RPAD 777
Advanced Topics in Social Network Analysis
Course Number: 9794
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CLASS MEETING TIME AND PLACE; EXAMS AND PAPER DUE DATES
Friday 3-6pm

CATALOGUE DESCRIPTION: This course is designed as an intensive seminar that will build students’ familiarity and facility with social network methods and theory. It is intended only for students who are strongly considering use of social network methods in their dissertation. Prerequisite: Pad 637.

ASSUMED PREREQUISITES: This course assumes that you have completed PAD 637 and are familiar with UCINET, NetDraw, and other packages used in that course. Completion of a statistics course that includes linear regression and maximum likelihood is highly recommended.

ADMISSION TO THE CLASS: All students must be enrolled in a Ph.D. or Masters program, with preference given to those in Ph.D. programs. Undergraduate students will not be admitted. Students from the Department of Public Administration & Policy are given first priority for slots in the class, which is limited to 10 students. All others will be admitted on a first come, first served basis, until the class maximum is reached.

AUDITORS: Auditors are welcome. However, we expect auditors to have read the assignments and reserve the right to cold-call anyone who is in the room. We also expect auditors to help lead at least one weekly discussion. Auditors who are unprepared or unwilling to contribute may be asked to leave. Because we will get more credit for the Department, we would prefer that
students formally audit (i.e., by registering as an auditor with the powers that be), but we will not enforce this policy unless the class is too small to sustain.

**OVERVIEW:** Social network analysis takes seriously the proposition that the relationships between individual units or “actors” are non-random and that their patterns have meaning and significance. It seeks to operationalize concepts such as “position”, “role”, or “social distance” that are sometimes used casually or metaphorically in social, political, and/or organizational studies. Network theory views dimly the idea that social behavior may be understood by aggregating individuals. If most “normal” statistics starts with the idea that randomly drawing “observations” from a “population” will lead one to identify population “characteristics,” network theory begins with the assumption that randomization obliterates an essential element of a person’s or organization’s social world: their interconnections. There are many models and methods in social network analysis, but all share an emphasis on the relationships of actors as the basis of social structure.

This course builds upon the deterministic models that were introduced in PAD 637. It is intended to familiar you with the most recent developments in stochastic social networks. To that end, we will be working with the SIENA package in the R statistical software framework as well as StOCNET.

**TEXTS:** The only required text is Wasserman and Faust. We will distribute the remaining materials through the course website and ERes.


Another text you might find useful (if you don’t already have it) is:


**READINGS:** Additional readings (primarily journal articles) have been/will be placed on ERes. The ERes system may be accessed from the library’s home page or from the course web site (see below). To find the readings for R. Karl Rethemeyer, select the PAD 777 Fall 2012 option, and use the class password, pad77f12.

At the beginning of each class we will pass out a “Class Note” that summarizes the topics for the class that day and the readings that should be completed by the next class.

**SOFTWARE:** As noted, we will be using the SIENA module for R as well as StOCNET. We may also use the ERGM module for R later in the term. You may find these packages:

- The software are available at:
  - R Package: [http://cran.r-project.org/](http://cran.r-project.org/)
  - RSiena (SIENA version 4): [http://r-forge.r-project.org/R/?group_id=461](http://r-forge.r-project.org/R/?group_id=461) or through R Package
SIENA (version 3): [http://stat.gamma.rug.nl/sniiders/siena_1_exce_317y.zip](http://stat.gamma.rug.nl/sniiders/siena_1_exce_317y.zip)
StOCNet: [http://stat.gamma.rug.nl/stocnet/downloads/stocnet18ins.zip](http://stat.gamma.rug.nl/stocnet/downloads/stocnet18ins.zip)
SONIA (http://www.stanford.edu/group/sonia)

**DISTRIBUTION OF COURSE MATERIALS:** You may find most of the materials for this course by visiting the course website:

http://www.albany.edu/faculty/kretheme/PAD777/overview.html

*Special thanks to Professor A. B. Snijders, Oxford University for generously sharing his “workshops” and related materials, which are the basis for several modules in this course.*

**GRADING:** The final grade will be based on class participation (33%) and a final paper (67%).

This class is organized as a PhD level class that is open to upper level masters students. When we grade, we take into account whether the student is a masters or PhD student, with the master’s students being given a bit of a “break” regarding the level of work needed to obtain a high grade. In particular, we have higher expectations regarding the Empirical Exercise for those students who are in a PhD program.

