Term Information

Effective Term	Autumn 2014

General Information

Course Bulletin Listing/Subject Area	Sociology
Fiscal Unit/Academic Org	Sociology - D0777
College/Academic Group	Arts and Sciences
Level/Career	Graduate
Course Number/Catalog	7710
Course Title	Introduction to Social Networks
Transcript Abbreviation	Intro Soc Network
Course Description	This course will focus on the theoretical and methodological bases of social network analysis.
Semester Credit Hours/Units	Fixed: 3

Offering Information

Length Of Course	14 Week, 4 Week (May Session), 12 Week (May + Summer)
Flexibly Scheduled Course	Never
Does any section of this course have a distance education component?	No
Grading Basis	Letter Grade
Repeatable	No
Course Components	Lecture
Grade Roster Component	Lecture
Credit Available by Exam	No
Admission Condition Course	No
Off Campus	Never
Campus of Offering	Columbus

Prerequisites and Exclusions

Prerequisites/Corequisites	Grad standing and enrollment in COMM or SOCIOL program; or instructor approval
Exclusions	Not open to students with credit for COMM 7710

Cross-Listings

Cross-Listings	Cross-listed in COMM

Subject/CIP Code

Subject/CIP Code	45.1101
Subsidy Level	Doctoral Course
Intended Rank	Masters, Doctoral

Requirement/Elective Designation

The course is an elective (for this or other units) or is a service course for other units

Course Details

Course goals or learning objectives/outcomes

- Introduce core concepts in networks in the social sciences.
- Familiarize students with foundational network theories in social sciences.
- Introduce students to basic methods of collecting and analyzing network data.
- Students should develop a research plan for the use of social network theories and data.

Content Topic List

- Social network theoretical foundations
- Introduction to network data, notation and collection
- Basic network measures
- Network structure
- Network Visualization
- Social influence, diffusion and peer influence
- Big data approaches to studying networks

Attachments

- Bond Syllabus 7710.pdf

(Syllabus. Owner: Hopkins,Kelly Renee)

Comments

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Hopkins,Kelly Renee	01/09/2014 01:24 PM	Submitted for Approval
Approved	Williams,Kristi L.	01/17/2014 01:39 PM	Unit Approval
Approved	Haddad,Deborah Moore	01/17/2014 03:05 PM	College Approval
Pending Approval	Vankeerbergen,Bernadette Chantal Nolen,Dawn Jenkins,Mary Ellen Bigler Hogle,Danielle Nicole Hanlin,Deborah Kay	01/17/2014 03:05 PM	ASCCAO Approval

SOC 7710: Introduction to Social Networks and Network Analysis
M 9:00 - 12:00, Room: [BUILDING] [ROOM]

Instructor: Robert Bond
Derby Hall 3072
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480.239.1919

Office Hours: 10AM-12PM, T/Th 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 network, 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 its application methodologically.

All students must be officially enrolled in the course by the end of the second full week of the quarter. No requests to add the course will be approved by the Chair after that time. Enrolling officially and on time is solely the responsibility of the student.

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. That is, you are expected to come to class having completed the assigned readings and prepared to discuss them.

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 one day 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.

Homework assignments: In weeks 3 through 9 there will be a homework assignment assigned to be completed before the next class. 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: Each student will present in class their research proposal idea for no less than 10 minutes and no more than 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: 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, 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.

The breakdown for your course grade will be 25% homework assignments, 15% class participation, 20% final presentation, and 40% final paper. Grades will be assigned based off the following scale:

90% - 100%: A
80% - 89.9%: B
70% - 79.9%: C
60% - 69.9%: D
Below 60%: F

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.

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/.

Textbook: The main text for this course is *Social Network Analysis*, by Wasserman and Faust.

Course Policies: 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/

Course Outline: Each of the first 13 weeks, we will meet and spend part of our time discussing readings about that week's topic, then spend part of our time working with data. This second part of the class will be part demonstration, part lab, so come prepared with questions, ideas, and your own data as soon as possible.

Course Schedule:

Week 1 - Introduction to network ideas

- This week will introduce students to the course and its expectations. We will discuss what is new and exciting about network methodologies as well as what is not so new (yet still exciting!). We will brainstorm projects about student's substantive interests that may fit well with network methodologies.
- 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"

Week 2 - Social network theoretical foundations

- This week will introduce some of the social scientific theoretical foundations of network methodology. We will discuss what it means to conceive of social science phenomena to be conceived of as networked phenomena, how this is different from other classical conceptions of communication processes, behavior and decision-making. Finally, we will discuss which types of problems networks are helpful for studying as well as which types of problems it may be less useful for.
- Granovetter (1973) "The Strength of Weak Ties" , American Journal of Sociology
- Milgram (1967) "The small world problem", Psychology Today
- Newman (2001) "The structure of scientific collaboration networks", PNAS

Week 3 - Foundations

- This week will introduce basic network concepts such as nodes and ties. This week our time will be split between discussion of the assigned chapters and chalkboard demonstrations of networks and an introduction to the R statistical computing environment.
- Wasserman & Faust, chapters 1-2
- Homework 1 (representing network data) assigned

