

ECON 4850 – Spring 2014

Economics of Networks

Instructor:	Ian M. Schmutte	Class:	MWF 10:10am – 11:00am
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This syllabus is a general plan for the course. The instructor will announce deviations from this syllabus to the class.

Course Description: The economic, social, business, and political worlds are highly interconnected. The structure of connections between workers, banks, and trading partners can affect the efficiency and equity of markets. Network analysis provides tools for characterizing these connections and help us to think about the role they play in the allocation of resources. The course begin with an overview of methods for describing networks and network data. We then explore a number of different ways in which the social and economic worlds are connected, including: how information travels through social networks and how this can lead to fads; how markets connect buyers and sellers and the relationship between social power and market position; how the structure of social networks influences the diffusion of beliefs; the dynamics of segregation, technology adoption, and other “tipping points”; the structure and fragility of financial networks, and the role of job referral networks in the allocation of labor.

Prerequisites: ECON2105, ECON2106, ECON4010, and MATH2200 or MATH2250. I will review all but the most rudimentary mathematical concepts needed for the class. Upon request, I will gladly consider waiving the formal prerequisites for students outside economics.

Required Reading:

- **[EK]** *Networks, Crowds, and Markets: Reasoning About a Highly Connected World*, by David Easley and Jon Kleinberg.
 - This book is available at the bookstore and online at a very reasonable price.
- **[B]** *Linked: How Everything is Connected to Everything Else and What It Means for Business, Science, and Everyday Life*, by Albert-László Barabási.
- Individual papers and book chapters where noted.

Communication: The best way to reach me is through UGA e-mail, schmutte@uga.edu. Most communication outside of class will occur via a Facebook group. To join the group, you should visit <https://www.facebook.com/groups/groupsatuga/>. From there, search for “UGA Economics of Networks” and ask to join the group. To use “Groups at UGA,” you need a Facebook account that is linked to your uga.edu e-mail address. I will make most announcements during class, but you must monitor your UGA e-mail and the Facebook group regularly throughout the semester.

Course Objectives: Our goal in this course is to develop mathematical models for analyzing complex networks and develop their application to economic problems.

Assessment

Homework	25%
Midterm	25%
Projects	25%
Final Exam	25%

Homework: I will collect homework once per week consisting of problems from the textbook and additional analytical and essay questions.

Exams: I will give two exams during the semester, one at the midterm and one during the final exam period. The first exam will cover material we have covered prior to the midterm. The second exam will cover material introduced between the midterm and end of the semester and will not be cumulative.

You must take exams during the scheduled times. I will not administer make-up exams. If you have an excused absence from the first midterm, its weight will be added to the weight of the final exam in determining your course grade. An unexcused absence from the final exam will result in a score of zero on that exam.

Projects: You will complete two projects this semester that apply methods of network analysis to some topic of economic interest. The first project will introduce you to the tools of complex network analysis through a software package called Gephi. The first project is worth 10 percent of your final grade. The second project will apply the tools you pick up in the first project, as well as other concepts from the course, to a topic of your choosing. The second project is worth 15 percent of your final grade.

Attendance: Attendance is not required, but I will call the roll regularly. I reserve the right to drop any student from the course who has missed a midterm exam without prior approval, failed to complete homework assignments, or has been excessively absent, prior to the withdrawal deadline. I will attempt to contact you in class and at your UGA e-mail address prior to an administrative withdrawal. I also reserve the right to withdraw any student who does not respond to their official UGA e-mail within one week.

Your attendance is vital to learning the material and achieving the course objectives. If you must be absent, show up late, or leave early, please let me know in advance. It is your responsibility to get notes from your classmates.

Academic Honesty: As a University of Georgia student, you have agreed to abide by the University's academic honesty policy, "A Culture of Honesty," and the Student Honor Code. All academic work must meet the standards described in "A Culture of Honesty," found at www.uga.edu/honesty.

Course Topics

The following is an overview of topics we will cover and their associated textbook readings. Some topics will involve supplemental reading. The choice and ordering of topics are subject to change.

1. Introduction: Networks and their Role in Economics
2. Graph Theory and Social Networks
 - (a) Graphs, **[EK]** Ch. 2.
 - (b) Strong and Weak Ties, **[EK]** Ch. 3.
 - (c) Networks and Social Structure, **[EK]** Ch. 4.
3. Markets and Strategic Interaction in Networks
 - (a) Overview of Game Theory and Auctions, **[EK]** Ch. 6 and Ch. 9.
 - (b) Matching Markets, **[EK]** Ch. 10.
 - (c) Trading Networks, **[EK]** Ch. 11.
 - (d) Bargaining and Power in Networks, **[EK]** Ch. 12.
4. Information, Network Effects, and Social Interactions
 - (a) Information Cascades, **[EK]** Ch. 16.
 - (b) Network Effects, **[EK]** Ch. 17.
 - (c) Power Laws and Rich-Get-Richer Effects, **[EK]** Ch. 18
5. The Effect of Network Structure on Social Behavior
 - (a) Cascading Behavior in Networks, **[EK]** Ch. 19.
 - (b) Small-Worlds and Search, **[EK]** Ch. 20.
6. Social Interactions in the Labor Market