

# Advanced Economic Theory: Market Design (ECON6121E)

Department of Economics, HKUST

## 1 General Information:

- Classroom: LSK 2007
- Lecture Time: Fridays, 9:00 a.m.–12:50 p.m.
- Instructor: Prof. Jinwoo Kim; Office: LSK 6007
- Contact Information: jinwookim@hst.hk
- Office hour: Thursdays, 2:00–3:00 p.m.

## 2 Course Description

In this course, we will study the theory of market design, focusing on the (centralized) matching theory. We will investigate how the design of matching market in various environments affects the incentives and behaviors of participating agents and how fair or efficient the resulting outcomes will be. The course mainly consists of two subjects, matching without transfers and matching with transfers, though the two subjects are related. Specifically, we shall discuss matching of agents on one side with agents on the other and matching of agents to indivisible resources/positions, and apply the theories to problems of house allocation, centralized labor market matching, school choice, and so on.

Toward the end of the semester, there will be student presentations in which each student should present at least one paper.

## 3 Intended Learning Outcomes

Upon successful completion of this course, students will be able to:

- Understand the foundational models and solution concepts in matching theory, including matching without transfers and matching with transfers.
- Analyze the incentive, efficiency, and fairness properties of key market design mechanisms used in centralized matching markets.
- Apply matching theory to canonical market design problems such as house allocation, school choice, and labor market matching.

- Critically read, interpret, and present advanced research papers in market design and matching theory.
- Develop the ability to evaluate and compare alternative market designs from a theoretical perspective.

## 4 Assessment Scheme

### 4.1 Assessment Weightings

- Single exam (to be given during the final exam period), 30 %
- 3 Problem sets, 20 %
- Presentation: Papers with # mark in the Reading Material listed below. (to be expanded as the class progresses), 50 %

### 4.2 Grading and Exam Policy

- No make-up exams will be provided.
- Requests for grade corrections must be submitted within one week of score announcement.

### 4.3 Grading Rubrics

- Excellent Performance (A range): Demonstrates a deep understanding of the course materials and applies them very effectively to problem solving. Presents assigned papers clearly and insightfully, and contributes thoughtful, critical discussion.
- Good Performance (B+, B): Shows a solid grasp of the course materials and applies them well to problem solving. Presents assigned papers clearly and participates actively in discussion.
- Marginal Performance (B?, C+, C): Has basic knowledge of the course materials and applies them at a minimal level. Presents assigned papers at a basic level and participates only minimally in discussion.
- Fail: Demonstrates no understanding of the course materials and cannot apply them to problem solving. Fails to present assigned papers adequately or engage in discussion.

## 5 Course Policies

### 5.1 Academic Honesty and Integrity

Students are expected to adhere to the University's policies on academic honesty. Any form of plagiarism, cheating, or academic misconduct will be handled according to HKUST regulations.

### 5.2 Use of AI and Generative AI Tools

The use of AI or generative AI tools is permitted only to the extent explicitly allowed by the instructor. Students are responsible for ensuring that all submitted work reflects their own understanding and complies with academic integrity standards.

## 6 Useful Readings

- Roth, A., and Sotomayor, M., *Two-sided Matching: A Study in Game-theoretic Modeling and Analysis*, Econometric Society Monographs, 1990.
- Abdulkadiroğlu, A. and Şonmez, T., “Matching Markets: Theory and Practice,” Econometric Society 10th World Congress, in *Advances in Economics and Econometrics*, edited by Acemoglu, Arellano, and Dekel, 2013.
- Kojima, K., “Recent Developments in Matching Theory and Their Practical Applications,” Econometric Society 11th World Congress, in *Advances in Economics and Econometrics*, edited by Bo Honoré, Ariel Pakes, Monika Piazzesi, Larry Samuelson, forthcoming.
- Pathak, K., “What Really Matters in Designing School Choice Mechanisms,” Econometric Society 11th World Congress, in *Advances in Economics and Econometrics*, edited by Bo Honoré, Ariel Pakes, Monika Piazzesi, Larry Samuelson, forthcoming.
- Scientific Background on the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2012, “Stable Allocations and the Practice of Market Design,” compiled by The Economic Sciences Prize Committee of the Royal Swedish Academy of Sciences.

