RPAD 637
Social and Organizational Networks in Public Policy, Management, and Service Delivery: Theory, Methods, and Analysis
Course Number: 6629
Spring 2011

Instructor: R. Karl Rethemeyer, Associate Professor & Chair
Course Fellow: Jeongyoon Lee, PhD Student (Public Administration & Policy)

Office: Milne 312A
Phone: (O) 518-442-5283
       (H) 518-478-9599
       (C) 518-253-5111
E-mail: kretheme@albany.edu
Office Hours: Tuesdays 4 – 5:30 PM
             Thursdays 4:00 – 5:30 PM
             Tuesdays 9 – 9:30 PM
             Milne 101A
             By Appointment (contact Linda McGrail: 442-5258)

CLASS MEETING TIME AND PLACE; EXAMS AND PAPER DUE DATES
Tuesdays, 5:45 PM to 8:50 PM in Draper 246/Draper 023. First meeting: January 25, 2010.

<table>
<thead>
<tr>
<th>Take-home final:</th>
<th>May 3, 2011, in class &amp; on web site</th>
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<tr>
<td>Distributed:</td>
<td>May 10, 2011 @ 5:00 PM</td>
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<td>Returned:</td>
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<td>Empirical Exercise:</td>
<td>May 10, 2011 @ 5:00 PM</td>
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CATALOGUE DESCRIPTION: The concept of “network” has become central to many discussions of public policy, management, and service delivery. However, use of the term is rarely backed with theoretical and empirical analysis of actual social networks. This course is designed to (1) explore the theoretical underpinnings of the concept; (2) introduce the basic methods needed to collect and analyze network data; (3) familiarize you with the process of initiating and completing a network analysis using real data from real cases; and (4) compare your network findings with results generated using other methods and techniques.

ASSUMED PREREQUISITES: This course assumes that you are (1) familiar with microcomputers and spreadsheet software such as Microsoft Excel; (2) comfortable learning new software packages; (3) familiar with college-level algebra, basic statistical techniques, and probability theory; and (4) comfortable using quantitative analysis to analyze social, political, and policy questions. Being familiar with common sociological concepts and language is also helpful but not required. Similarly, being familiar with calculus, linear regression, and/or maximum likelihood techniques is helpful but not required. If you are a mathophobe I promise you that you can gain a lot from this class without too much trauma!

ADMISSION TO THE CLASS: All students must be enrolled in a PhD or Masters program, with preference given to those in PhD 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 20 students. All others will be admitted on a first come, first served basis, until the class maximum is reached.

**AUDITORS:** Auditors are welcome, up to the room’s practical capacity (about 25). However, I expect auditors to have read the assignments and reserve the right to cold-call anyone who is in the room. I 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 I will get more credit for the Department, I would prefer that students formally audit (i.e., by registering as an auditor with the powers that be), but I 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.

We will examine two major forms of network data, egocentric and complete. Egocentric data measure the “interpersonal environments” that surround individual “actors.” Such designs are more compatible with large-population survey research than some other approaches to network studies. As we shall see, actors may be persons, organizations, groups, countries, or regions. Network analytic ideas may be applied to any group of interconnected social units; they are without a particular scale.

We will devote most of our time to studying analytic methods for “complete network data,” which consist of measurements of the social ties linking all actors within some closed population. Included here are spatial models driven by the concept of social distance; graph theoretic models emphasizing connectedness; and models for “positional analysis” (also known as blockmodel analysis) centered on the idea of structural equivalence and its generalizations. Toward the end of the course we will delve into recent developments in statistical modeling of complete network data, including methods appropriate for longitudinal study of networks.

A good deal of the course will focus on methods for describing social structures or locating structural regularities in network data. Toward the end, however, we will examine approaches to assessing network effects.

**TEXTS:** There are two texts that have been requested at both the UAlbany Bookstore and at Mary Jane’s. (I have asked the bookstore to make copies available in the Annex in the cafeteria.)


The Wasserman and Faust text provides a comprehensive overview of analytic methods and offers illustrations. It will be the primary source we draw upon during the semester. The Burt book is primarily a substantive study that draws heavily on network theory and methods. They are also available through Amazon.com.

In addition, I recommend the following texts, in part because Steve Borgatti, author of UCINET VI, recommends them:


Finally, three new texts have come out which are not required for the course but are terrific extensions of everything we will learn in this class:


Throughout the syllabus you will find chapters from the Carrington et al. book. Some Carrington chapters are optional; others are required. If you intend to use social network analysis in your research I highly recommend buying this book. NOTE: Because I cannot legally post all sections of the Carrington book to ERos, I have only uploaded the required chapters.

