Economics 300: Methods and Tools of Economic Analysis

Professor Cramton

Spring 2012

Course description

The methodology of economics employs mathematical and logical tools to model and analyze markets, national economies, and other situations where people make choices. Understanding of many economic issues can be enhanced by careful application of the methodology, and this in turn requires an understanding of the various mathematical and logical techniques. This course reviews concepts and techniques usually covered in algebra, analytical geometry, and the first semester of calculus. It also introduces the components of subsequent calculus and linear algebra courses most relevant to economic analysis. The course emphasizes the reasons economists use mathematical concepts and techniques to model behavior and outcomes.

The course will meet three times a week, twice for lectures and once in discussion section conducted by a teaching assistant. Lectures will demonstrate the power of math to answer economic questions, stressing the reasons economists use math and explaining mathematical logic and techniques. Discussion sections will demonstrate solutions for problems, answer questions about material presented in the lectures or book, and focus on preparing students for exams.

Students should be prepared to devote at least 4 hours per week outside class meetings, primarily working on problem sets as well as reviewing materials and practicing with Mathematica. Students with weak math skills will need to spend additional time mastering techniques.

Course objectives

Each student should be able by the end of the semester to:

- Recognize and use the mathematical terminology and notation typically employed by economists
- Explain how specific mathematical functions can be used to provide formal methods of describing the linkages between key economic variables
- Employ the mathematical techniques covered in the course to solve economic problems and predict economic behavior
- Explain how mathematical concepts enable economists to analyze complicated problems and generate testable hypotheses

Pre-requisites

You are responsible for having completed three courses (or their transfer equivalents) with grades of C- or better before taking this course, including: Econ 200 (Principles of Microeconomics), Econ 201 (Principles of Macroeconomics) and either Math 220 (Elementary Calculus I) or Math 140 (Calculus I). If

you have already taken Math 141, you should talk with a departmental advisor to ascertain if you should complete Econ 300 or go on to take Math 241.

Instructor's contact information

Professor Peter Cramton, pcramton@gmail.com, Tydings 4101A
Office hours Tuesday 7:30-9:30am

Teaching assistant's contact information

Teaching assistants' contact information and office hours are posted at www.cramton.umd.edu/courses/econ-300.

Lectures

Tuesdays and Thursdays, 11-11:50 am, Marie Mount Hall 1400

Discussion sections

Each student is registered for a specific discussion section, which meets on Friday.

Course Websites

www.cramton.umd.edu/courses/econ-300. In addition, grades will be available at elms.umd.edu. If you are registered for this course, you can use your directory ID and password to access your grades.

Email

The University has adopted email as the primary means of communication outside the classroom. Students are responsible for updating their current email address via the appropriate link on www.testudo.umd.edu/Registrar.html. New information about the course will be distributed to you via email as well as announcements on the course website.

Software

Mathematica 8 is recommended for this course. It is available for $10. The regular price is $2,495, so this is quite a discount. See www.oit.umd.edu/slic/howto/homeuse.html. Mathematica 8 is a state-of-the-art tool for mathematical analysis. It is both extremely powerful and easy to use. Mathematica runs on either Windows or Apple computers. For most topics in the course, there are a number of demonstration notebooks available from the course website. The demonstrations illustrate the topics or related ideas. In addition, I strongly recommend that you use www.wolframalpha.com to answer math and economics questions. It is an extremely powerful computational search engine based on Mathematica.

Problem sets

There are six problem sets. All problem sets are posted on the class website. Problem sets are to be handed in in hard copy at your discussion session on the date due. If for some reason you cannot hand it in at that time, please put it in the mailbox of your TA before your discussion session; *problem sets put in the professor's mailbox will be discarded*. TA mailboxes are in the Econ Dept office, Tydings 3105. *Late problem sets will not be accepted.* Problem sets are graded on a four point scale: 4 excellent, 3 good, 2 fair, 1 poor, 0 not attempted. Answers will be posted on the course website shortly after discussion

section ends. The problem set with the lowest score will be dropped. Thus, you should not worry if an emergency, illness, or other matter prevents you from turning in one problem set when due—just be sure to hand in the others. Your answers should be your own. You may use Mathematica or another computation aid. However, it is a violation of the University's Code of Academic Integrity to consult past problem set solutions or copy the work of another.

Math in subsequent economics classes

A main objective of this course is to prepare you to be able to handle the math in the advanced economics classes you will take in later years. Many of the problems in this course are taken from problem sets and previous exams from a number of 400-level economics classes. Pay attention; you may see these problems again.

Recommended textbook

Michael W. Klein, *Mathematical Methods for Economics*, Addison-Wesley. It is fine to get a used copy. It is also fine to get the University of Maryland customized version: Michael, W. Klein, *Methods and Tools of Economic Analysis*, Pearson. I recommend getting whichever is least expensive.

Expectations of students

You are expected to attend lecture and discussion section regularly, fully utilize the textbook and other course materials, complete problem sets on time, and every week check the course website for updated information. You are expected to read the assigned chapters and reading materials before class. Research shows that students who actively participate in class tend to learn significantly more than those who only passively listen. You should ask questions, articulate your ideas and concerns out loud, and if you find that you can't follow the logic of lectures, please visit office hours of your teaching assistant.

Students with learning disabilities should get in touch with their assigned TAs as soon as possible to make arrangements for exams.

Grades and assignments

Your grade will be determined by your performance on the following assignments, weighted as indicated.

Department of Economics' policy on grading requires instructors to use the grading system announced at the beginning of the semester in all cases. I cannot make any exceptions to that rule. There will be no opportunity for extra credit after the semester ends.

Problem sets	10%
First midterm exam	25%
Second midterm exam	25%
Final exam	40%
Total	100%

Schedule of lectures, exams, and due dates

The schedule of lectures, exams, and due dates is posted at www.cramton.umd.edu/courses/econ-300. All dates are subject to change.

Exams

All exams will be given in the class room. Exams will use a multiple choice format. You may bring to the exam an 8.5" x 11" *cheat sheet* (two-sided) with any formulas, definitions, etc., that the you think will be helpful in the exam. Not all material from the text will be covered on the exams; in contrast, all material covered in lectures and discussion sections may be covered on the exams.

Calculator

You will need a calculator to use for exams. In addition to standard functions, your calculator must have functions for general exponents, logs, and the exponential function. Note that wireless enabled devices, cell-phones, programmable calculators, and notebook computers cannot be used during exams.

Legal excuses for missing an exam

If you anticipate missing an exam because of a religious observance or participation in University activities at the request of a University official, you must inform your TA within the first three weeks of the semester. If you miss an exam because of illness that can be documented by a medical professional, you must inform your TA as soon as possible, preferably in advance of the exam, and a make-up exam will be scheduled. If you miss a midterm exam for any other reason, then you can take a make-up at a time selected by your TA, and you will automatically lose 25% of the maximum points possible for that exam. If you fail to show up for the make-up, then you will earn a zero for that exam. If you miss the final exam without a valid excuse, the 25%-deduction make-up option does not apply, and your score will be a zero. Note: make-up exams are not given for students whose travel plans conflict with the date of the scheduled final.

Academic integrity

The University of Maryland has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards applicable to all undergraduate students, and you are responsible for upholding these standards as you complete assignments and take exams in this course. Please make yourself aware of the consequences of cheating, fabrication, and plagiarism. For more information see www.studenthonorcouncil.umd.edu.