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

Logistics

Time. Tuesdays, 15:00–17:45+ε (beginning September 4, 2018).

Location. Harvard Hall 104.

Office Hours.
• In clusters – Wednesdays 11:00–11:50 in Littauer 309, except as otherwise specified.
• By appointment – https://2099-officehours.youcanbook.me/.
• Over dinner – After class each week, there will be an optional, informal “design dinner” in Harvard Square. (Restaurants will be selected via social choice mechanism.)

Course Webpage.

Teaching Assistants.
• Ravi Jagadeesan (ravi.jagadeesan@gmail.com).
• Erica Moszkowski (emoszkowski@g.harvard.edu).

Course E-mail Address.
• econ2099@gmail.com.

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 see enrollment information below and then get in touch early in (or before) the fall semester. I am inclined to reward individuals for taking risks and stretching themselves.

Harvard University, Fall 2018.
**Enrollment.** GSAS and HBS doctoral students may enroll directly; students in other programs and schools require permission of the instructor. Permission will be granted automatically to anyone who has taken at least one graduate-level economic theory course (Economics 20**), a course on economics and computation (e.g., Computer Science 136, 234, or 236r), or at least one graduate-level Mathematics course. All other students will need to file a brief application (at [https://tinyurl.com/2099app/](https://tinyurl.com/2099app/)) detailing their backgrounds and reasons for wanting to enroll. There will be two deadline tranches: Thursday, September 6, at 05:00; and Monday, September 10, at 02:00.

**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 17, 2018. The final proposal will be due on December 10, 2018 (the last day of Reading Period).

**Section.** There will be an optional discussion section each week that will conduct a deep dive into either a paper discussed briefly in class or a related paper with complementary material.

**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.

**Topics**

**Introduction/Overview – September 4, 2018.**

*For Class Discussion.*


*Background.*


*Further Reading.*


For Class Discussion.


Background.


Georgy Artemov, Yeon-Koo Che, and Yinghua He. Strategic ‘mistakes’: Implications for market design research. 2017.

Further Reading.


Food Supply, Scrip, and Pseudo-Markets – September 18, 2018. (Featuring Erica Moszkowski.)

For Class Discussion.


Scott Duke Kominers and Alan Lam. Feeding America (A) and (B). Harvard Business School Case 818-130 and Supplement 818-131, 2018.
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.


For Class Discussion.


Background.


**Further Reading.**


(Featuring Ravi Jagadeesan.)
For Class Discussion.


**Background.**


**Further Reading.**


---

**Markets for Intellectual Property – October 9, 2018.**

*For Class Discussion.*


**Background.**


**Further Reading.**


---

**Auction Theory – October 16, 2018.**

*(Featuring Shengwu Li.)*

*For Class Discussion.*


*Background.*


*Further Reading.*


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.


For Class Discussion.


Background.


Further Reading.


**Finance, Cryptocurrency, and Blockchain – November 6, 2018.**

*Readings to be announced.*

**Inequality and Urban Issues – November 13, 2018.**

(Featuring Edward L. Glaeser.)

*Readings to be announced.*

**New Horizons – November 20, 2018.**

(Featuring Zoë Cullen, Andrey Fradkin, David Parkes, M. Utku Ünver, and Kate Vredenburgh.)

*Readings to be announced.*

**Refugees, Immigration, and Economic Development – November 27, 2018.**

(Featuring Benjamin Roth.)

*For Class Discussion.*

Reshmann Hussam, Natalia Rigol, and Benjamin Roth. Targeting high ability entrepreneurs using community information: Mechanism design in the field. 2017.

*Background.*


Further Reading.


**Student Talks/Course Wrap – December 4, 2018.**

*For Class Discussion.*


**General References**

**Matching.**


**Auctions.**


Market Design.


Related Areas

Search/Decentralized Matching.


Mechanism Design.


Algorithmic Game Theory.


Privacy.


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 (1000000110011) 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.
- The course number is the least number having exactly 37 representations in the form \(ab + ac + bc\) with \(0 < a < b < c\).
- 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