

Market Design

Module 2, 2024/2025

Sergei Izmalkov
Professor, New Economic School
sizmalkov@nes.ru

Course information

Course Website: at my.nes.ru

Instructor's Office Hours: TBA (after class) and by appointment

Class Time: TBA

Room Number: 247 Beta (online)

TAs: Alexander Tonis

Course description

How do economic agents interact with each other? The rules of games people play can be designed so that outcomes satisfy desired properties. Markets and marketplaces can be designed as well. In class, we would study in detail several main components of the mechanism and market designer toolbox: taking care of incentive constraints (auctions are leading examples), generating value from heterogeneous preferences via matching, and communicating appropriate information to shape incentives and outcomes. We would apply these components for analysis of real-life markets and phenomena in variety of shapes and forms, with a particular emphasis on modern online platforms.

Course requirements, grading, and attendance policies

There will be:

- 4+ homeworks, combined worth 40% of the grade;
- an extensive small group (3-4 people) project, worth 20%;
- and a final exam worth 40% of the grade.

Often, you will be asked to read certain materials before the lecture.

Course contents

The course has four main broad topics

1. Auctions

- single-unit and multi-unit auctions, double auctions
- revenue and payoff-equivalence
- risk-aversion, budget-constraints, and other difficulties
- practical design
- collusion

2. Matching

- one-sided and two-sided
- one-to-one, many-to-many
- school-choice problems
- with contracts and transfers

3. Platforms/ Online markets

- two-sided markets: pricing, access
- many-sided markets
- competition among platforms
- online platforms as intermediaries
- online advertisement
- crowdfunding

4. Product/ Information Design (applications, extra topics)

- bundling, lotteries
- persuasion
- selling information/ experiments
- recommender systems

There could be extra specific topics broadly related to the course (e.g. on matching, implementation, estimation)

Sample tasks for course evaluation

Solve for an equilibrium of a particular auction format (find players' strategies, compute expected revenue to the seller).

Decide whether a particular matching algorithm is stable under given conditions? Offer a better alternative, if not.

Find the optimal pricing and access policy for the platform.

Find the optimal disclosure policy for the seller of a certain product.

Course materials

Required textbooks and materials

Roth, Alvin E., and Robert B. Wilson. (2019.) "How Market Design Emerged from Game Theory: A Mutual Interview." *Journal of Economic Perspectives*, 33 (3): 118-43.

Roth, A. E. (2008). "What have we learned from market design?" *Innovations: Technology, Governance, Globalization*, 3(1), 119-147.

Rochet, J. C., & Tirole, J. (2006). "Two-sided markets: a progress report." *The RAND journal of economics*, 37(3), 645-667.

Klemperer, P. (2004). *Auctions: theory and practice*. Princeton University Press. (available online at <http://www.paulklemperer.org/>)

Roth, A. E. (2002), "The Economist as Engineer: Game Theory, Experimental Economics and Computation as Tools of Design Economics." *Econometrica*, vol. 70 (4), pp. 1341-1378.

Additional materials

Krishna, V. (2009). *Auction theory*. Academic press.

Milgrom, P., & Milgrom, P. R. (2004). *Putting auction theory to work*. Cambridge University Press.

Abdulkadiroğlu, A., & Şunmez, T. (2003). School choice: A mechanism design approach. *American economic review*, 93(3), 729-747.

Aoyagi, M. (2003). Bid rotation and collusion in repeated auctions. *Journal of economic Theory*, 112(1), 79-105.

Armstrong, M. (2006). Competition in two-sided markets. *The RAND Journal of Economics*, 37(3), 668-691.

Asker, J. (2010). A study of the internal organization of a bidding cartel. *American Economic Review*, 100(3), 724-62.

Athey, S., & Ellison, G. (2011). Position auctions with consumer search. *The Quarterly Journal of Economics*, 126(3), 1213-1270.

Ausubel, L. M. (2004). An efficient ascending-bid auction for multiple objects. *American Economic Review*, 94(5), 1452-1475.

Ausubel, L. M., & Milgrom, P. R. (2002). Ascending auctions with package bidding. *The BE Journal of Theoretical Economics*, 1(1). Bergemann, D., Bonatti, A., & Smolin, A. (2018). "The design and price of information." *American Economic Review*, 108(1), 1-48.

Azevedo, E. M., & Leshno, J. D. (2016). "A supply and demand framework for two-sided matching markets." *Journal of Political Economy*, 124(5), 1235-1268.