The De Nooy et al. book is the definitive introduction and guide to Pajek. For this class we will primarily use NetDraw to visualize social networks. However, Pajek is used for visualization and exploratory analysis of larger datasets.

We will read Chapter 5 of Burt’s *Brokerage and Closure*. If you are interested in social capital you should buy this book. However, for the class I will put the chapter on ERos (see below).

I have requested that the library purchase and reserve both books, but so far the library has not received their copies. I have copies of both in my office that may be checked out for short periods of time.

**Readings:** Additional readings (primarily journal articles) have been/will be placed on ERos. The ERos system may be accessed from the library’s home page or from the course web site.
below). The URL is for ERes is: http://ereserves.albany.edu. To find the readings for R. Karl Rethemeyer, select the PAD637 Spring 2011 option, and use the class password, pad637s11.

At the beginning of each class I 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: Many uses of network methods involve substantial manipulation of quantitative data in matrix form. Some of this can be undertaken using Microsoft Excel or elements of standard statistical software packages such as R, SPSS, or Stata. These packages often include multidimensional scaling and hierarchical clustering routines. Some models for network effects can be studied using such software, while others require special software. Software packages like GAUSS can be useful for inventive work.

Most of this course will focus on learning to use and manipulate the “industry standard” application for social network analysis, UCINET VI:


This is the recommended software for the course. The homework will teach you how to use it. UCINET VI runs on Windows computers. Unfortunately, there is no Macintosh version. Public-use copies are available in all student labs across all three campuses. However, no more than 24 students may use UCINET VI at one time, and anyone may boot it up – even those who are not in this class. Analytic Technologies offers this software to students at $40. If you wish to make an order, contact Analytic Technologies at (phone) (978) 502-7089 or (email) sales@analytictech.com.

In addition, UCINET VI incorporates NetDraw, Pajek, and Mage – three network visualization tools. We will use NetDraw extensively. I strongly urge you to buy the software.

As of January 19, 2011, here are the current versions of the software:

UCINET: Version 6.308
NetDraw: Version 2.097

Note: UCINET and NetDraw are often updated. You should check the site for new versions.

During week 7 we will examine dynamic visualization using SONIA, a free package that may be downloaded from http://www.stanford.edu/group/sonia/. During week 12 we will look at stochastic approaches to social network analysis; we may use two programs. The first, StOCNET, we will use to conduct exponential random graph models (ERGM). StOCNET is available from http://stat.gamma.rug.nl/stocnet/. The second package is SIENA in R (an open-source statistical package). To use SIENA in R you need to download the R software framework (available from http://www.stats.ox.ac.uk/~snijders/siena/) first. Once you have installed R, you will need to download and install the SIENA subpackage, which may be downloaded directly
from within the R framework. For more information on the SIENA R module, see http://cran.r-project.org/web/packages/RSiena/.

**PROBLEM SETS:** Problem sets must be handed in at the beginning of class on the day they are due. Late assignments will not receive full credit, in part because the findings will be extensively discussed during the class in which they are due. Students are strongly encouraged to work in small groups (2 - 4 people) but each student must write up his or her answers separately. Submissions that are functionally identical to one another will lose half credit. The course fellow for PAD 637 will grade the problem sets lightly: If you turn in an answer to each section of the problem set, you will receive 9 out of 10 points. The last point will be awarded for original, independent thought and/or analysis (independent of your group, that is). If you wish to get the additional point, indicate on your problem set what material is your unique contribution. Problem sets and their associated datasets will be distributed through the course website:

http://www.albany.edu/faculty/kretheme/PAD637/overview.html

In addition to the regular problem sets there will be a longer Empirical Exercise due at the end of the course. The Empirical Exercise is to be completed either individually or in pairs.

The Empirical Exercise is designed to test your ability to make an argument about some phenomenon using network data. I am open to many types of paper proposals, but each must have a data component. Ideally, your paper will rely on data you have collected yourself. However, recent struggles with the Institutional Review Board make original research in the context of a semester-long course difficult. Nonetheless, I encourage you to consider this option. I have put nine data sets on the course web site that you may wish to use in one fashion or another. For instance, you could extend the analysis originally done by the author; you could test a new hypothesis; or you could write a research proposal for a larger study that is motivated by a preliminary analysis that is done using one of these data sets. Victor Asal and I have several very large terrorism datasets that we are willing to share, though if we will have to make some arrangements regarding ownership of the data and publication rights. All students must submit a one or two paragraph paper proposal by March 8.

There will be a take-home exam at the end of the course. It will be distributed on May 3 on the course web site and via the course LISTSERV. A hard copy of your take-home is due in my mailbox by 5:00 PM on May 10.

