

This syllabus is a draft and will be updated

Advanced Topics in Quantitative Analysis: Networks

POS5XXX.1

Thursdays 9-11:30AM in BEL 113

Instructor: Matthew Pietryka

Email: mpietryka@fsu.edu

Office: BEL 561

Office Hours: WF 9-10AM and by appointment

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1 OVERVIEW

Course Description

Social network analysis is the broad set of theories and statistical approaches aimed at understanding the interdependence between units, be they molecules, words, people, organizations, or countries. This course provides an introduction to the use of social network analysis for the study of politics. The course will help students understand the methodological underpinning of this approach and provide examples of substantive applications.

Course Objectives

By the end of the course, students should be able to:

1. Evaluate the usefulness of social network analysis for a given research question
2. Describe and compare individuals' positions within a network
3. Describe and compare the features of networks
4. Measure relationships between network features, network positions, and individual attributes
5. Develop and test theories that account for the interdependence between actors

Required Book

Stanley Wasserman and Katherine Faust. *Social Network Analysis: Methods and Applications*. Cambridge University Press, November 1994

Software

Students will learn to perform social network analysis using the free statistical package, R (<https://www.r-project.org/>). Before the course begins, students are expected to have basic familiarity with the R programming language.

2 GRADES

Students' grades for the course are comprised of the following components:

PARTICIPATION (20%): Students' participation grades hinge on their contribution to each course meeting. Students will earn a B grade for the week if they are able to demonstrate their familiarity with the readings, a B+/A- grade if they can demonstrate an understanding of the strengths and weaknesses of these readings, and an A if they demonstrate an understanding of how these readings connect with or contradict material from earlier in the course.

ASSIGNMENTS (50%): Students will complete eight assignments based on the course material. Specific instructions for each assignment will be provided the week before it is due. All assignments are due by 5pm on the Monday before the relevant class and must be submitted to me by email. Late assignments will not be accepted except with a documented excuse. All assignments must be carefully proofread and properly formatted using the APSA guidelines, single spaced, with 12-point Times New Roman font, and one-inch margins. All graphics and tables should be approaching publication quality. Assignments must include as an appendix all relevant R code used to perform the analysis.

FINAL PAPER (20%): The final paper requires students to develop and test a theory using approaches from the course. More details will be available as the semester progresses.

PRESENTATION OF FINAL PAPER (10%): In the last meetings of the course, each student will present their final paper. Presentations should be 10-15 minutes and must include slides.

The final letter grade will be assigned according to the standard table:

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| 93-100 : A | 87-89 : B+ | 80-82 : B- | 73-76 : C | 67-69 : D+ | 60-62 : D- |
| 90-92 : A- | 83-86 : B | 77-79 : C+ | 70-72 : C- | 63-66 : D | 00-59 : F |

3 POLICIES

University Attendance Policy

Excused absences include documented illness, deaths in the family and other documented crises, call to active military duty or jury duty, religious holy days, and official University activities. These absences will be accommodated in a way that does not arbitrarily penalize students who have a valid excuse. Consideration will also be given to students whose dependent children experience serious illness.

Academic Honor Policy

The Florida State University Academic Honor Policy outlines the University’s expectations for the integrity of students’ academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process. Students are responsible for reading the Academic Honor Policy and for living up to their pledge to “...be honest and truthful and ...[to] strive for personal and institutional integrity at Florida State University.” (Florida State University Academic Honor Policy, found at <http://fda.fsu.edu/Academics/Academic-Honor-Policy>.)

Americans With Disabilities Act

Students with disabilities needing academic accommodation should (1) register with and provide documentation to the Student Disability Resource Center; and (2) bring a letter to the instructor indicating the need for accommodation and what type. Please note that instructors are not allowed to provide classroom accommodation to a student until appropriate verification from the Student Disability Resource Center has been provided. This syllabus and other class materials are available in alternative format upon request. For more information about services available to FSU students with disabilities, contact: Student Disability Resource Center, 874 Traditions Way, 108 Student Services Building, Florida State University, Tallahassee, FL 32306-4167, 850-644-9566 (voice), 850-644-8504 (TDD), sdrc@admin.fsu.edu, <http://www.disabilitycenter.fsu.edu/>

Syllabus Change Policy

Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice.

4 SCHEDULE

4.1 INTRODUCTION TO NETWORKS

- Wasserman & Faust, Chapters 1-2
- David Lazer. Networks in Political Science: Back to the Future. *PS: Political Science & Politics*, 44(01):61–68, January 2011

4.2 INTERDEPENDENCE AS A METHODOLOGICAL NUISANCE

- Wasserman & Faust, Chapters 3-4
- Brendan Nyhan and Jacob M. Montgomery. Connecting the Candidates: Consultant Networks and the Diffusion of Campaign Strategy in American Congressional Elections. *American Journal of Political Science*, 59(2):292–308, February 2015
- Skyler J. Cranmer and Bruce A. Desmarais. A Critique of Dyadic Design. *International Studies Quarterly*, page sqw007, March 2016

