Course Description:
This course focuses on recent developments in quantitative marketing and empirical industrial organization, with an emphasis on dynamic structural models. We will study techniques for developing and estimating models of demand and competition in both static and dynamic settings. In these types of models, an economic agent’s decision today can have an impact on how he and other players make their decisions in the future. In many situations, economic agents recognize this relationship and make strategic choices. Examples of dynamic demand models include consumer learning models, inventory and stockpiling problems, durable goods adoption and replacement decisions. Examples of dynamic competition models include dynamic price competition, entry-exit, store location and product positioning. We will emphasize the importance of combining theory, institutional details and econometric techniques to answer these types of questions in marketing, industrial organization and other applied microeconomics areas. By discussing several empirical applications in detail, we will illustrate how to apply basic modeling techniques to problems at hand. There is no text. The course will be a mixture of lecture notes and discussion of specific papers.

Meetings:
In each class, I will also assign several papers to students to read, typically oriented around a particular topic, estimation or modeling approach. I will give lectures in some classes. But in other classes, if you are assigned to read one paper (or more than one occasionally) carefully, you will be responsible for making a comprehensive presentation to the class about it and leading a discussion of the paper’s strengths, weaknesses, and opportunities for future research. Please note that attendance at all class sessions is a course requirement.

Each student presentation of an assigned paper should provide:
- An analysis of what the research has accomplished its contribution, and a clear explanation of any potentially confusing aspects. At this time the key modeling elements and empirical results of the paper should be reviewed and evaluated.
- A careful critique of the research, including a discussion of the paper's major strengths and weaknesses.
- An agenda for future research in the problem area.

So you essentially need to prepare a detailed referee report when you are assigned to read a paper carefully. Students who audit the course will also be assigned readings and be responsible for presenting.
Term Project

Students who take this class for credits are required to complete a term project. It should develop a clear research question(s), and at least an empirical modeling framework that can be used to answer the research question(s). Ideally, it should also include data analysis. The empirical framework needs to be at the advanced level, either the ones that we covered in the class, or those at the similar level of sophistication. A research topic needs to be determined by the 4th week of the classes. Ideally, preliminary data analysis should be conducted by the 4th week of the class as you explore the feasibility of research questions. By the 5th week of the classes, you should determine your research question(s), and give a presentation on your progress. By the 8-9th week of the classes, you should develop the basic empirical framework for your paper. For the rest of the course, you should fine tune your model, and implement it to the data. The deadline of submitting the term project is Dec 13 (if students have many final exams to prepare, I might extend the deadline).

Basis for Grading
- 35% Assignments (incl. presentations)
- 15% Participation in Class Discussions
- 50% Term Project

Class Schedule

Session 1: Introduction: Choice Models (Sep 9)
- Train, Kenneth (2009), Discrete Choice Methods with Simulation, Ch.2, 3, 4 (sections 4.1, 4.2 and 4.3), 6.
- Matt Shum’s notes on “Single-agent dynamic optimization models.”

Session 2: Finite horizon single agent dynamic problem (Sep 16)
  http://athena.sas.upenn.edu/~petra/papers/handbook_labor.pdf
Session 3: Dynamic stockpiling (Sep 23)


Assignment 1 will be given.

Session 4: Consumer Learning: A survey (Sep 30)


Session 5: Student’s presentation on research progress (Oct 7)

Session 6: Bayesian Estimation of Dynamic Programming Models (Oct 14)

- Train, Kenneth (2009), [Chapter 11, 12](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1910839); Geweke, John (2003), Chapter 2, 3

**Assignment 2 will be given.**

**Session 7: Other approaches to estimate dynamic models (Oct 21)**


**Session 8: Identification of Dynamic Models (Oct 28)**


**Session 9: Dynamic oligopoly model (Nov 4)**


**Session 10: Endogeneity Problem (Nov 11)**


**Session 11: Take a Deeper Look at Random Utility Models (Nov 18)**


**Session 12: Structural estimation vs. Atheoretic approach (Nov 25)**


Session 13: Students’ presentations (Dec 2)