Week 4 - Introduction to data, notation and collection

- This week will introduce types of network data and how we can denote them properly. We will discuss methods of data collection, such as online data collection, snowball sampling, and the benefits and drawbacks of each. We will walk through several online data collection tools to collect data from Twitter and other online sources.
- Wasserman & Faust, chapters 3-4
- Homework 2 assigned (correct network notation, brainstorming data collection), Homework 1 due

Week 5 - Centrality and related concepts

- This week will introduce a set of basic network measures for the nodes (centrality, degree, etc.) and for the network itself (diameter, degree distribution, etc.) that can be used to describe

the network. We will then discuss reading that use network measures of phenomena that are typically not measured in a network fashion.
- Wasserman & Faust, chapter 5

- Borgatti (2005) "Centrality and Network Flow", Social Networks
- Fowler & Jeon (2008) "The Authority of Supreme Court Precedent", Social Networks
- Homework 3 assigned (calculation of network measures by hand and using R), Homework 2 due

Week 6 - Group structure, part 1
- This week will introduce concepts of structure within a network (structural balance, clustering, transitivity, etc.) and the concept of homophily. We will discuss when we should expect these types of phenomena to occur as well as how to measure them.
- Wasserman & Faust, chapters 6 & 14
- McPherson, Smith-Lovin & Cook (2001) "Birds of a Feather: Homophily in Social Networks", Annual Review of Sociology
- Homework 4 assigned (calculation of transitivity by hand, measures of group structure/homophily using R), Homework 3 due

Week 7 - Group structure, part 2
- Further discussion of structure within a network, focusing on community structure. Discussion of what constitutes a community, how to measure communities using network structure alone as well as with node attributes.
- Wasserman & Faust, chapter 9
- Newman (2006) "Modularity and Community Structure in Networks", PNAS
- Homework 5 assigned (calculation of modularity by hand and using R), Homework 4 due

Week 8 - Local structure and Sub-graphs
- This week will introduce concepts of local structure within a network (dyads, triads, etc.) and their related concepts such as balance, triadic closure and reciprocity. We will discuss statistical methods for measuring local network phenomena.
- Wasserman & Faust, chapters 13-14
- Homework 6 assigned (calculation of local network measures by hand and in R), Homework 5 due

Week 9 - Matrix permutation tests
- This week will discuss more methods for describing the structure of a network, and in particular will focus on matrix permutation tests. We will go over the theoretical reasons behind matrix permutations. Students will be introduced to methods to conduct matrix permutation tests using built-in functions as well as using their own code.
- Baker & Hubert (1981) "The Analysis of Social Interaction Data: A Nonparametric Technique", Sociological Methods and Research
- Hubert (1978) "Evaluating the conformity of sociometric measurements", Psychometrika
- Homework 8 assigned (conduct network permutation tests using packages in R and with students' own code), Homework 7 due

Week 10 - Network Visualization
- This week will introduce various tools to visualize network data. We will work with visualiza-

tion software in R and Pajek. Additionally, we will discuss how best to visualize the results of other statistical tests on network data.
- Freeman (2000) "Visualizing Social Networks", Journal of Social Structure
- Read through this documentation and the examples - http://igraph.sourceforge.net/doc/R/plot.common.h
- Tufte (2001) "The Visual Display of Quantitative Information" (skim)
- Homework 9 assigned (create graphs of networks using R and Pajek, scatterplots, box plots, etc. using R), Homework 8 due

Week 11 - Diffusion and Peer Influence
- This week will introduce the concepts of social influence. We will discuss the theories and mechanisms by which we expect that social influence may occur. We will then discuss methods for testing for social influence, and the advantages and disadvantages of each.
- Christakis & Fowler (2007) "The Spread of Obesity in a Large Social Network", New England Journal of Medicine
- Aral, Muchnik & Sundararajan (2009) "Distinguishing influence-based contagion from homophile-driven diffusion in dynamic networks", PNAS
- Centola (2010) "The Spread of Behavior in an Online Social Network", Science

Week 12 - Introduction to ERGM
- This week will introduce the concept of exponential random graph models. We will discuss how such models work, the problems with more traditional models that they solve, and the types of data for which they are not appropriate.
- Wasserman & Faust, chapter 15
- Robins et al. (2007) "An introduction to exponential random graph (p*) models for social networks"
- Homework 8 due

Week 13 - Experiments and networks
- This week will introduce the use of network concepts for the study of experimental data. We will discuss the advantages of using this approach, how network concepts can be used to study traditional experiments, and how to design an experiment using to test network hypotheses, both in the lab and in the field.
- 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
- Nickerson (2008) "Is voting contagious? Evidence from two field experiments", American Political Science Review

Week 14 - Big data and Digital Networks
- This week we will discuss research that uses online, big data approaches to studying networks. We will discuss how network data of this type are collected and stored, as well as what types of tools are available for analysis. We will discuss the promise of this type of research as well as some of the drawbacks to it.
- Aral and Walker (2012) "Creating Social Contagion through Viral Product Design: A Randomized Trial of Peer Influence in Networks", Management Science
- Eagle, Pentland and Lazer (2009) "Inferring friendship network structure by using mobile

phone data", Proceedings of the National Academy of Sciences
- Bond et al (2012) "A 61-Million-Person Experiment in Social Influence and Political Mobilization", Nature

Week 15 - Student Presentations, Papers due by Friday of this week