

**Yonsei University**  
**Summer 2019 Semester**

Theory of Market Design I

**Instructor:** Jinyong Jeong  
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**Class Day/Time:** July 5-6<sup>th</sup>, 8-11<sup>th</sup>: 10AM-1PM / 2PM-5PM  
**Class room:** 335 Daewoo  
**Office Hours:** By appointment (either lunch time or after class) at room 518

**Introduction:** Matching and Market Design is one of the most practical fields in Economics. Matching theory has been developed with real world applications as its core element; school choice, organ exchange, doctor-hospital match, among many others. After we study the theory, we will explore some applications and see how it can be modeled in a matching framework.

**Course Objectives:** During and after this course, students are expected to

1. Study the fundamentals in matching theory.
2. Understand important real world applications in market design.
3. Find a research idea in real world applications.

**Grading**

Attendance and Participation: 20%  
Review paper and idea sharing: 80%  
More details in class.

During the semester (yes, 7days semester), you should meet me at least once to discuss your research idea. You can come to my office before or after class, or you can make an appointment in advance. There's no need for bringing a complete idea. We can brainstorm together, or I can give you a direction to develop your idea. On 11<sup>th</sup>, we will discuss your ideas in class.

## Course Schedule

Date	TOPIC	Contents
July 5	Introduction to matching theory	Economics as a Designer / School choice and Deferred Acceptance mechanism / Properties of DA / One-sided vs. two-sided matching
July 6	One sided Matching/ Properties of matching and mechanism	House allocation and Housing markets/ Good properties vs. optimization approaches in matching problem / Formal definition of matching and mechanism and their properties / Case study: Boston Public School's choice of DA over TTC
July 8	Matching with Contract: Theory and application	Conditions for stable outcome in matching (and matching with contract) model / Cadet Branch Matching
July 9		
July 10	Matching in real world problems	Market Design with Big data, Behavioral Economics, and Experimental Economics: a case study of PittSmartLiving project.
July 11	Matching Problems (in Korea)	Idea sharing and discussions. Prepare a short (5min) presentation! Ask questions, suggest other directions, compare and combine your ideas.

### **School choice:**

Atila Abdulkadiroglu and Tayfun Sönmez (2003) "School Choice: A Mechanism Design Approach" *American Economic Review*, 93, 729-747.

Michel Balinski and Tayfun Sönmez (1999) "A Tale of Two Mechanisms: Student Placement" *Journal of Economic Theory* 84: 73-94, January 1999.

Ergin, H. and Tayfun Sonmez (2006) "Games of School Choice under the Boston Mechanism," *Journal of Public Economics*.

Abdulkadiroglu, Che and Yasuda (2008) "Expanding 'Choice' in School Choice," mimeo.

Atila Abdulkadiroglu, Parag Pathak and Alvin E. Roth "Strategyproofness versus Efficiency in Matching with Indifferences: Redesigning the NYC High School Match," mimeo.

Onur Kesten, "An Alternative Mechanism Design Approach to School Choice in the United States." mimeo

Fuhito Kojima and Mihai Manea (2010), *Axioms for Deferred Acceptance*, *Econometrica*.

Parag Pathak and Tayfun Sonmez, "Leveling the Playing Field: Sincere and Strategic Players in the Boston Mechanism," forthcoming in *American Economic Review*.

### **Matching with couples:**

B. Klaus and F. Klijn (2005): "Stable Matchings and Preferences of Couples," *Journal of Economic Theory*, 121(1), 75-106.

B. Klaus, F. Klijn, T. Nakamura (2007): "Corrigendum: Stable Matchings and Preferences of Couples," *Journal of Economic Theory*.

Fuhito Kojima, "Finding All Stable Matchings with Couples," mimeo

F. Kojima, P.A. Pathak, and Alvin E. Roth (2013), "Matching with Couples: Stability and Incentives," *Quarterly Journal of Economics*

## **Housing markets:**

Ma, J., "Strategy-Proofness and the Strict Core in a Market with Indivisibilities" *International Journal of Game Theory*, 1994(23), 75-83.

Alvin E. Roth (1982) "Incentive compatibility in a market with indivisibilities" *Economics Letters* 9, 127-132.

Lloyd Shapley and Herbert Scarf (1974) "On cores and indivisibility," *Journal of Mathematical Economics* 1, 23-28.

Lars-Gunnar Svensson (1999) "Strategyproof Allocation of Indivisible Goods," *Social Choice and Welfare* 16, 557-567.

Atila Abdulkadiroglu and Tayfun Sönmez (1999) "House Allocation with Existing Tenants" *Journal of Economic Theory*, 88, 233-260.

Chen, Y. and Tayfun Sonmez (2002), "Improving Efficiency of On-Campus Housing: An Experimental Study," *American Economic Review*.

## **Kidney exchange**

Alvin E. Roth, Tayfun Sönmez and M. Utku Ünver (2003) "Kidney Exchange" *Quarterly Journal of Economics*,

Tayfun Sonmez and Utku Unver, "Kidney Exchange with Good Samaritan Donors: A Characterization," mimeo

Alvin E. Roth, Tayfun Sönmez, and M. Utku Ünver (2005) "Pairwise Kidney Exchange," *Journal of Economic Theory*.

Alvin E. Roth, Tayfun Sönmez, and M. Utku Ünver (2005) A Kidney Exchange Clearinghouse in New England. *American Economic Review Papers and Proceedings*, 95(2): 376-380

Alvin E. Roth, Tayfun Sonmez and Utku Unver (2007), "Efficient Kidney Exchange: Coincidence of Wants in Markets with Compatibility-Based Preferences," *American Economic Review*, 97(3): 828-851.

**Random assignment:**

Abdulkadiroglu, A., and T. Sonmez (1998): "Random Serial Dictatorship and the Core from Random Endowments in House Allocation Problems," *Econometrica*, 66, 689

Abdulkadiroglu, A., and T. Sonmez (2003) "Ordinal Efficiency and Dominated Sets of Assignments," *Journal of Economic Theory*, 112, 157--172.

Bogomolnaia, A., and H. Moulin (2001), "A New Solution to the Random Assignment Problem," *Journal of Economic Theory*, 100, 295{328.

E. Budish, Y-K. Che, F. Kojima, and Paul R. Milgrom (2012) "Designing Random Allocation Mechanisms: Theory and Applications" forthcoming, *American Economic Review*.

Kesten, O, "Why Do Popular Mechanisms Lack Efficiency in Random Environments?" mimeo