4.3 EGOCENTRIC NETWORKS

- Bernard R. Berelson, Paul F. Lazarsfeld, and William N. McPhee. *Voting: A Study of Opinion Formation in a Presidential Campaign*. University of Chicago Press, Chicago, 1954 [pp. 118-149]
- Robert Huckfeldt. The Social Communication of Political Expertise. *American Journal of Political Science*, 45(2):425–438, 2001
- Casey A. Klofstad, Scott D. McClurg, and Meredith Rolfe. Measurement of Political Discussion Networks: A Comparison of Two “Name Generator” Procedures. *Public Opinion Quarterly*, 73(3):462–483, September 2009
- John Barry Ryan. Social Networks as a Shortcut to Correct Voting. *American Journal of Political Science*, 55(4):753–766, October 2011
- Edward O. Laumann. The Social Structure of Religious and Ethnoreligious Groups in a Metropolitan Community. *American Sociological Review*, 34(2):182–197, 1969
- P. V. Marsden. Core discussion networks of Americans. *American Sociological Review*, 52(1):122–131, 1987
- Tyler H. McCormick, Matthew J. Salganik, and Tian Zheng. How Many People Do You Know?: Efficiently Estimating Personal Network Size. *Journal of the American Statistical Association*, 105(489):59–70, March 2010

4.4 WHOLE-NETWORK STUDIES

- Hyunjin Song and William P. Eveland. The Structure of Communication Networks Matters: How Network Diversity, Centrality, and Context Influence Political Ambivalence, Participation, and Knowledge. *Political Communication*, 32(1):83–108, January 2015
- Gueorgi Kossinets. Effects of missing data in social networks. *Social Networks*, 28(3):247–268, July 2006
- Peter V. Marsden. Network Data and Measurement. *Annual Review of Sociology*, 16:435–463, 1990
- David Lazer, Brian Rubineau, Carol Chetkovich, Nancy Katz, and Michael Neblo. The Coevolution of Networks and Political Attitudes. *Political Communication*, 27(3):248–274, 2010

4.5 DESCRIBING NETWORKS

- Wasserman & Faust, Chapters 5-6
- Phillip Bonacich. Power and Centrality: A Family of Measures. *American Journal of Sociology*, 92(5):1170–1182, 1987
- Emilie M. Hafner-Burton, Miles Kahler, and Alexander H. Montgomery. Network Analysis for International Relations. *International Organization*, 63(03):559–592, July 2009
- Wendy K. Tam Cho and James H. Fowler. Legislative Success in a Small World: Social Network Analysis and the Dynamics of Congressional Legislation. *The Journal of Politics*, 72(01):124–135, 2010

4.6 SUBGRAPHS

- Wasserman & Faust, Chapters 7-8
- Gregory Koger, Seth Masket, and Hans Noel. Partisan Webs: Information Exchange and Party Networks. *British Journal of Political Science*, 39(03):633–653, July 2009
- Lucia Falzon. Determining groups from the clique structure in large social networks. *Social Networks*, 22(2):159–172, May 2000
- E. A. Leicht and M. E. J. Newman. Community Structure in Directed Networks. *Physical Review Letters*, 100(11):118703, March 2008

4.7 TIE STRENGTH

- Mark S. Granovetter. The Strength of Weak Ties. *The American Journal of Sociology*, 78(6):1360–1380, 1973
- Daniel Carpenter, Kevin Esterling, and David Lazer. The Strength of Strong Ties A Model of Contact-Making in Policy Networks with Evidence from U.S. Health Politics. *Rationality and Society*, 15(4):411–440, November 2003
- Peter V. Marsden and Karen E. Campbell. Measuring Tie Strength. *Social Forces*, 63(2):482–501, December 1984
- Robert Huckfeldt, Paul Allen Beck, Russell J. Dalton, and Jeffrey Levine. Political Environments, Cohesive Social Groups, and the Communication of Public Opinion. *American Journal of Political Science*, 39(4):1025–1054, 1995

4.8 POSITIONS AND STRUCTURE

- Wasserman & Faust, Chapters 9-10
- Ronald S. Burt. Structural Holes and Good Ideas. *American Journal of Sociology*, 110(2):349–399, 2004
- Ronald S. Burt. Social Contagion and Innovation: Cohesion Versus Structural Equivalence. *The American Journal of Sociology*, 92(6):1287–1335, May 1987
- Daniel P. Carpenter, Kevin M. Esterling, and David M. J. Lazer. Friends, Brokers, and Transitivity: Who Informs Whom in Washington Politics? *The Journal of Politics*, 66(01):224–246, February 2004
- Mathew D. McCubbins, Ramamohan Paturi, and Nicholas Weller. Connected Coordination Network Structure and Group Coordination. *American Politics Research*, 37(5):899–920, September 2009

