



**Course:** Matching, Matching, Markets and Mechanism Design

**Faculty:** Jordi Masó and Antonio Miralles

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**Term:** Winter

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**Office Hours:** On request

**Description and Objectives:** This course contains the basics of market design. It is divided in two parts. The first part is related to environments with ordinal preferences, mainly two-sided matching with no indifferences on both sides. The second part is devoted to environments where cardinal preferences are relevant: assignment problems with no or coarse priorities, auctions, etc.

**Outline:**

### **Part 1: Ordinal Preferences**

1. Introduction
2. The Marriage Model
  - 2.1. Stability
  - 2.2. Structure of the Set of Stable Matching
  - 2.3. Strategic Incentives
3. The College Admissions Problem
4. Many-to-one and Many-to-many Models
5. The House Allocation Problem

## Part 2: Cardinal Preferences

1. Random Assignment with No or Coarse Priorities
  - 1.1. Uncertainty and Tie-Breaking Lotteries
  - 1.2. Properties: Efficiency, Fairness, Consistency
  - 1.3. Market-like Mechanisms
  - 1.4. Large Market Equivalences
  - 1.5. Extensions: Priorities, Assigning Bundles
2. Mechanism Design with and without Monetary Transfers
  - 2.1. The Revelation Principle
  - 2.2. Sandwiching: Envelope Theorems
  - 2.3. Applications: Optimal Auctions
  - 2.4. Applications: Optimal Allocation without Transfers
  - 2.5. Extensions: Boundedly Rational Agents, Dynamic Mechanism Design
3. Implementation (if time allows)
  - 3.1. Maskin's Shouting Contest
  - 3.2. Extensions: Dynamic Implementation

**References:** Specific references will be provided along the course

### *Text Books*

Alvin E. Roth and Marilda A. Oliveira Sotomayor. *Two-sided Matching: A Study in Game-theoretic Modelling and Analysis*. Econometric Society Monograph No. 18 Cambridge University Press, 1990.

Dan Gusfield and Robert W. Irving. *The Stable Marriage Problem: Structure and Algorithms*. The MIT Press, Cambridge, 1989.

Chapters 21 and 23 in Mas-Colell A., Whinston M. and Green J. *Microeconomic Theory*, Oxford University Press, 1995, for Mechanism Design.

Chapter 10 in *A Course in Game Theory* by Martin J. Osborne and Ariel Rubinstein (MIT Press, 1994), for Implementation Theory.

**Grading:** Each part will be followed by an exam. Each exam will count for 50% of the final grade of the course.