Introduction to Mathematical Economics

Economics 482, Spring 2009
TR 2:10 – 3:25pm, HBB 303

Professor:
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Office Hours: Wednesdays, 10:00-11:30 and Thursdays, 3:30-5:00. Other meeting times can be arranged by appointment.

Course Description: This course provides an introduction to the mathematical techniques used in contemporary economics, including multivariable calculus, comparative statics, and unconstrained and constrained optimization. Emphasis will be placed on applications of microeconomic and macroeconomic theory, and the interpretation and translation of mathematical results into economic terms.

Audience: This course is best-suited for students who intend to pursue graduate studies in economics or a related discipline, and/or desire an alternative to the graphical analysis endemic to introductory and intermediate economics courses. Further, this course should prove useful for the 400-level economics courses that use calculus and/or optimization.

Prerequisites: The prerequisites for this class are Economics 311 (with grade of "B" or better) and one semester of calculus (Mathematics 125 or 141).

Math help: If you know or find you need special assistance (beyond what can reasonably be provided through office hours), try the Math Tutorial Center (http://www.math.utk.edu/MTC/) located at Ayres Hall 324.

Required Text: Knut Sydsaeter and Peter Hammond. 2008. *Essential Mathematics for Economic Analysis*, third edition. Prentice Hall. ISBN (13-digit): 978-0-273-71324-1; ISBN (10-digit): 0-273-71324-8. This book is available in the University bookstore, and is also available from a wide variety of online retailers.

Course Requirements

Attendance, 5% of course grade. Success in this course depends on skills in both mathematics and economics. Needless to say, many will find the material challenging. View lectures and the textbook as complements, not substitutes. For your benefit as well as my own, I will take attendance during each class meeting. Besides simply attending, you should come to class prepared to participate in discussion. Being prepared means having read the relevant material before we discuss it in class. Borderline grades will be decided on class participation, e.g. assisting me when I get stuck on a problem. A basic rule will be that, if your grade is on the border and you are active in participation, I will take the liberty of giving you *up to* a 2% boost.

Problem Sets, 20% of course grade. Assignments will be given nearly every week. Your best $n - 2$ scores on these will count towards your grade. Collaboration with your colleagues is allowed, although final write-up must be your own. On each problem set I will assign a grade of 0 (mostly incorrect), 1, or 2 (mostly correct), as determined from your performance on a randomly selected problem. Although I will not check your work on all problems, I will provide detailed, typed solutions on every assigned problem. **Assignments are due, <u>in class</u>, on the specified due date. No late assignments are accepted.**

Exams, 75% of course grade. There will be two midterms and a final exam worth 25% each. If the final exam score is your highest score, I will instead count each midterm as 15% and the final as 45%. The final will be cumulative and will take place on the University-scheduled final exam period for this course. **Make-up exams are entirely at my discretion and are generally available only for students with direct UT exam conflicts or <u>written</u> medical excuses. You must make arrangements with me <u>in advance</u> of the scheduled exam, or will receive a score of zero.**

Grading Scale: I will use the following scale to assign final course grades: 92 to 100% is an A; 90 to 92% is an A-; 87 to 90% is a B+; 82 to 87% is a B; 80 to 82% is a B-; 77 to 80% is a C+; 70 to 77% is a C; 65 to 70% is a C-; 60 to 65% is a D+; 50 to 60% is a D; and less than 50% is an F. I do not anticipate implementing a curve.

Students with Disabilities: If you have a documented disability and need special accommodations, please come see me as soon as possible. Special accommodations will be handled discreetly.

Academic Dishonesty: I reserve the right to take appropriate actions, as mandated by University policies, in the event of suspected cheating or plagiarism. While I allow collaboration on assignments, do not simply copy off one another. Students turning in assignments with (near) identical write-ups will receive a grade of zero.

Course Website: This course will utilize the "blackboard" online course management system. I will post the course syllabus, many handouts, and supplementary reading materials, as well as post grades throughout the semester. Please check the website for important announcements.

Course Outline: Some Economics departments use the initial chapters of this book to teach basic algebra and calculus to their students (as a substitute for Math department courses). As a pre-requisite for this class is a first-semester course in calculus, the initial chapters will serve as a useful reference. As it may have been some time since many of you have taken a calculus class or have used calculus, the first two weeks will focus on non-calculus background material. In the meantime you can review basic calculus on your own. Then, I briskly go through single variable calculus and optimization, with an emphasis on economic application. Chapters 11, 13 and 14 represent the core of the course. An outline is given below.

I. Selected Background Material (5 lectures)
Introduction to course
Chapter 10: sections 10.1-10.5
Chapter 3: 3.4, 3.5, 3.7
Chapter 4, Chapter 5: skim
Handouts: Notation; Proofs; Exponential and natural log functions

II. (Review of) Single Variable Calculus and Optimization (6-7 lectures)
Chapter 6: all
Chapter 7: 7.1 – 7.4; 7.7
Chapter 8: all
Handouts: Differentiation; Unconstrained optimization (single variable)

II. Multiple Variable Calculus and Optimization (14-15 lectures)
Chapter 11: 11.1, 11.2, 11.5 – 11.8
Chapter 13: all
Chapter 14: all
Handouts: Concavity and convexity of multivariable functions; Unconstrained optimization

Exam Dates:	Midterm Exam on February 19 (Sections I and II)
	Midterm Exam on April 2 (Focus on material in Ch. 11 & 13)
	Final Exam on Tuesday, May 5, 2:45-4:45pm (comprehensive)