Syllabus: Economics 703, Advanced Microeconomics

Professor Peter Cramton

Timing: Tuesday and Thursday, 9:30 am to 10:45 am, Tydings 0111, Fall 2017

Website: www.cramton.umd.edu/courses/econ-703

Course Description. Economics 703, Advanced Microeconomics, presents a formal treatment of game theory, and then introduces selected topics in mechanism and market design. The game theory portion covers foundations, dynamic games, games with incomplete information, mechanism design and signaling. Then we turn to selected topics in market and advanced mechanism design. Market design combines behavioral and experimental economics with auction and matching theory to design innovative markets. Applications are seen in almost all markets and government programs that attempt to assign and sometimes price scarce resources. Market design research leads to better understanding of the incentives that guide behavior. Then the incentives can be designed to better achieve goals. In settings where prices are used to motivate behavior, auctions have been developed to assign and price scarce resources. Possible topics include the assignment of radio spectrum for mobile communications, electricity market design to price and allocate wholesale electricity, mechanisms for routing traffic, approximation in mechanism design, and alternative approaches to characterizing agent behavior (e.g. price of anarchy).

Course Logistics. We will meet twice a week for one hour and fifteen minutes. There will be a mixture of slides and board-work, so please arrange to get notes from another student if you must miss a lecture. There will be 4 problem sets over the course of the semester, and a final examination (8 am to 11 am, Thursday, 14 December 2017). You are encouraged to do the problem sets as much as you can on your own; you may discuss the problem sets in small groups (two or three students); solutions, however, must be written up independently. Your course grade will be based 1/3 on the problem sets and 2/3 on the final exam. Good class participation can improve your evaluation. I expect you to come to class prepared to respond intelligently to questions about the readings and assignments.

Books and Readings. The main text for the course is Drew Fudenberg and Jean Tirole, *Game Theory*, MIT Press (1991). We will accompany this with two sets of lecture notes: a set by me and a set by William Sandholm at University of Wisconsin. Both are available on the course page. I recommend that you purchase Vijay Krishna, *Auction Theory*, Academic Press (2002). You may also wish to consult Paul Milgrom, *Putting Auction Theory to Work*, Cambridge University Press (2004), Peter Cramton, Yoav Shoham, and Richard Steinberg, *Combinatorial Auctions*, MIT Press (2006), and Martin Osborne and Ariel Rubinstein, *A Course in Game Theory*, MIT Press (1994), which offers excellent coverage of games without private information.

Office Hours. Office hours are by appointment; email me to schedule a time.

Contact. My email is pcramton@gmail.com; please include "Econ703:" at the start of the subject in any course-related emails.

Outline

Notes, problem sets, and other course materials are on the [course website](#).

F&T = Fudenberg and Tirole, *Game Theory*;
K = Vijay Krishna, *Auction Theory*,
M = Paul Milgrom, *Putting Auction Theory to Work,*
O&R = Osborne and Rubinstein, *A Course in Game Theory*.
CSS = Peter Cramton, Yoav Shoham, and Richard Steinberg, *Combinatorial Auctions*.

0. Introduction and Motivation

1. Strategic-Form Games

F&T, chapters 1 and 2; O&R, chapters 1 and 2.

2. Extensive-Form Games

F&T, chapter 3; O&R, chapter 6.

3. Repeated Games

F&T, chapters 4 and 5; O&R, chapter 8 and 9.

4. Bayesian Games and Bayesian Equilibrium

F&T, chapter 6.

5. Dynamic Games of Incomplete Information

F&T, chapter 8; O&R, chapter 11.

6. Refinements of Sequential Equilibrium

F&T, chapter 11; O&R, chapter 12.

7. Bargaining Theory

F&T, chapter 10; O&R, chapters 7, and 13-15.

8. Auction Theory and Market Design

K chapters 1-17; M entire book; CSS entire book.