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Matching and Market Design: Theory and Applications (Advanced)
Preliminary Syllabus, Winter Term 2015/2016

Matching plays an important role in many aspects of our economic and social lives: Students need to be assigned places to study, donor organs need to be matched to patients, workers to jobs, and so on.

This course introduces students to matching theory and its applications to the analysis and design of real-life markets. More specifically, students will learn

- about leading theoretical models of matching
- how to apply theoretical models to develop ?good? matching mechanisms for real-life matching markets
- how a mixture of theoretical, experimental, and empirical methods can be used to evaluate existing matching mechanisms and, if necessary, design better ones

Prerequesites: This course will be self-contained. Knowledge of graduate level microeconomic theory and game theory is helpful but not required. A familiarity with writing and understanding proofs is recommended.

Target Audience: PhD students and Advanced Master students.

Aim: Students who master the topics of this class are equipped to pursue independent research projects/a master thesis in the area of matching theory and market design.

Lectures and Tutorials: The class will meet two times a week.

- Monday, 10:00 - 11:30 in Room S92 in the Philosophikum (Building 103)
- Thursday, 10:00 - 11:30 in Room S92 in the Philosophikum (Building 103)

Approximately 2/3 of the meetings will be lectures and the remaining third will be tutorials. In tutorials, we will derive solutions to the problem sets together.

Office hour: There will be a weekly office hour (time and place TBD) that is open to all students who register for this class.

Grading:

- For PhD students, grades will be based on one 60 minute final exam and a term paper.

- For Master students, grades will be based on one 60 minute final exam. Master students, who are interested in writing a Master-Thesis on topics related to this course, are encouraged to write a term paper.
- More details on examination requirements will be discussed in the first meeting.

Topics:

- Introduction
- Pure matching models
  - One-sided matching: Organs and houses
    (**Applications**: Dormitory rooms, Kidney Exchange)
  - Many-to-one matching
    (**Applications**: Entry-level labor markets, School Choice, University Admissions)
  - Many-to-Many matching
    (**Applications**: Erasmus student exchange, Course allocation and combinatorial assignment)
- Matching with salaries and contracts
  - The assignment game and a theory of marriage
  - Matching with salaries and auctions
  - Many-to-one matching with contracts
    (**Applications**: Career specializations, Distributional Constraints in Matching)
- Optional topics (time permitting)
  - Generalized matching models
  - Matching with frictions

If necessary, the list of topics will be adjusted during the semester.

Literature:

As general background reading, you may want to consult the following two books:

- Al Roth, Marilda Sotomayor, Two-sided matching (1990), Cambridge university press (Econometric Society Monograph)
- Al Roth (2015), Who gets what - and why: The new economics of Matchmaking and Market Design, Eamon Dolan / Houghton Mifflin Harcourt

We will also cover a number of academic research articles. More detailed literature references will be available on the lecture slides.