Participation will be graded principally on the basis of the class discussion that results when you (or your group, depending on the number enrolled) summarize the weekly readings and lead the discussion. (See the handout on leading group discussions that will be distributed during the first class.) However, class participation will also be evaluated on the frequency of relevant, constructive contributions that reflect a close reading of assigned materials and thoughtful reflection on the topic.

**E-MAIL COMMUNICATION:** To reach me, use my personal e-mail address. To subscribe to this list, send an e-mail message to LISTSERV@LISTSERV.ALBANY.EDU with the line SUBSCRIBE pad777-s10 YOUR_FIRST_NAME YOUR_LAST_NAME in the body of the message and nothing in the subject. You will be asked to confirm your membership in the list by a return message. To send a message to EVERYONE who is subscribed, use the address pad777-s10@LISTSERV.ALBANY.EDU. Please register for this list as soon as possible and check your e-mail regularly for class news and information. If the class must be cancelled on short notice, the announcement will be made through the LISTSERV. Also use this LISTSERV for sharing common concerns and issues. Please do not use it for discussions or announcements that are not related to the class.

**TIME COMMITMENT FOR THIS COURSE:** This is a four-credit graduate course taught at the upper Masters/PhD level. Hence you should plan on spending three to five hours per week in class and in the lab plus approximately five to seven hours per week doing the reading and preparing problem sets. Students with strong prior background or experience in computing and/or statistics may spend less time than this. Students with little prior background may have to spend more time than this, especially in the first several weeks. If you discover that you are spending more time than this on the course, please let me know so that we can discuss it.
PLAGIARISM AND CHEATING: Due to the intensive nature of this course, students are expected to form study groups and to work together on assignments. Learn by interacting with one another — support and help one another. However, (a) all students must submit an individually prepared copy of their final paper. As a policy for this course, plagiarism or cheating will result in a failing grade for the whole course. In addition, I will pursue further disciplinary action at the University level, including suspension and/or expulsion.

For the purposes of this course, the following are taken as evidence of plagiarism or cheating:

- Material reproduced from another source without adequate citation.
- Identical answers being turned in by two or more students on the Take-Home Final.
- A pattern of unusually similar answers being turned in by two or more students on the Take-Home Final.
- Written answers or solutions that a student cannot logically explain verbally.
- Other evidence of unauthorized collaboration between students on the Take-Home Final or Empirical Exercise.

PLEASE NOTE: SEEKING PROBLEM SETS, ANSWERS TO PROBLEM SETS, PAST EXAMS, OR PAST EXAM ANSWERS FROM ANY PREVIOUS STUDENT IS PROHIBITED WITHOUT MY EXPRESSED, WRITTEN PERMISSION. I WILL TREAT SUCH BEHAVIOR AS SERIOUS ACADEMIC MISCONDUCT BY BOTH THE CURRENT AND PAST STUDENT.

Your work may be subject to computerized analysis to discover whether materials have been taken from on-line sources or to determine statistically whether answers are more similar than random chance would allow. Since this is such an important matter, if you have any questions about this course policy, you should ask me for any clarification that you may need.

SOURCES ON SOCIAL NETWORKS. Because students may have quite diverse reasons for taking this course, we offer the following listing of some sources on the social network orientation for your reference purposes. Many of these will go into more depth on substantive applications than will the bulk of the course. You may find them useful as you develop your projects and areas of interest. Most of them include rather substantial bibliographies that will offer further leads. We make no claim that this is a complete bibliography, but it does include a number of sources that you may find useful.

On-line Resources

One of the most useful resource is probably the SOCNET LISTSERV. I strongly encourage you to subscribe to this list. Subscription instructions may be found at www.analytictech.com/connections/socnet.htm. If you find pages that are especially useful, please send the URL to me by e-mail with a sentence or two of description; we will put the references on the web site.
We also strongly encourage you to visit the following websites. These websites are directly related to the contents of our course and contain valuable resources including literature and datasets open to the public.

