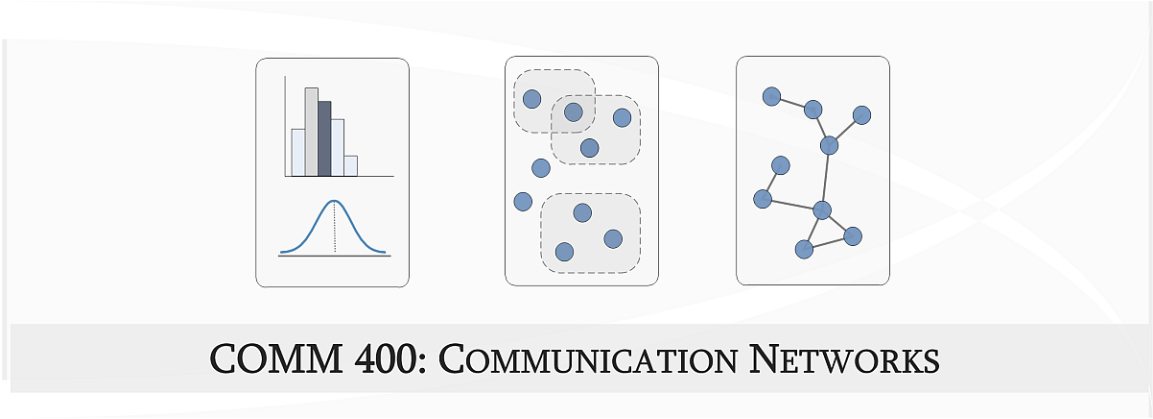
Annenberg School of Communication

University of Southern California



COMM 400: COMMUNICATION NETWORKS

Syllabus for COMM 400: Senior Seminar in Communication Networks

Spring, 2013; Mondays, 2:00 – 4:50 p.m. in room ASC 223AB

Professor Peter Monge
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Course Description

Comm 400: Senior Seminar in Communication Networks, is a course designed to provide Annenberg seniors the opportunity to pursue in depth investigation of selected advanced topics. This semester one topic is communication networks. Students will review theory and research pertaining to network topics. These include criminal and terrorist networks, social support networks, online communities, organizational communication networks, global telecommunications networks, disease transmission networks, and interpersonal networks. Students will also be introduced to computer programs for computing communication networks, including UCINET, NetDraw, NodeXL and Gephi.
Class will be conducted in lecture-discussion format centered on the course readings. Each week one or two students will be selected to lead the class discussion over the substantive (nontechnical) articles. Everyone will be expected to post to the class

discussion board their assessment of the readings and at least two questions that they would ask the authors if they had a chance to talk with them about their articles. Postings are due by 6:00pm on Sunday nights

Texts

Monge, P. R., & Contractor, N. (2003). *Theories of Communication Networks*. New York: Oxford University Press. Available in the USC bookstore in the section entitled Faculty Books.

Hanneman, R., & Riddle, M. (2005). *Introduction to Social Networks Methods*. Available at no cost on the web at http://faculty.ucr.edu/~hanneman/nettext/.

Software tools introduced in the course:

UCINET & NetDraw: Borgatti, S., Everett, M., & Freeman, L. (2012) UCINET 6.415 for Windows software for social network analysis. Harvard, MA: Analytic Technologies. http://www.analytictech.com, http://sites.google.com/site/ucinetsoftware

NodeXL: Smith, M., Milic-Frayling, N., Shneiderman, B., Capone, T., Mendes Rodrigues, E., Leskovec, J., Dunne, C. (2012) Network Overview, Discovery and Exploration Add-In for Microsoft Excel. http://nodexl.codeplex.com

Gephi: Bastian, M. (2012) An open graph visualization platform. The Gephi Consortium. http://gephi.org, http://consortium.gephi.org

Take-Home Labs

The course includes five take-home labs introducing network formats, analytical techniques, and software tools. Labs should be submitted by 2pm on Monday of the week when they are due. All labs must be completed correctly in order to receive a grade for the class. To correct a lab, please revise and resubmit it within a week of receiving your graded work.

