Economics 4050-001	Market Design	Spring 2017

Oleg Baranov
Assistant Professor
Department of Economics

Office: ECON 14C
Voice: 303.492.7869
Email: oleg.baranov@colorado.edu
Website: www.obaranov.com

Location: ECON 119
Meeting Times: TTH 9:30-10:45
Office Hours: TTH 3:00 – 4:00
(or by appointment)

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

Course Description:

Economists are increasingly involved not just in studying but in designing practical market mechanisms. These include auctions to sell diamonds, timber, electricity, procurement contracts and radio spectrum; matching algorithms to assign students to schools, or candidates to jobs; as well as marketplaces and mechanisms to sell internet advertising, trade financial securities, or reward innovation. The field of market design studies how to construct rules for allocating resources or to structure successful marketplaces. It

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.

A book “ ” by is a very famous book suitable for the Game Theory part of the class.

A book “ ” by 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 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 theoretical arguments in every class.

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

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

A student can miss two classes without excuse. After that, any unauthorized missed classes will be reflected in the course grade. 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.

Feel free to form study groups to review and discuss lecture/reading materials, and homework assignments but you must submit individual work for grading (Note: if you work on assignments as part of a study group, please list the names of all members on the front page of your submitted assignment).

Tentative Course Outline:

1. Game Theory (weeks 1-4)
2. Midterm 1 (in class, tentatively on Feb 16th)
3. Matching (weeks 5 - 9)
4. Midterm 2 (in class, tentatively on Mar 16th)
5. Spring Break (week 11)
6. Auctions (weeks 12- 14)
7. Platforms (weeks 14-16, if time permits)
8. Final Exam (May 10th, 1:30 pm)

Detailed Course Outline with topics:

1. Overview of the class

   syllabus, overview of the content, introduction into game theory and market design

Game Theory:

2. Static Games

   static games, dominant strategies, Nash Equilibrium

3. Dynamic Games

   dynamic games, subgame perfect equilibrium and backward induction

4. Incomplete Information

   simple games with incomplete information, concept of Bayesian Nash equilibrium, simple auction games

Matching:

5. Introduction to Matching Markets

   "marriage market" and one-to-one matching, stable matches, the Deferred Acceptance algorithm, existence result, optimal matches for both sides of the market, incentives of participants, "roommate problem", nonexistence result, redefinition of the stability for the "roommate problem" and existence result.

“College Admissions and the Stability of Marriage” by David Gale and Lloyd Shapley (1962)

6. Stable Matching and Orderly Markets

stable matchings and orderly markets, the problem of market unravelling, case study: medical residents and the NRMP, medical fellowships, law clerks, college admission

“What Have We Learned from Market Design” by Alvin Roth (2008)

“The Re-Design of the Matching Market for American Physicians: Some Engineering Aspects of Economic Design” by Alvin Roth and Elliott Peranson (1999)

7. House Allocation and Kidney Exchange

the House Allocation Problem, efficient outcomes and the core, serial dictatorship, the top trading cycles algorithm and its variations, kidney exchanges

"A Kidney Exchange Clearinghouse in New England" by Alvin Roth, Tayfun Sonmez and Utku Unver (2005)

“Kidney Exchange: A Life-Saving Application of Matching Theory” (2005)

8. School Choice

School Choice Problem, the Boston algorithm and its incentives, deferred acceptance and top trading cycles as alternatives, problem of ties, case studies: NYC and Boston

“The New York City High School Match” by Atila Abdulkadiroğlu, Parag Pathak and Alvin Roth (2005)

“The Boston Public School Match” by Atila Abdulkadiroğlu, Parag Pathak, Alvin Roth and Tayfun Sonmez (2005)

“School Choice” by Joseph Malkevitch

Auctions:

9. Introduction to Auction Theory

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

“The Bidding Game” National Academy of Sciences Beyond Discovery Report (2003)

10. Designing Good Auctions

how to design an auction, facilitating entry, reserve prices, bidder subsidies, collusive bidding, optimal auction design

"What Really Matters in Auction Design" by Paul Klemperer (2002)

11. Penny Auctions (???)

Topics: case study: QuiBids, LazyBids

12. Common Value Auctions

common value model, the winner’s curse, examples and applications, aggregation of information, application to oil lease auctions

"An Empirical Study of an Auction with Asymmetric Information" by Ken Hendricks and Robert Porter (1988)

“Anomalies: The Winner’s Curse” by Richard Thaler (1988)

13. Financial Markets and High-Frequency Trading

    Topics: electronic markets for trading equity and other financial securities, the use of auctions for IPOs, real-time trading and market clearing, competition between exchanges

    "Concept Release on Market Structure" by SEC (2010)

    "The High-Frequency Trading Arms Race: Frequent Batch Auctions as a Market Design Response" by Eric Budish, Peter Cramtom and John Shim

14. Multi-Unit Auctions

    multi-unit auctions, uniform price, pay-as-bid price (discriminatory), demand reduction, Vickrey pricing and efficient auction design, case study: treasury auctions

15. Sponsored Search Auctions

    the sponsored search market, Google's advertising auction, bidding incentives and equilibria, other ways to run the auction, Facebook's Vickrey auction, optimal design in search auctions (Yahoo case study)

    "The Economics of Internet Search" by Hal Varian (2007)

    "Online Advertising: Heterogeneity and Conflation in Market Design" by Jonathan Levin and Paul Milgrom (2010)

16. Large-Scale Auctions for Radio Spectrum

    auctions to award property rights for radio spectrum, design of FCC auctions, evidence from US and Europe

"Winning Play in Spectrum Auctions" by Jeremy Bulow, Jonathan Levin and Paul Milgrom

"The Biggest Auction Ever: The Sale of the British 3G Telecom Licenses" by Ken Binmore and Paul Klemperer

17. Combinatorial Auctions

Topics: complementarities, auction design issues, winner determination problem, pricing rules, case studies: airport slot auction FAA, truckload auctions.

"Spectrum Auction Design" by Peter Cramton

Platforms: (if time permits)

18. Introduction to the Economics of Platforms

designing platforms for exchange, network effects, optimal pricing by the platform owner, competition between platforms for users, market tipping

“The Economics of Internet Markets” by Jonathan Levin

“The Industrial Organization of Markets with Two-Sided Platforms” by David Evans and Richard Schmalensee

“The Singularity is Not Near: Slowing Growth of Wikipedia” by Suh et al.

19. Internet Commerce Markets

Topics: creating internet markets for e-commerce, eBay and internet auctions, reputation systems, Amazon and internet retail, search and sales mechanisms

"Sales Mechanisms in Online Markets: What Happened to Internet Auctions?" by Liran Einav, Chiara Farronato, Jonathan Levin and Neel Sundaresan

"Engineering Trust: Strategic Behavior and the Production of Reputation Information" by Gary Bolton, Ben Greiner and Axel Ockenfels

20.

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 campus policy regarding religious observances for full details.

If you qualify for accommodations because of a disability, please submit to your professor a letter from Disability Services in a timely manner (for exam accommodations provide your letter at least one week prior to the exam) so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities. Contact Disability Services at 303-492-8671 or by email at dsinfo@colorado.edu. If you have a temporary medical condition or injury, see Temporary Injuries guidelines under the Quick Links at the Disability Services website and discuss your needs with your professor.

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 differences of race, color, culture, religion, creed, politics, veteran's status, sexual orientation, gender, gender identity and gender expression, age, disability, and nationalities. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. For more information, see the policies on classroom behavior and the student code.