Economics 4808 - Introduction to Mathematical Economics - Spring 2008

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Contact

Office: Economics 14A   Office hours: MW 9:30-10:45, 1:00-2:00

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Course Description

Econ 4808 is a course that will improve your math skills and will introduce you to how mathematical tools are applied in economic analysis. The ability to apply mathematics is crucial for economic analysis. Thus, this course is essential for anyone who wants to pursue graduate work in economics or a career in economic analysis.

The course covers the mathematics and economic applications of equilibrium, slopes and derivatives, differentials, optimization (maximizing and minimizing profit, cost and utility), constrained optimization (e.g., maximizing utility subject to the budget constraint) and integration. Applications include problems in consumer and producer theory, general equilibrium, and welfare economics.

The course will follow the unpublished text written by Professor Edward Morey. The material is available at: http://www.colorado.edu/Economics/morey /4808/4808home.html.

Prerequisites

Principles of Economics (Econ 2010 and Econ 2020, or Econ 1000) are prerequisites, and so are Econ 1078 (Mathematical Tools for Economists 1) and Econ 1088 Mathematical Tools for Economists 2), or the equivalent. One or more semesters of Calculus would suffice for Econ 1078 and 1088. This course and Intermediate Micro Theory are compliments. It is **very** important that you fulfill the prerequisites **before** you take this course, and **still** understand the materials in the prerequisites. To be successful in mathematical economics, you need to first be comfortable with algebra and derivatives. If you have any uncertainty as whether you are under or over qualified to take the course, please talk to me ASAP.

Class format

The course includes lectures, problems and discussion. In-class problems will be solved both individually and in groups.

The readings for this course will be posted on the course web site although some of the material for which you are responsible will be presented in lectures only, and is not explicitly covered in the readings.

Review problems will be posted on the course web site.

Readings
I will not assign specific readings from a text book. However, you need access to good algebra and calculus texts.

Essential Mathematics for Economic Analysis (by Knut Sydsaeter and Peter Hammond) is the official math text for undergraduate econ majors here at C.U. You are expected to own a copy and understand much of the material in this book. The book is the required text for Econ 1078 and Econ 1088 and students in those courses are told to keep and use the book until they finish their undergraduate major in economics.

You should also have an intermediate micro theory textbook that will provide you the theory that you need; e.g. the one you used in Econ 3070. *Intermediate Microeconomics* (by Hal Varian) is a good example.

Evaluation
Your grade will be determined by five components:
- Homework assignments are 25%.
- Quizzes are 15%
- The better of the two midterm exams is 25%.
- Cumulative final exam is 35%.

Review questions and homework problems sets will be posted for each section of the course. Late homework will NOT be accepted. Homework assignments will be graded randomly.

Midterm 1: Wednesday, February 20th
Midterm 2: Wednesday, April 2nd
Final: Monday, May 5, 10:30 a.m. - 1:00 p.m.

Tentative Course Outline (Text chapters are in parentheses)
1. **Introduction, Models (Theories) and Tools.** A brief review of necessary and sufficient, what's a theory (model), variables, functions, sets, and proofs (*S&H*: chap 1, chap 2, chap 3: sections 3.4-3.7)

2. **Equilibrium Analysis, that is, Economic Models and Static Analysis** (there is no a lot to read in S&H for this section, but review Chapter 2 - Chapter 12 *Tools for Comparative Statics* is relevant but too advanced for the moment - we will return to it later).
2.1 Equilibrium – definition, partial and general equilibrium models.
2.2 Simple partial equilibrium models: a simple linear model of supply and demand; a simple nonlinear model of supply and demand; a simple Keynesian macro model.
2.3 Moving toward general equilibrium models (G.E.).

3. **Economic Applications of Differential Calculus**
3.1 The nature of comparative static analysis and the concept of a derivative: slopes, continuity, limits and derivatives (*S&H*: Chapter 4).

3.2 Rules of differentiation: first-order derivatives, higher-order derivatives, partial derivatives (*S&H* 15.3-15.6), economic applications of derivatives (marginal revenue, marginal cost, marginal products, elasticities, Shepard's Lemma and the conditional input demand function, macro models and market models, etc.).

4. Total Differentials (*S&H* 5.4)
4.1 Differentials - definition and the basics.
4.2 Economic applications of total differentials: isoquants, isocost lines, indifference curves and budget lines.

5. Economic Applications of Constrained Optimization

6. Integration: An Introduction and Some Simple Economic Applications

University Policies
Please be aware of the university policies regarding classroom behavior, honor code, disabilities, religious practices and sexual harassment. All campus policies should be accessible at http://www.colorado.edu/policies/.

University policies regarding classroom behavior are available at http://www.colorado.edu/policies/classbehavior.html and at http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student_code

Information regarding the University Honor Code is available at http://www.colorado.edu/policies/honor.html and at http://www.colorado.edu/academics/honorcode. The Honor Code Council can be contacted by email at honor@colorado.edu or by telephone at 303-725-2273.

University policies regarding disabilities are available at http://www.colorado.edu/disabilityservices. Disability Services can be contacted by telephone at 303-492-8671, or in person at Willard 322.

University polices regarding religious practice are available at http://www.colorado.edu/policies/fac_relig.html.

University policies regarding Sexual Harassment and Amorous Relationships are available at http://www.colorado.edu/odh/. The Office of Discrimination and Harassment can be reached by telephone at 303-492-2127. The Office of Judicial Affairs can be reached at 303-492-5550.