

ECON 401: MATHEMATICAL METHODS IN ECONOMICS
MARK MOORE
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This course aims to train you to use mathematical methods commonly in use in economic analysis. Throughout, the intent is to integrate the mathematics with economic applications. The course focuses on three topics: comparative statics, optimization, and dynamic analysis.

Comparative statics refers to analysis of the relation between the values of the endogenous variables in a model's equilibrium state and the set of values of the parameters and exogenous variables. In other words, if the value of a parameter or exogenous variable changes, how are the equilibrium values of the endogenous variables affected? Optimization concerns methods for determining the maximum (minimum) values of functions, with and without constraints. Dynamic analysis concerns methods for examining the path of variables over time, methods for determining whether variables will tend to converge to certain values over time, and methods of optimization when variables are changing over time.

This course will rely heavily on the assigned textbook. However, I may add other readings or supplement the lectures with additional examples, particularly economic examples, as the course progresses.

Requirements

There will be three exams, two exams in class during the semester and a final exam. The exams will be weighted equally in the final grade. The in-class exams are scheduled for Monday, September 26, and Monday, October 31. The final exam is scheduled for Monday, December 12, 8 to 10 a.m., in accordance with the University-wide exam schedule.

Please do not miss the exams. If you foresee any reason that you may miss an exam, see me within the first three weeks of the semester. Note, however, that apart from conflicts with University-sponsored activities, there are very few legitimate foreseeable reasons for missing an exam. If you do not see me within the first three weeks, the only valid excuses for missing an exam are documented medical or family emergencies.

The text includes many problems with answers. Students may borrow from me a copy of the answers to the remaining problems. I will also assign practice problems not in the text at various points in the course.

None of the problem sets will be graded. You are strongly encouraged to complete these problems, however. Struggling with problems is the best way to learn the material. I will work through some of the problems in class and on review days, and I may schedule extra sessions for problem review.

Textbook

The required text for the course is Chiang and Wainwright, *Fundamental Methods of Mathematical Economics*, 4th edition.

I will supplement the text with additional material in class at some points in the course.

Website

There will be a course website on the blackboard system. All course documents will be posted on the course website.

Disability Services and Programs

Students requesting academic accommodations based on a disability are required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DS when adequate documentation is filed. Please be sure the letter is delivered to me (or to a TA) as early in the semester as possible. DSP is open Monday-Friday, 8:30-5:00. The DSP office is GFS 120, and the phone number is (213) 740-0776.

Academic Integrity

The University takes academic integrity quite seriously. All violations of academic integrity will be reported to Student Judicial Affairs and Community Standards, in accordance with university policy. You can find the Trojan Integrity Guide at <http://www.usc.edu/student-affairs/SJACS/forms.tig.pdf>.

Course Outline (Tentative)

The topics and exam dates are fixed dates. The scope of the readings is tentative. We will likely not cover all of the chapters listed below in their entirety. In each section, I will pick and choose material from among the chapters listed. I will adjust the pace and scope of the course as we move along. Although I may not cover the chapters listed in their entirety, I will complete the coverage of each of the topics in the time indicated. So, I will cover comparative statics before the first exam, optimization (Part A) before the second exam, and optimization (Part B) and dynamic analysis before the final exam.

Note that the lecture prior to each in-class exam is scheduled for in-class review.

I. Introduction, Models, and Linear Algebra: Chapters 3-5

II. Comparative Statics:

Basic concepts in real analysis: sets and limits (in class presentation)

Chapters 6 -8.

In-Class Review: Wednesday, September 21

Exam 1: Monday, September 26

III. Optimization:

Part A: Chapters 9-12 (at least through 12.5, the exact stopping point for this section is TBA)

Some supplemental material will be presented in class.

In-Class Review: Wednesday, October 26
Exam 2: Monday, October 31

Part B: Chapter 12 (any parts not covered in Part A)
Chapter 13.

IV. Dynamic Analysis: (tentative)
Chs. 14, 15 16 (parts), 17, 18 (parts), 19 (parts)
Introduction to dynamic optimization (time permitting)

Final Exam: Monday, December 12, 8-10 a.m.