Economics 4050-001

Market Design

Oleg Baranov Assistant Professor

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0-3:30 M, W 9:30 11:30 T, TH, F 3:30 5:30 (or by appointment)

Course website:

All course materials will be posted on <u>Desire2Learn (D2L)</u> website that can be accessed at <u>https://learn.colorado.edu</u>.

market design studies how to construct rules for allocating resources or to structure successful marketplaces. It draws on the tools of game theory and mechanism design to identify why certain market rules or institutions succeed and why others fail.

to transplant patients and college admissions. The third part of the class is on auctions and good auction design. Examples range from simple auctions used tosix

-peer online markets.

Textbook: There is no required textbook for this class. by *Guillaume Haeringer*.

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Appropriate readings will be indicated during lectures and available on the class website. The readings are mostly economics journal articles, or popular press articles, that provide some context for the class. All of the listed papers (at least large parts of them) should be readable.

Thinking Strategically Avinash Dixit and Barry Nalebuff is a very famous book suitable for the Game Theory part of the class.

Who Gets What — and Why: The New Economics of Matchmaking and Market Design Alvin E. Roth is an easy read suitable for the Matching part of the class.

Prerequisites:

The course is available to students who have completed ECON 3070 Intermediate Microeconomic Theory.

Required Level of Mathematics:

The class does not require prior knowledge of mathematical concepts beyond the ones covered in ECON 1088. At the same time, the course includes a good deal of economic theory and extensive strategic arguments. Students should expect complex logical arguments in every class.

Attendance and Administrative Drops:

A student can miss one class without excuse. After that, any unauthorized missed classes will be reflected in the course grade (see below).

Any student who miss two first class meetings (14 and 15 May) will be administratively dropped from the class.

Assessment:

There will be two midterm exams, the final exam, and regular problem sets.

- 1. Problem sets (20%)
- 3. Midterm exams (25% each)
- 4. Final Exam (30%)

There will be no make-up exams. A student who misses a midterm due to an excused absence will have the additional weight shifted to the final.

courses in the Department. Its website is

http://www.colorado.edu/Economics/undergraduate/tutorial-lab.pdf.

Tentative Course Outline:

- 1. Administrative Material (0.5 lecture)
- 2. Game Theory (first week)
 - a. Dominance (1 lecture)
 - b. Nash Equilibrium (1.5 lectures)
 - c. Mixed Strategies & Dynamic Games (1 lecture)
 - d. Bayesian Games and Mechanism Design (0.5 lecture)
- 3. Midterm 1 (in class, on May 21st)
- 4. Matching (second week)
 - a. Two-Sided Matching (1 lecture)
 - b. Two-Sided Applications (0.75 lectures)
 - c. One-Sided Matching, Kidney Exchange (0.75 lectures)
 - d. School Choice (1 lecture)
- 5. Midterm 2 (in class, on May 25th)
- 6. Auctions (third week)
 - a. Auction Theory (1.5 lectures)
 - b. Auction Design (1 lecture)
 - c. Common-Value Auctions (0.5 lecture)
 - d. Multi-Item Auctions (1 lecture)
 - e. Sponsored Search Auctions (1 lecture)
 - f. Financial Exchanges (0.5 lecture)
- 7. Platforms (0.5 lecture, if time permits)
- 8. Final Exam (June 1st)

Detailed Course Outline with topics:

1. Overview of the class. *Topics:* syllabus, overview of the content, introduction into game theory and market design

Game Theory:

- 2. Static Games. *Topics:* static games, dominant strategies, Nash Equilibrium
- 3. Dynamic Games. *Topics:* dynamic games, subgame perfect equilibrium and backward induction
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The Boston Public School Match by Atila A Alvin Roth and Tayfun Sonmez (2005)

Auctions:

9. Introduction to Auction Theory. *Topics:* private value model, first and second price sealed bid auctions, all pay auctions, ascending auctions, the revenue equivalence theorem, eBay auctions - equivalence and nonequivalence to the second-price auction

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13. Sponsored Search Auctions. *Topics:* the sponsored search market, G advertising auction, bidding incentives and equilibria, other

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Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. In this class, please see me at least two weeks prior to any conflicts due to religious observances. See the <u>campus policy regarding religious observances</u> for full details.

Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alterna2(r)4(p)-3(r)4(o)-8(fessor)6(.)]TJE (