Department of Economics

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ECON 808
Spring 2010

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Syllabus

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Lectures	Tue & Thu 1:30–3:18 in Arps 388	
Course Website	http://carmen.osu.edu	

This course is the third quarter of the first-year PhD microeconomics sequence. The theme of the course is 'Market Mechanisms and Mechanism Design'. Roughly speaking, we will cover Parts III and V of Mas-Colell, Whinston & Green's *Microeconomic Theory* (aka MWG), plus some additional topics not in the text. It is presumed that students have a working knowledge of the topics from the previous two quarters of the sequence, including all of Parts I and IV and most of Part II of MWG. The only required text is MWG (which you should already own), but I will also lecture out of other texts and sources, some of which I list below.

Required Text:

- *Microeconomic Theory*, by Mas-Colell, Whinston, & Green ("MWG"). It's encyclopedic, but a reference that every economist absolutely must have and know forward and backward. It's not the best for gaining intuition, however, so picking up an alternative text is a good idea.

Recommended Texts:

- *A Toolbox for Economic Design* by Diamantaras (ISBN: 0-230-61060-9). Published in 2009, this book provides the best (and most up-to-date) treatment of mechanism design theory available in textbook form.
- *Advanced Microeconomic Theory* by Jehle & Reny. This book is far easier to read than MWG because it is willing to make stronger assumptions (like strongly monotone, convex preferences, for example) and doesn't worry much about what happens when they are relaxed. It's also better than MWG at auction theory, but worse at general mechanism design theory.
- *Game Theory* by Fudenberg & Tirole, *Game Theory* by Roger Myerson, or *A Course in Game Theory* by Osborne & Rubinstein. These are three good texts in game theory, and each has its strengths and weaknesses. Although we won't stray much beyond the game theory in MWG, any serious student in microeconomics should own (and read) all three of these books.

- *Contract Theory* by Bolton & Dewatripont or *The Theory of Incentives: The Principal-Agent Problem* by Laffont & Martimort. These two books (which are fairly substitutable) explore adverse selection, screening, signalling, and moral hazard in far more detail than MWG.
- *The Handbook of Mathematical Economics*, ed. by Arrow & Itrilligator. Very expensive four-volume set for researchers in economic theory. The first volume is just a math textbook for economists, and the 2nd book covers the theory of general equilibrium very rigorously. Volume 3 is welfare economics and mechanism design, and volume 4 contains extensions to the basic model that bring the reader more up-to-date.

Homework & Problem Sets: Worth 15% of your grade.

In this class, "homework" and "problem sets" are two distinct entities:

Homework consists of problems, questions, or proofs that I pose in class that you should work on at home. Homework will not be collected or graded, but is a good way for you to understand the material and prepare for exams.

Problem sets are assigned problems that will be collected and graded. Problem sets will be assigned roughly every two weeks, for a total of (around) five problem sets. Each problem set will receive a score from 0 to 3 based on completeness and quality of the work done, but not based (directly) on the accuracy of the work; answers to problem sets will be provided and students will be responsible for checking the quality of their own work. Problem sets will be assigned in class and due at the beginning of class exactly one week later (*e.g.*, problem sets assigned in class on Tuesday are due at the beginning of class the following Tuesday). Late problem sets will receive a maximum grade of 1.

Working on problem sets (and homework) in groups is strongly encouraged, though each individual is expected to turn in their own, unique answers.

Students often have access to official solutions from previous years, published solution manuals, solutions found online, or past students' answers; if you choose to use one of these sources to help you solve a problem, **you must write clearly at the top of the first page of your solutions that you used one of these sources** and you will then receive a maximum of 2 out of 3 points. If it appears that you are using one of these sources without writing it on your solutions then you will receive 0 points for that problem set. If you do not use any of these sources (which is strongly recommended), you can earn a maximum of 3 out of 3 points on the problem set. Of course, you're free to look at existing solutions with no penalty *after* completing your own solutions.

Group Work Policy: You are highly encouraged to work together to solve your problem sets and homework problems, but each person must submit their own solutions. Verbatim copying of others' solutions is forbidden. If two students' solutions are found to be identical, they will both receive zero points.

Recitations: Each of you is enrolled in one recitation section, which will be run by the course TA. The recitation will be used (1) to discuss the material or readings assigned for the week, (2) to

answer any questions, including questions about problem sets, and (3) to re-explain any especially difficult material from the week's lectures.

Exams: Worth 85% of your grade.

There will be a mid-term exam and a final exam. The mid-term exam will be worth 40% of your grade and the final will be worth 45% of your grade. The final exam will focus on material from the second half of the course, but certain questions may require knowledge from the first half. The mid-term exam will be given in lieu of a lecture and will take the entire 108 minutes; if you arrive late, you will not be granted additional time. The mid-term is tentatively scheduled for the fifth week of class and the final will be held during the allotted final exam time slot (also 108 minutes). Please do not schedule your summer travel plans to conflict with finals week.

Academic Dishonesty: It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct: `http://studentaffairs.osu.edu/resource_csc.asp`.

Disability Services: Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated, and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerene Hall, 1760 Neil Avenue; telephone 292-3307, TDD 292-0901; `http://www.ods.ohio-state.edu/`.

Tentative Topic List:

- Properties of Walrasian Equilibrium (MWG Ch. 17)
  - Uniqueness, local uniqueness, & stability of equilibrium
  - The core and core convergence
- Externalities & Public Goods (MWG Ch. 11)
  - Bilateral externalities & various solutions
  - Public goods & non-optimality of market outcomes
- Hidden Information (Adverse Selection) (MWG Ch. 13)
  - Signalling
  - Screening
- Hidden Action (Moral Hazard) (MWG Ch. 14)
- Social Choice Theory (MWG Ch. 21)
  - Social welfare functionals
  - May's Theorem
  - Arrow's Impossibility Theorem
  - Ways around Arrow's Impossibility Theorem
- Mechanism Design & Implementation Introduction (MWG Chs. 21–23)
  - Social choice functions/correspondences
  - Mechanisms and implementation: The Mount-Reiter diagram
- Dominant Strategy Implementation
  - The Gibbard-Satterthwaite Theorem
  - VCG mechanisms
  - Restricted domains
- Bayesian Implementation
  - The Myerson-Satterthwaite Theorem
  - The d'AGV (expected externality) mechanism
  - The revenue equivalence theorem
  - Optimal Bayesian mechanisms
- Nash Implementation
  - Public goods mechanisms (Groves-Ledyard, Hurwicz, etc.)
  - Maskin's canonical mechanism
  - Implementing via refinements of Nash