The course covers Market Design, the analysis and engineering of market rules and institutions. In the last 60 years practitioners and academics have deliberately engineered the rules of an increasing number of markets, with classic examples including medical resident matching (e.g., NRMP), spectrum auctions (e.g., FCC auctions), and organ donation exchanges. In the last few years, very large markets have been created from scratch, such as Ebay, Adwords, and many smaller markets like odesk.com and sittercity.com. These designs use a broad set of tools, including economic theory, empirical analysis and experiments (and a fair dose of trial-and-error). With this experience, useful principles have emerged, on what market failures typically have to be addressed, and on which rules work and which do not.

Course Objectives and Structure.
The goal of the course is to prepare students to do cutting edge research, and solve industry and policy problems in market design. As such, more than 70% of the course covers recent papers and empirical work. This reflects my view that many of the opportunities for high-impact research are in empirical work and investigating new markets. Because of the broad methodological scope of the field, the course takes a top-down perspective. You will learn, in the context of applications, the main tools of auction theory, matching theory, and experimental economics, but this is not a comprehensive review of these areas. If you want to, e.g., specialize in matching theory, Professor Mailath’s course is a much better choice. What the course will offer is a good grasp of the tools and insights of market design, to navigate the large amount of information and methodologies used in the field, and a sense of what the key open problems are.

The course is structured in three parts. The first two parts cover classic applications, key ideas, and theoretical and empirical tools. Part I focuses on matching markets. While discussing engineering aspects of several markets, we will get an overview of matching theory, and the key market failures observed due to ill-designed rules. Part II covers auction markets, with applications including spectrum auctions and bidding rings. We will cover the most important points in auction theory, and empirical methods in auctions. Part III applies the tools developed in the first lectures to problems in the research frontier. Lectures in part III will involve guest speakers from industry and academia, and students in the course. Speakers for Spring 2014 include David Reiley from Google, Nikhil Agarwal from MIT Economics, Aaron Roth from UPenn CS, Michael Bailey from Facebook, and John Horton from NYU Stern IOMS and oDesk.com.

Lectures: Schedule and readings are listed below. You are responsible for readings with an *. Five papers have a *** mark, and I highly recommend reading them.
Grading: Students will be graded on class presentations of the papers in part III of the course. We will cover the necessary theory and statistics, so there are no requirements. PhD students in Economics, Operations, Computer Science, Marketing and related areas are welcome.

Course Outline and Readings

Week 1. Overview and Critiques of Market Design

- (*) Roth, Alvin E. "The economist as engineer: Game theory, experimentation, and computation as tools for design economics." *Econometrica* 70.4 (2002): 1341-1378.

Part I: “Design” Market Failures and Matching Markets

Week 2. Matching Markets
*The Evolution of the Medical Match:*


Matching Theory:


Week 3. Classic Market Failures in Market Design
*Unraveling: law clerks, associates, medical residents, college bowls:*


**Congestion:** clinical psychologists, AEA, online dating:

**Week 4. Market Failures due to Strategic Complexity (i.e., Rules that are Easy to Game)**

**School choice reforms:**

**Strategyproofness, Wilson doctrine, Strategyproofness in the large:**

**Part II: Auction Design**

**Week 5. Auctions, theory and practice.**

*Spectrum Auctions:*

*Mechanism Design and Auction Theory:*

**Week 6. Econometric Analysis of Auctions**

*Theory:*

*Collusion, comparison of auction formats, combinatorial auctions, online auctions:*


Part III: Current Research Topics, Policy and Industry Applications

Week 7. Wharton’s Course Match / Combinatorial Procurement Auctions

Week 8. FCC Repackaging Auction / Medicare Auction
• http://www.fcc.gov/incentiveauctions
• (*) Cramton, Peter, Sean Ellermeyer, and Brett E. Katzman. "Designed to Fail: The Medicare Auction for Durable Medical Equipment." University of Maryland(2011).

Week 9. Sponsored Search
Week 10.  Organ Donation Exchanges

Week 11.  Financial Markets
High Frequency Trading:
• http://www.nanex.net/flashcrash/ongoingresearch.html

Centralized and Decentralized Markets:
• Zhu, Haoxiang. "Do dark pools harm price discovery?." Available at SSRN 1712173 (2012).

CDS Auctions:

Week 12.  Reputation Systems / Antitrust of the Medical Match

Week 13.  Healthcare Exchanges