4.9 SMALL WORLDS, PREFERENTIAL ATTACHMENT, AND REINFORCEMENT

- Duncan J. Watts and Steven H. Strogatz. Collective dynamics of “small-world” networks. *Nature*, 393(6684):440–442, June 1998
- Peter Hedstrom, Rickard Sandell, and Charlotta Stern. Mesolevel Networks and the Diffusion of Social Movements: The Case of the Swedish Social Democratic Party. *American Journal of Sociology*, 106(1):145–172, 2000
- Albert-Laszlo Barabasi and Reka Albert. Emergence of Scaling in Random Networks. *Science*, 286(5439):509–512, October 1999
- L. a. N. Amaral, A. Scala, M. Barthélémy, and H. E. Stanley. Classes of small-world networks. *Proceedings of the National Academy of Sciences*, 97(21):11149–11152, October 2000
- Damon Centola. The Spread of Behavior in an Online Social Network Experiment. *Science*, 329(5996):1194–1197, September 2010

4.10 INFERENCE NETWORK ANALYSIS

- Garry Robins, Pip Pattison, Yuval Kalish, and Dean Lusher. An introduction to exponential random graph (p^*) models for social networks. *Social Networks*, 29(2):173–191, May 2007
- Skyler J. Cranmer, Philip Leifeld, Scott D. McClurg, and Meredith Rolfe. Navigating the Range of Statistical Tools for Inferential Network Analysis. *American Journal of Political Science*, June 2016
- Skyler J. Cranmer and Bruce A. Desmarais. Inferential Network Analysis with Exponential Random Graph Models. *Political Analysis*, 19(1):66–86, December 2011
- Yin Li and Keumhee Chough Carriere. Assessing Goodness of Fit of Exponential Random Graph Models. *International Journal of Statistics and Probability*, 2(4), October 2013

4.11 COMPARING NETWORKS

- Zeev Maoz. Network Polarization, Network Interdependence, and International Conflict, 1816-2002. *Journal of Peace Research*, 43(4):391–411, July 2006
- B. A. Desmarais and S. J. Cranmer. Statistical mechanics of networks: Estimation and uncertainty. *Physica A: Statistical Mechanics and its Applications*, 391(4):1865–1876, February 2012
- Leifeld, Philip and Skyler J. Cranmer. 2015. “The Temporal Network Autocorrelation Model.” Working Paper.
- Katherine Faust and John Skvoretz. Comparing Networks Across Space and Time, Size and Species. *Sociological Methodology*, 32(1):267–299, January 2002

4.12 CAUSATION

- James H. Fowler, Michael T. Heaney, David W. Nickerson, John F. Padgett, and Betsy Sinclair. Causality in Political Networks. *American Politics Research*, 39(2):437–480, March 2011
- Nicholas A. Christakis and James H. Fowler. The Collective Dynamics of Smoking in a Large Social Network. *New England Journal of Medicine*, 358(21):2249–2258, May 2008
- Ethan Cohen-Cole and Jason M. Fletcher. Detecting implausible social network effects in acne, height, and headaches: longitudinal analysis. *BMJ*, 337:a2533, December 2008
- Tyler J. VanderWeele. Sensitivity Analysis for Contagion Effects in Social Networks. *Sociological Methods & Research*, 40(2):240–255, May 2011
- Hans Noel and Brendan Nyhan. The Unfriending Problem: The Consequences of Homophily in Friendship Retention for Causal Estimates of Social Influence. *Social Networks*, 33(3):211–218, July 2011

4.13 NATURAL & FIELD EXPERIMENTS

- Lindsey Clark Levitan and Penny S. Visser. Social network composition and attitude strength: Exploring the dynamics within newly formed social networks. *Journal of Experimental Social Psychology*, 45(5):1057–1067, September 2009
- David W. Nickerson. Is Voting Contagious? Evidence from Two Field Experiments. *American Political Science Review*, 102(01):49–57, 2008
- Betsy Sinclair, Margaret McConnell, and Donald P. Green. Detecting Spillover Effects: Design and Analysis of Multilevel Experiments. *American Journal of Political Science*, 56(4):1055–1069, October 2012
- Jon C. Rogowski and Betsy Sinclair. Estimating the Causal Effects of Social Interaction with Endogenous Networks. *Political Analysis*, 20(3):316–328, July 2012

4.14 AGENT-BASED MODELS & LAB EXPERIMENTS

- Mark Granovetter. Threshold Models of Collective Behavior. *American Journal of Sociology*, 83(6):1420–1443, 1978
- David A. Siegel. Social Networks and Collective Action. *American Journal of Political Science*, 53(1):122–138, January 2009
- David A. Siegel. Social Networks and the Mass Media. *American Political Science Review*, 107(04):786–805, November 2013
- Thomas C. Schelling. Models of Segregation. *The American Economic Review*, 59(2):488–493, 1969
- T. K. Ahn, Robert Huckfeldt, Alexander K. Mayer, and John Barry Ryan. Expertise and Bias in Political Communication Networks. *American Journal of Political Science*, 57(2):357–373, April 2013
- Daniel Enemark, Mathew D. McCubbins, and Nicholas Weller. Knowledge and networks: An experimental test of how network knowledge affects coordination. *Social Networks*, 36:122–133, January 2014

4.15 SO WHAT?

We will conclude by discussing the problem of interdependence for the study of politics. When can network analysis address those problems? When will it fall short?