Lab 1: Network Formats - Due February 4
Lab 2: Working with UCINET and NetDraw – Due March 4
Lab 3: Working with NodeXL – Due April 8
Lab 4: Network correlation and regression – Due April 15
Lab 5: Working with Gephi – Due April 22

Evaluation

Grades in this course will be based entirely on a research paper. Students will examine a network topic of interest to them and prepare original analyses of their chosen areas. Students will work closely with the instructors to develop and elaborate their ideas. Students are encouraged to range widely in the focus of their papers. Students are expected to collect and analyze network data. The paper should contain four sections: (1) Statement of the problem and review of relevant theory and research literature, (2) A method section that describes how the research was conducted, (3) a results section that presents the findings of the study, and (4) a discussion section that explores the implications of the findings for network theory and research and applies them to potential uses in society. A research paper proposal is due on March 4. It should contain a description of the research question(s) or hypotheses you want to study and a brief summary of relevant research literature. You should explain how you will collect your data and what tools you will use to analyze the data. The proposal should contain a Reference list of at least a dozen articles or books you plan to cite in your final paper.

Schedule

January 14: Course Overview

Getting acquainted
Networks Everywhere…!
Class Network Analysis
Review of the syllabus

January 21: Martin Luther King Holiday: Enjoy!

January 28: Network concepts I & The Social Network Revolution

Wellman, B., & Rainie, L. (2012). *Networked: The new social operating system. Cambridge*, MA: MIT Press, Cp.2 The Social Network Revolution

Monge, P. R. (2003). *Theories of Communication Networks*, Pp. 29-45.

Hanneman and Riddle, Cp. 1

Take-home Lab 1: Network Formats – Due February 4
Note: For next week, please download and install the UCINET software.

February 4: Fundamental Network Concepts II, Intro to UCINET & Strength of Weak Ties

Granovetter, M. (1983). *The strength of weak ties: A network theory revisited. Sociological theory*, 1, 201-233.

Hanneman and Riddle, Chs. 5 & 6.

In-class Lab: Learning UCINET and NetDraw.

February 11: Social Support Networks

McPherson, M., Smith-Lovin, L., Cook, J.M. (2001) Birds of a Feather: Homophily in Social Networks. *Annual Review of Sociology*, 27: 415-444.

Takhteyev, Y., Gruzd, A., & Wellman, B. (2011). Geography of Twitter networks. *Social Networks*.

Monge, P. R. (2003). *Theories of Communication Networks*, Pp.223-235

In-class Lab: Density, connectedness, reciprocity, and transitivity.

February 18: President's Day Holiday: Enjoy!

February 25: Social Capital

Moody, J. & Paxton, P. (2011) Building Bridges: Linking Social Capital and Social Networks to Improve Theory and Research. *American Behavioral Scientist, 52*(11).

Shen, C., Monge, P., & Williams, D. (2012). Virtual brokerage and closure: Network structure and social capital in a massively multiplayer online game. *Communication Research*, 39(4), 1-21.

Monge, P. R. (2003). *Theories of Communication Networks*, Pp.142-149

Take-Home Lab 2: Distance, centrality, and centralization – Due March 4

March 4: Contagion, Social Networks and Health

Bearman, P., Moody, J., & Stovel, K. (2004). Chains of affection: The structure of adolescent romantic and sexual networks. *American Journal of Sociology*, 110(1): 44-91.

Christakis, N. A., & Fowler, J. H. (2007). The spread of obesity in a large social network over 32 years. *New England Journal of Medicine, 357*(4), 370-379.

Monge, P. R. (2003). *Theories of Communication Networks*, Pp.173-186

In-class Lab: Clustering, cliques and subgroups.

Research Paper Proposal due

March 11: Small World Networks

Schnettler, S. (2009) A structured overview of 50 years of small-world research. *Social Networks* 31, p.165–178

Dodds, P. S., Muhamad, R., Watts, D. J. (2003) An Experimental Study of Search in Global Social Networks. *Science* 301, 827

In-class Lab: Affiliation networks

March 18: Spring Break

March 25: Criminal and Terrorist Networks

Krebs, V. (2002). Mapping networks of terrorist cells. *Connections*, 24(3), 43-52.

Robins, G. (2009) Understanding individual behaviors within covert networks: the interplay of individual qualities, psychological predispositions, and network effects. *Trends Organized Crime* 12:166–187

In-class Lab: Introduction to Qualtrics & CIKNOW

April 1: Online Networks

Bakshy, E., Rosenn, I., Marlow, C., & Adamic, L. (2012). The role of social networks in information diffusion. Paper presented at the ACM 21st international conference on the World Wide Web, New York, NY.

