

# Selected Topics in Market Design: Matching, Auctions and Networks

Universidad del Rosario  
Facultad de Economía  
Semestre 2011 - I

## Syllabus

**Instructor:** Çağatay Kayı.

**Class Hours:** TBA

**Lecture Hall:** TBA.

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### Objectives:

Economists are interested in the allocation of scarce resources, and for this reason they design economic institutions, such as markets, and develop mechanisms. Matching and auction mechanisms are frequently used in market design and the network structure of the markets is getting important.

Matching mechanisms have been successively applied in many contexts such as medical internship allocation, organ allocation (kidney exchange and liver allocation), college admission, job matching, house allocation, course enrollment, and law clerkships allocation. Auctions have been used for a long time for the sale of a variety of objects; commodities ranging from tobacco, fish, and tulips to scrap metal, treasury bonds, off-shore oil leases, procurement, electromagnetic spectrum etc. Networks play a central role in the trade of many goods and services and for designing markets. Social networks are also getting important in which products to buy, which language to speak, how we vote, how much education we obtain etc.

The purpose of the course is to provide some successful applications of economic theory. We will explore theory and practice of matching markets. We will try to answer why auctions are so prevalent as a selling mechanisms. We will understand how social network structures affect behavior and which network structures are likely to emerge in a society.

## Course Outline:

1. Matching
  - (a) Two-Sided Matching Markets
    - i. Marriage Market
    - ii. College Admissions Problem
  - (b) One-Sided Matching Markets: Roommate Markets
  - (c) Object Allocation
    - i. With Endowments: Housing Market
    - ii. Without Endowments: House Allocation
    - iii. Mixed case: House Allocation with Existing Tenants
  - (d) School Choice
  - (e) Kidney Exchange
  - (f) Matching with Contracts
2. Auctions.
  - (a) Single Object Auctions
    - i. Private Value Auctions
    - ii. Revenue Equivalence Principle
    - iii. Mechanism Design and Efficient Mechanisms
    - iv. Auctions with Interdependent Values
  - (b) Multiple Object Auctions
    - i. Equilibrium and Efficiency with Private Values
    - ii. Sequential Sales
    - iii. Multiple Objects and Interdependent Values
3. Networks.
  - (a) Representing and Measuring Networks
  - (b) Models of Network Formation
  - (c) Diffusion through Networks
  - (d) Learning and Networks
  - (e) Allocation Rules, Networks, and Cooperative Games.

**Suggested Readings:**

- Jackson, M.O. (2008) Social and Economic Networks, Princeton University Press.
- Krishna, V (2002) Auction Theory, Academic Press.
- Roth, A.E. and Sotomayor, M.A. (1990) Two-Sided Matching: A Study in Game-Theoretic Modeling and Analysis, Cambridge University Press.