# References

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- Hatfield, J., and Kominers, S., (2012), “Matching in Networks with Bilateral Contracts,” *American Economic Journal: Microeconomics*, 4, 176–208.
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- Roth, A.E., (1991), “A Natural Experiment in the Organization of Entry-Level Markets: Regional Markets for New Physicians and Surgeons in the United Kingdom,” *American Economic Review*, 81, 415–440.
- Roth, A. E., and Peranson E., (1999), “The Redesign of the Matching Market for American Physicians: Some Engineering Aspects of Economic Design,” *American Economic Review*, 89, 748–780.
- Roth and Sotomayor, Chapters 2–4.
- Roth and Sotomayor, Chapter 5.

- Şonmez, T., and Switzer, T., (2013), “Matching with (Branch-of-Choice) Contracts at the United States Military Academy,” *Econometrica*, 81, 451–488.

## 2. Matching/Assignment with Transfers

- Athey, S., and Ellison, G., (2011), “Position Auctions with Consumer Search,” *Quarterly Journal of Economics*, 126, 1213–1270.
- Burdett, K., and Coles, M., (1997), “Marriage and Class,” *Quarterly Journal of Economics*, 112, 141–168.
- Che, Y.-K., Choi, S., and Kim, J., (2017), “An Experimental Study of Sponsored Search Auctions,” *Games and Economic Behavior*, 102, 20–43.
- Chiappori, P.-A., Iyigun, M., and Weiss, Y., (2009), “Investment in Schooling and the Marriage Market,” *American Economic Review*, 99, 1689–1713.
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- # Qingmin, L., (2020), “Stability and Bayesian Consistency in Two-Sided Markets,” *American Economic Review*, 110, 2625–2666.
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- Roth and Sotomayor, Chapters 7–8.
- Shapley, L. S., and Shubik, M., (1971), “The Assignment Game I: The Core,” *International Journal of Game Theory*, 1, 111–130.
- Varian, H., (2007), “Position Auctions,” *International Journal of Industrial Organization*, 25, 1163–1178.

### 3. Assignment of Agents to Objects (without Transfers)

- Abdulkadiroğlu, A., and Şönmez, T., (1999), “House Allocation with Existing Tenants,” *Journal of Economic Theory*, 88, 233–260.
- # Budish, E., (2011), “The Combinatorial Assignment Problem: Approximate Competitive Equilibrium from Equal Incomes,” *Journal of Political Economy*, 119, 1061–1103.
- Che, Y.-K., Kim, J., and Kojima, F., (2015), “Efficient Assignment with Interdependent Values,” *Journal of Economic Theory*, 158, 54–86.
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- # Pycia, M., and Troyan, P., (2025), “The Random Priority Mechanism is Uniquely Simple, Efficient, and Fair,” working paper.
- # Root, J., and Ahn, D., (2025), “Incentives and Efficiency in Constrained Allocation Mechanisms,” working paper.

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- Roth, A. E., Sönmez, T., and Ünver, M. U., (2005), “A Kidney Exchange Clearinghouse in New England,” *American Economic Review P&P*, 95, 376–380.
- Roth, A. E., Sönmez, T., and Ünver, M. U., (2005), Pairwise Kidney Exchange. *Journal of Economic Theory*, 125, 151–188.
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#### 4. Random Assignment Mechanisms (without Transfers)

- Abdulkadiroğlu, A., and Sönmez, T., (1998), “Random Serial Dictatorship and the Core from Random Endowments in House Allocation Problems,” *Econometrica*, 66, 689–701.
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## 5. School Choice and Other Applications

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- # Sönmez, T., and Yenmez, M. B., (2022), “Affirmative Action in India via Vertical, Horizontal, and Overlapping Reservations,” *Econometrica*, 90, 1143–1176.

## 6. Large Matching Markets

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- Che, Y.-K., Kim, J., and Kojima, F., (2019), “Stable Matching in Large Economies,” *Econometrica*, 87, 65–110.
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## 7. Dynamic Matching Markets

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## 8. Empirical Approaches to Matching and School Choice

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