Fielding, N. (Ed.). (2008). *The Sage Handbook of Online Research Methods*. Thousand Oaks, CA: Sage Publications. Ch.8 Analyzing Social Networks Via the Internet – Bernie Hogan

Take-Home Lab 3: NodeXL and Online Social Networks – Due April 8

April 8: Social Support and Discussion Networks

Hampton, K., Sessions, L. F., & Her, E. J. (2011). Core networks, social isolation, and new media: How Internet and mobile phone use is related to network size and diversity. *Information, Communication & Society*, 14(1)

Wang, H., & Wellman, B. (2010). Social connectivity in America: changes in adult friendship network size from 2002 to 2007. *American Behavioral Scientist*, 53(8)

Take-Home Lab 4: Network correlation and regression, QAP & MRQAP – Due April 15

April 15: The Evolution of Organizational and Community Networks

Monge & Contractor, Cp. 9, Evolutionary and Coevolutionary Theories

Powell, Walter W., White, Douglas R, Koput, Kenneth, and Owen-Smith, Jason. (2005). Network Dynamics and Field Evolution: The Growth of Interorganizational Collaboration in the Life Sciences, *American Journal of Sociology*.

Take-Home Lab 5: Network visualization with Gephi – Due April 22

April 22: Project Day

April 29: Presentations

May 6: Course Project Due

Network Resources

Academic Organizations and Conferences

- Sunbelt Conference, International Network for Social Network Analysis (INSNA). http://www.insna.org/index.html
    - INSNA SOCNET listserv. http://www.insna.org/pubs/socnet.html
- Web Science Trust. http://webscience.org/home.html
- Communication and Technology Division, Organizational Communication Division. International Communication Association (ICA). http://www.icahdq.org
- Organizational Behavior Division, Organizational Communication and Information Systems Division, Academy of Management (AoM). http://www.aom.pace.edu
- Conference on Human-Computer Interaction (CHI), Conference on Computer-Supported Cooperative Work (CSCW), Conference on Supporting Group Work (GROUP), Association for Computing Machinery (ACM). http://www.acm.org
- Conference on Social Computing (SocialComp), World Wide Web Conference (WWW), Hawaii Conference on System Sciences (HICSS), Conference on Advances in Social Networking and Mining (ASONAM), IEEE Computer Society. http://www.computer.org
- Conference on Network Science (NetSci). http://netsci2011.net/
- Conference on Weblogs and Social Media (ICWSM), Conference on Artificial Intelligence (AAAI), Knowledge Discovery and Data Mining (KDD), Association for Advancement of Artificial Intelligence (AAAI). http://www.aaai.org/

Data Sets

- McFarland, D. “Social Network Analysis Labs in R and SoNIA.” Stanford University. http://sna.stanford.edu/rlabs.php
- Newman, M. “Network data.” University of Michigan. http://www-personal.umich.edu/~mejn/netdata/
- Leskovec, J. “Large Network Dataset Collection.” Stanford University. http://snap.stanford.edu/data/
- Batagelj, V. & Mrvar, A. “Pajek datasets.” University of Ljubljana. http://vlado.fmf.uni-lj.si/pub/networks/data/

- Börner, K., *et al.* "InfoVis Cyberinfrastructure Databases." Indiana University. http://iv.slis.indiana.edu/db/index.html
- Barabasi, A.-L. & Toroczkai, Z. CCNR Lab at the University of Notre Dame http://www.nd.edu/~networks/resources.htm

People and Research Groups

- Science of Networks in Communities (SONIC). Noshir Contractor. http://sonic.northwestern.edu
- Northwestern Institute on Complex Systems. Daniel Diermeier, Brian Uzzi, Kevin Lynch, William Kath, *et al.* http://www.northwestern.edu/nico/
- Amaral Lab. Luis Amaral. http://amaral.northwestern.edu
- Center for Connected Learning. Uri Wilensky. http://www.ccl.sesp.northwestern.edu
- Research on Complex Systems. Dirk Brockmann. http://rocs.northwestern.edu
- Annenberg Networks Network. Peter Monge, University of Southern California. http://ann.uscannenberg.org/
- Program for Network Governance. David Lazer, Harvard University. http://www.hks.harvard.edu/netgov/html/index.htm
- NETLAB. Barry Wellman, University of Toronto. http://www.chass.utoronto.ca/~wellman/
- CASOS. Kathleen Carley, Carnegie Mellon University. http://www.casos.cs.cmu.edu/
- MELNET. Gary Robbins, University of Melbourne. http://www.sna.unimelb.edu.au/
- LINKS Center. Steve Borgatti, University of Kentucky. http://linkscenter.org/
- Santa Fe Institute. http://www.santafe.edu/
- Center for the Study of Complex Systems, University of Michigan. http://www.cscs.umich.edu/

Online Network Courses

- Social Network Analysis – Lada Adamic (Fall 2012) – Recommended. https://www.coursera.org/course/sna
- Networked Life - Michael Kearns (Fall 2012) - Unknown https://www.coursera.org/course/networks