Economics 2099 – Market Design (= HBS 4150)
Scot Duke Kominers

Logistics

Time. Tuesdays, 16:00–18:45±ε (beginning September 5, 2017).

Location. Northwest Labs B103.

Office Hours.
- By appointment – https://2099-officehours.youcanbook.me/.
- Over dinner – After class each week (if there is interest), there will be an optional, informal “design dinner” in Harvard Square. (Restaurants will be selected via social choice mechanism.)

Course Webpage.

Teaching Assistant.
- Andrei Ciupan (aciupan@hbs.edu).

Overview

Description. This course explores the theory and practice of market design. Key topics include auctions, labor market matching, school choice programs, online markets, organ exchange systems, financial market design, and matching with contracts. The first half of the course will introduce market design and its technology; subsequent weeks will discuss recent papers alongside their classical antecedents.

Quasi-Prerequisites. Courses in microeconomics (Economics 1011a, 1080, and/or 2010a,b) and game theory (Economics 1052, 2052 and/or 2087hf) will provide useful context and technical background. Some understanding of algorithms, complexity, and/or combinatorics (e.g., Computer Science 121, 124, and/or 224, Math 152, and/or Applied Math 107) will at times be useful. Courses at the intersection of economics and computation (e.g., Computer Science 136, 234, and/or 236r) are highly complementary. However, I do not believe in formal prerequisites—these observations are made only for the purpose of guidance.

If you are interested in taking the course and are concerned about the difficulty of the material, please get in touch with me early in (or before) the fall semester. I am inclined to reward individuals for taking risks and stretching themselves.

Requirements. Evaluation will be primarily based upon class participation and discussion. Additionally, each student will prepare a written “research proposal” detailing a novel problem in market design and an approach to a solution. A short proposal summary/plan will be due on October 13, 2017. The final proposal will be due on December 8, 2017 (the last day of Reading Period).

How to Read this Syllabus. “Background” readings will be presented in class. Readings listed as “For Class Discussion” will be discussed intensively, and thus should be read in advance. (I will give specific advance reading guidance.) “Further Reading” references may be touched upon in class sessions, but are mostly provided as suggestions for students who wish to explore in more depth.

Harvard University, Fall 2017.
Topics


*For Class Discussion.*


*Background.*


*Further Reading.*


*For Class Discussion.*


*Background.*


Further Reading.


For Class Discussion.

Background.


Further Reading.


Eric Budish and Judd B. Kessler. Bringing real market participants’ real preferences into the lab: An experiment that changed the course allocation mechanism at Wharton. NBER Working Paper No. 22448, 2016.


School Choice – September 26, 2017. (Featuring Parag Pathak.)

For Class Discussion.


Background.


Further Reading.


For Class Discussion.

Background.


Further Reading.


Internet Markets – October 10, 2017. (Featuring Ben Edelman & Andrey Fradkin.)

For Class Discussion.


Background.


Further Reading.


Auction Theory – October 17, 2017. (Featuring Shengwu Li.)

For Class Discussion.


Background.


**Further Reading.**


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**The US Spectrum Incentive Auction – October 24, 2017.**

(Featuring Nazar Batih and Mariko Cantley.)

**For Class Discussion.**


**Background.**

FCC Staff. The broadcast television spectrum incentive auction: Innovation in policy to ignite innovation for consumers and business, 2013.


Further Reading.


Organ Allocation – October 31, 2017. (Featuring Carmen Wang.)

For Class Discussion.


Background.


Further Reading.


*(Featuring Natalia Rigol and Ilya Vidrin.)*

*Readings to be announced.*


*For Class Discussion.*


*Background.*


Further Reading.


(Featuring Ravi Jagadeesan, Nikhil Naik, David Parkes, Ben Roth, & Utku Ünver.)

Readings to be announced.

Student Talks/Course Wrap – November 28, 2017.

Readings to be announced.

General References

**Matching.**


**Auctions.**


Market Design.


Related Areas

Matching in Trading Networks.


Search/Decentralized Matching.


Mechanism Design.


Algorithmic Game Theory.


Miscellany

Food for Thought.


A Useful Book.

Interesting Properties of the Course Number(s).

- The course number is a “safe prime” – that is, 2099 is prime and \((2099 - 1)/2 = 1049\) is also prime.
- The binary representation of the course number \((100000110011)\) is also the decimal representation of a prime.
- The course number is the smallest prime that is the sum of 29 consecutive primes \((2099 = 13 + 17 + \cdots + 139)\).
- The course number is in the four-step Fibonacci sequence starting with 0, 1, 1, and 1.
- Assuming no changes in our calendar system, the year 2099 will have exactly three “Fridays the Thirteenth.”
- The HBS cross-listing number is the first “5-powerful number” – that is, 4150 is the smallest number that is the sum of the fifth powers of its digits \((4150 = 1024 + 1 + 3125 + 0 = 4^5 + 1^5 + 5^5 + 0^5)\).
- The HBS cross-listing number is the smallest integer \(k\) such that \(\frac{50!+k}{50}\) is prime.
- The HBS cross-listing number is a Rothian number.
- The HBS cross-listing number satisfies a Spironacci-style recurrence.

QED