

18D029

3 ECTS

Networks: Models and Applications

Overview and Objectives

Nowadays, networks are pervasive and influence many of our decisions and outcomes. We are going to explore models about how networks form (both from a random and incentive point of view), about how they influence individual and aggregate behavior (through, for example, social learning or peer effects, among other kind of influence factors), or about how dynamic processes evolve (like the spread of viruses and information, social revolts,...).

Together with the first part, Networks: Concepts and Algorithms, the two courses on networks provide a multifaceted approach to the study of networks, bringing together concepts, models, algorithms, and tools from graph theory, game theory, sociology, economics, computer science, and statistics, among other areas.

Prerequisite reading

Some basic knowledge of classical concepts, models, and algorithms from networks/graph theory is recommended. Such ideas are covered in the previous course Networks: Concepts and Algorithms.

Course Outline

Individual and Aggregate Behavior in Networks

Peer Effects and the Econometrics of Social Interactions

Network Formation: Incentives and Matching

Socioeconomic Applications

Required Activities

Attendance to theory class and problem sets (that may include theory problems as well as practice with software and data sets).

Evaluation

30% Problem Sets, 35% Project, 35% Final Exam

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Materials

Books:

D. Easley and J. Kleinberg, *Networks, Crowds, and Markets*, Cambridge University Press 2010

Matthew Jackson, *Social and Economic Networks*, Princeton University Press 2010

Mark Newman, *Networks: An Introduction*, Oxford University Press 2010

S. Wasserman and K. Faust, *Social Network Analysis: Methods and Applications*, Cambridge University Press 1994

M. Osborne, *An Introduction to Game Theory*, Oxford University Press 2003

Other:

A list of other resources (data sets, papers,...) will be provided as the course progresses.