SIENA Website: [http://stat.gamma.rug.nl/snijders/siena.html](http://stat.gamma.rug.nl/snijders/siena.html)
SIENA Website: [http://stat.gamma.rug.nl/stocnet/](http://stat.gamma.rug.nl/stocnet/)

You may also wish to join SIENA users’ group ([http://tech.groups.yahoo.com/group/stocnet](http://tech.groups.yahoo.com/group/stocnet)). Tom Snijders runs this group and often clarifies methodological or technical questions regarding using SIENA.

Finally, there are a several datasets that we have co-developed (with Victor Asal, Deneen Hatmaker, and others) over the years that we are willing to share on a limited basis, including datasets on terrorist networks, the Rockefeller College MPA cohort, and others. **HOWEVER,** any publications or papers that result from these datasets must be (1) approved by me and (2) must contain our names and any of the data co-developers names on the publication. We reserve the right to veto a project that uses any of these datasets if the project would adversely affect our, our co-developers’, or their ability to publish from these datasets.

**Periodicals**


**Books providing overviews:**


**Anthologies:**


TOPIC SCHEDULE AND READINGS

Note: Selections marked with an asterisk (*) are optional

1. Introductions and Class Organization – August 31

No required readings – bring your a priori understanding of social networks and social network methods. We will spend some time getting to know one another and SIENA.

As background, you may read the following web pages. Also, please download manuals and tutorials (especially for SIENA).

http://stat.gamma.rug.nl/snijders/siena.html - An overview of SIENA
http://stat.gamma.rug.nl/stocnet/ - An overview of StOCNet

2. Overview of Stochastic Approaches to Social Network Analysis – September 7

*Wasserman and Faust, Chapter 13-16.
*Simpson, William. 2001. The quadratic assignment procedure (QAP). In North American Stata Users' Group Meetings. SAGE handbook chapter

3. Exponential Random Graph Model (ERGM) – September 14

*Wasserman and Faust, Chapters 15-16 (Re-read) – Not for presentation

**4. Lab Session: ERGM** – September 21

- Creating data files for analysis; exporting from UCINET or Excel for stochastic analysis
  - DL Language
- Setting up software
- Comparison of estimates: P* vs. MCMCMLE ERGM estimates
- Applications of ERGM
  - Policy network
  - Terrorist network

**5. Longitudinal Social Network Data** – September 28


**6. Lab Session: Longitudinal Social Network Data** – October 5

- Setting up R and RSIENA: Before you come to the class, please download the most recent version of R and RSIENA and bring your laptop with you.
- The software are available at:
  - R Package: [http://cran.r-project.org/](http://cran.r-project.org/)
  - RSIENA (SIENA version 4): [http://r-forge.r-project.org/R/?group_id=461](http://r-forge.r-project.org/R/?group_id=461) or through R Package
- Getting Data in RSIENA format
- Example: MPA cohort data

**7. Network Dynamics: Coevolution of Social Network** – October 12


**8. Lab Session: Coevolution of Social Network** – October 19

- Delinquent behavior and friendship network
  - Creating, operationalising and testing hypotheses using RSiena

- Social selection and influence processes of MPA students
  - Social integration and academic performance

**9. Two-Mode Stochastic Analysis** – October 26


*Lubell, Mark N.; Robins, Garry; and Wang, Peng, "Policy Coordination in an Ecology of Water Management Games" (2011): [http://opensiuc.lib.siu.edu/cgi/viewcontent.cgi?article=1023&amp;context=pnconfs_2011](http://opensiuc.lib.siu.edu/cgi/viewcontent.cgi?article=1023&amp;context=pnconfs_2011)*

**10. Lab Session: Two-Mode Stochastic Analysis** – November 2

- Using BPnet and RSIENA for analysis of bipartite networks

- Public data
  - Davis et al. (1941): 14 informal social events by 18womens in Natchez (see Wang et al. (2009)
  - Partial data from a recent project
No Class: APPAM Conference – November 9

11. Stochastic and Other Approaches to Blockmodeling – November 16
* Wasserman and Faust, chapters 9, 10, 12. (review of “traditional” blockmodeling)

No Class: Thanksgiving – November 23

12. Lab Session: Advanced Blockmodeling – November 30
- STocNET for stochastic single membership modeling
- Data
  - Rethemeyer ABE data Wave 2
  - Rethemeyer MH data
  - MPA cohort data

13. Applications and Course Wrap-up – December 7


- Due in class: Final Project
- Project presentations