*Special thanks to Professor Peter V. Marsden, Department of Sociology, Harvard University for generously sharing his “workshops” and related materials, which are the basis of the problem sets in this course.*
GRADING: The final grade will consist of the class participation, problem sets, the Take-Home Final, and the Empirical Exercise, with the following weights:

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<th>Weight</th>
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<tbody>
<tr>
<td>Class Participation</td>
<td>15%</td>
</tr>
<tr>
<td>Problem Sets</td>
<td>20%</td>
</tr>
<tr>
<td>Take-Home Exam</td>
<td>25%</td>
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<tr>
<td>Empirical Exercise</td>
<td>40%</td>
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This class is organized as a PhD level class that is open to upper level masters students. When I grade, I 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, I 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.

Because this course requires an empirical paper, I will allow incompletes, provided that (a) you have made substantial progress on the paper during the term and (b) that we agree in writing that the incomplete will be resolved by no later than August 29, 2011. I will be enforcing this deadline much more strictly this year.

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 pad637-s11 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 pad637-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 six to eight 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 homework and (b) some work such as the Empirical Exercise must be completed by the individual (or the individual and their approved partner). 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, I 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. I 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

The course website contains links to several online resources I have found useful over the years. However, 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; I will put the references on the web site.
While at Harvard I “harvested” data from nine prominent studies published in paper form. The data is available from the website, along with references and comments on the articles from which the data was originally mined. You may wish to use one or more of these data sets for your Empirical Exercise. In addition, UCINET VI includes 25 datasets from prominent network studies; you may also use these as the basis for your Empirical Exercise.

Finally, there are a several datasets that I have co-developed (with Victor Asal, Hyun Hee Park, Deneen Hatmaker, and others) over the years that I am willing to share on a limited basis, including datasets on terrorist networks, the Rockefeller College MPA cohort, and a network of state auditors. **HOWEVER,** any publications or papers that result from these datasets must be (1) approved by me and (2) must contain my name and any of my data co-developers names on the publication. I reserve the right to veto a project that uses any of these datasets if the project would adversely affect my, my co-developers’, or my dissertation students’ 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, Class Organization, and an Overview of UCINET – January 25

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 UCINET.

As background, you should read the following web pages on the Hawthorne Studies prepared by Stephen Borgatti, creator of UCINET. The Hawthorne studies produced a classic set of network data which we will use over and over to study different properties of networks. It is helpful to know the background to the studies themselves and the physical layout of the key area studied, the bank wiring room.


PDF versions of these pages are also available from ERes.

2. Overview of Network Theory – February 1

Wasserman and Faust, chapter 1.
3. **Network Data; Introduction to Graph Theory and Sociometric Notation** – February 8

Wasserman and Faust, chapters 3-4.

4. **Data Collection & Social Cognition** – February 15

Wasserman and Faust, chapter 2.

Due in class: *Problem Set #0 – Getting to Know UCINET VI*
No class February 22 – President’s Day Break

5. Centrality and Centralization – March 1

Wasserman and Faust, chapter 5.

6. Studying Cohesive Subgroups and Core-Periphery Structures – March 8

Wasserman and Faust, chapter 7.

Due in class: Problem Set #1 – Connectedness, Centrality, and Centralization
7. Picturing Networks – March 15


Freeman, Linton C. (2000) “Visualizing Social Networks.” *Journal of Social Structure, 1*. [This is an electronic journal. Its address is http://www.heinz.cmu.edu/project/INSNA/joss/]


*SONIA website and documentation – http://www.stanford.edu/group/sonia/

Due in class: Problem Set #2 – Cohesive Subgroups & Core/Periphery Structures

Paper proposal due.

8. Analyzing and Representing “Two-Mode” Network Data – March 22

Wasserman and Faust, chapter 8


Due in class: Problem Set #3 – Visualizing Networks
9. Blockmodels/Positional Analysis – Fundamentals – Week of March 29

Wasserman and Faust, chapters 9, 10.

Due in class: Problem Set #4 – Working With Two-Mode Data

10. Blockmodels/Positional Analysis – Implementation and Applications – April 5

Wasserman and Faust, chapter 12.

Due in class: Problem Set #5 – Positional/Blockmodel Analysis
11. Networks, Social Capital, Autonomy, and Achievement – April 12


Due in class: *Problem Set #6 – Abstract Equivalence*

No class April 19 – Spring Break!!

12. Statistical Approaches to Networks: p₁ and p* – April 26

Wasserman and Faust, chapters 15-16.


* StOCNET and SIENA websites: http://stat.gamma.rug.nl/stocnet/; http://stat.gamma.rug.nl/siena.html

Due in class: *Problem Set 7 – Handling Egocentric Network Data*


Optional: Problem Set #8 – The P* Model

Take home exam distributed