

# Network Economics\*

Markus Walzl

## 1 Course content

**Lectures** The complex connectedness of modern societies due to the growth of the Internet, the ease of global communication, and the ability of news and information as well as epidemics and (financial) crises to spread with considerable speed and intensity has changed our social and economic environment and therefore attracted a lot of attention by economic research during the last decade. The course introduces key theories of the structure and evolution of social and economic networks and analyzes the impact of stronger societal and economical connectivity on markets.

Specifically, the course deals with the structure of social and economic networks, the relation between individual contacts and global network properties, trade and other economic interaction on networks (search engines, sponsored search markets), information-transmission and -diffusion on networks (cascades, reputation, and scientometrics), and the transmission and diffusion of behavior (herding and clustering).

Lectures deepen and extend the presentation in the textbook by Easley and Kleinberg (2010). Students are expected to read the respective chapter before the corresponding lecture (see schedule) to facilitate a discussion.

**Proseminar** The proseminar deepens the methodological understanding of the concepts that are introduced throughout the lectures and discusses their applications in various areas of economic and social decision making. Proseminar meetings consist of the collaborative solving of problem sets and the presentation and discussion of recent applied research by the students.

## 2 Prerequisites and grading

We assume that students have a basic knowledge of mathematics, microeconomics, and game theory as provided by the corresponding compulsory courses in the first semester of the master program.

The proseminar grade will be composed (with equal weight) of a grade for a midterm exam, a grade for a short paper (up to five pages) on a research topic related to network

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economics (for possible topics and references see below), and a grade for the presentation and discussion of these papers.

The module grade consists of the proseminar grade (60%) and the grade for the final exam (40%). Exam questions for the midterm and the final exam are similar to the problem sets discussed in the proseminar. The final exam covers all topics of the course. Enrollment for midterm and final exam and the distribution of research topics for the paper and the presentation will be discussed and organized in the first proseminar meeting (see schedule). Formal requirement for admission to the final exam is a passing grade (1-4) in the proseminar.

All course material (syllabus, slides, research papers, problem sets) can be found on the OLaT page of this course (we maintain a joint page for lectures and proseminars).

## 3 Schedule

### 3.1 Lecture

#### Part 1: Structure of social and economic networks

1. *Lecture 1: 5-3-14: Introduction*  
Easley und Kleinberg (2010), Networks, Crowds, and Markets, Cambridge University press (online: <http://www.cs.cornell.edu/home/kleinber/networks-book/>) (EK), Chapter 1 and 2
2. *Lecture 2: 12-3-14: Individual links in social networks:* EK Chapter 3
3. *Lecture 3: 19-3-14: Global properties of social networks:* EK Chapter 4
4. *Lecture 4: 26-3-14: Stability of social and economic networks:* EK Chapter 5

#### Part 2: Networks and Markets for Information

1. *Lecture 5: 2-4-14: Strategic decisions on networks:* EK Chapter 6 and 8
2. *Lecture 6: 9-4-14: Matching:* EK Chapter 10
3. *Lecture 7: 30-4-14: Trade on networks:* EK Chapter 11 and 12
4. *Lecture 8: 7-5-14: Matching market applications:* Roth (2008)
5. *Lecture 9: 14-5-14: Information on networks:* EK Chapter 13 and 14
6. *Lecture 10: 21-5-14: Sponsored search markets:* EK Chapter 15

#### Part 3: Information dissemination and cascades

1. *Lecture 11: 28-5-14: Information cascades and herding:* EK Chapter 16
2. *Lecture 12: 4-6-14: Network effects:* EK Chapter 17
3. *Lecture 13: 11-6-14: Cascading behavior and collective decisions:* EK Chapter 19
4. *Lecture 14: 18-6-14: Markets, information, and wisdom of the crowds:* EK Chapter 22
5. *Lecture 15: 25-6-14: Review exercises and wrap-up*

## 3.2 Proseminar

1. *Session 1: 6-3-14: Organisation and basic concepts of network analysis*
2. *Session 2: 13-3-14: Concepts of network analysis and the small world phenomenon*
3. *Session 3: 20-3-14: Social capital and labor market access*
4. *Session 4: 27-3-14: Homophily, affiliation, and segregation*
5. *Session 5: 3-4-14: Structural balance and stability of relationships*
6. *Session 6: 10-4-14: Traffic on networks*
7. *Session 7: 8-5-14: Matching and trade on networks*
8. *Session 8: 15-5-14: Proseminar exam and paper information session*
9. *Session 9: 22-5-14: Paper consultation*
10. *Session 10: 5-6-14: Paper presentation I*
11. *Session 11: 12-6-14: Paper presentation II*
12. *Session 12: 26-6-14: Paper presentation III*

## 3.3 Possible topics for your research project

All references can be found on the OLat page of this course.

1. *Public good provision on networks*: Bramouille and Kranton (2007)
2. *Financial networks and contagion*: Elliot et al. (2014)
3. *Scientific collaboration and co-authorship networks*: Goyal et al. (2006)
4. *Citation networks and scientometrics*: Ritzberger (2008)
5. *Labor market access and social ties*: Granovetter (2005)
6. *Network formation and bounded rationality*: Jackson and Watts (2002)
7. *The economics and ethics of kidney exchange*: Roth et al. (2004)