Battaglini, M. (2002). Multiple referrals and multidimensional cheap talk. *Econometrica*, 70(4),

Bergemann, D., Bonatti, A., & Smolin, A. (2018). "The design and price of information." *American Economic Review*, 108(1), 1-48.

Bergemann, D., & Morris, S. (2016). Information design, Bayesian persuasion, and Bayes correlated equilibrium. *American Economic Review*, 106(5), 586-91.

Bulow, J., & Roberts, J. (1989). "The simple economics of optimal auctions." *Journal of political economy*, 97(5), 1060-1090.

Crawford, V. P., & Sobel, J. (1982). Strategic information transmission. *Econometrica: Journal of the Econometric Society*, 1431-1451.

Courty, P., & Hao, L. (2000). Sequential screening. *The Review of Economic Studies*, 67(4), 697-717.

Edelman, B., Ostrovsky, M., & Schwarz, M. (2007). "Internet advertising and the generalized second-price auction: Selling billions of dollars worth of keywords." *American Economic Review*, 97(1), 242-259.

Gale, D. & L. S. Shapley (1962). "College Admissions and the Stability of Marriage," *The American Mathematical Monthly*, 69:1, 9-15

Garratt, R. J., Truger, T., & Zheng, C. Z. (2009). Collusion via resale. *Econometrica*, 77(4), 1095-1136.

Hatfield, J. W., & Milgrom, P. R. (2005). Matching with contracts. *American Economic Review*, 95(4), 913-935.

Horner, J., & Skrzypacz, A. (2016). Selling information. *Journal of Political Economy*, 124(6), 1515-1562.

Izmalkov, S., Lepinski, M., & Micali, S. (2011). Perfect implementation. *Games and Economic Behavior*, 71(1), 121-140.

Jeziorski, P., & Segal, I. (2015). What makes them click: Empirical analysis of consumer demand for search advertising. *American Economic Journal: Microeconomics*, 7(3), 24-53.

Kamenica, E., & Gentzkow, M. (2011). "Bayesian persuasion." *American Economic Review*, 101(6), 2590-2615.

Kelso Jr, A. S., & Crawford, V. P. (1982). "Job matching, coalition formation, and gross substitutes." *Econometrica: Journal of the Econometric Society*, 1483-1504.

Lucking-Reiley, D. (1999). Using field experiments to test equivalence between auction formats: Magic on the Internet. *American Economic Review*, 89(5), 1063-1080.

McAfee, R. P., & McMillan, J. (1992). Bidding rings. *The American Economic Review*, 579-599.

- Milgrom, P. (2007). Package auctions and exchanges. *Econometrica*, 75(4), 935-965.
- Myerson, R. B. (1981). Optimal auction design. *Mathematics of operations research*, 6(1), 58-73.
- Ostrovsky, M. (2008). Stability in supply chain networks. *American Economic Review*, 98(3), 897-923.
- Ottaviani, M., & Sorensen, P. N. (2006). Reputational cheap talk. *The Rand journal of economics*, 37(1), 155-175.
- Porter, R. H. (2005). "Detecting collusion." *Review of Industrial Organization*, 26(2), 147-167.
- Riley, J. G., & Samuelson, W. F. (1981). Optimal auctions. *The American Economic Review*, 71(3), 381-392.
- Rysman, M. (2009). The economics of two-sided markets. *Journal of economic perspectives*, 23(3), 125-43.
- Shapley, L., & Scarf, H. (1974). On cores and indivisibility. *Journal of mathematical economics*, 1(1), 23-37.
- Sobel, J. (2013). Giving and receiving advice. *Advances in economics and econometrics*, 1, 305-341.
- Strausz, R. (2017). "A theory of crowdfunding: A mechanism design approach with demand uncertainty and moral hazard." *American Economic Review*, 107(6), 1430-76.
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- Weyl, E. G. (2010). A price theory of multi-sided platforms. *American Economic Review*, 100(4), 1642-72.
- Wilson, R. (2002). "Architecture of power markets." *Econometrica*, 70(4), 1299-1340.

Academic integrity policy

Cheating, plagiarism, and any other violations of academic ethics at NES are not tolerated and will be punished. This includes self-plagiarism: students cannot submit projects that are identical to or with minor modifications of those submitted for other courses. Major modifications might be allowed but must receive an explicit approval from the professor before submitting. Failure to declare overlap or submitting projects with high similarities to existing works will result in severe punishment. Students must adhere to these regulations as part of the NES Honor code. Course projects are subject to random plagiarism checks.