their best, these will help highlight main points and focus attention on areas of debate for further discussion. Keep them simple! As a rule, less is more.

- Close your presentation with a set of discussion questions aimed at getting the discussion going. These are very important, and the more thought you put into them, the better. These might highlight major unanswered (even unasked) questions that the readings do not deal with. What are the authors forgetting? They might tie a week's readings into earlier themes and readings. They might push on themes some or all of the readings develop. They might explore the empirical evidence the readings bring to bear on their questions. They might suggest ways that the readings challenge existing understandings of networks. In general, your questions should stimulate conversation by focusing the class on some aspect or aspects of the readings that are interesting, contradictory, revolutionary, etc. At the same time, good questions avoid being so broad that they abstract away from the central issues of the readings. Please circulate these **by 2pm the day before the class meeting**.