Economics 4808
Introduction to Mathematical Economics
Fall 2008

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Office Hours: TR 12:20-1:35pm; F 10am-12pm; and by appointment.

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The course will follow the unpublished text written by Professor Edward Morey.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 both lectures and problem-solving. 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 economics 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.

Exams and Grading:

Homework	15%
Exam I (Tuesday, 9/23)	25%
Exam II (Thursday, 10/23)	25%
Exam III (Thursday, 12/4)	25%
Final Exam (Saturday, 12/13 at 10:30am)	35%

There will be three exams and a cumulative final. Obviously, one exam will be dropped. Exams (except for the final) are not cumulative, but the material does build on itself so it is important to understand all of the concepts as we go. No makeup exams will be given. If you miss an exam, you will receive a zero. There is one exception to this rule. In the event that you do not take one of the exams, the weight of the final exam may be increased if you are ill and can provide proof (e.g. a letter from the student health center), or you have a **prearranged** excused absence from me.

Homework assignments will be posted on the class website. It is a vital part of learning the math concepts we will cover and their applications. Some class time will be set aside to do and go over homework assignments.

Grading Scale:

Your Score	**Grade**
92% to 100%	A
90% to 91%	A-
88% to 89%	B+
82% to 87%	B
80% to 81%	B-
78% to 79%	C+
72% to 77%	C
70% to 71%	C-
68% to 69%	D+
62% to 67%	D
60% to 61%	D-
Below 59.5%	F

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 not 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.

2.3 Moving toward general equilibrium models (G.E.).

2.4 Matrix Algebra

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

5.1 General optimization rules.

5.2 Constrained optimization and a return to consumer and producer theory.

6. Integration: An Introduction and Some Simple Economic Applications

Additional Notes:

Incompletes, Extra Credit, etc.:

I adhere strictly to the University guidelines on Incompletes ("An IF is given only when students, *beyond their control*, have been unable to complete course requirements. A substantial amount of work must have been *satisfactorily completed* before approval for such a grade is completed."). Economics department policy prohibits IWs. Bad grades, unsatisfactory performance, too many credit hours, work conflicts, etc. are not reasons for an incomplete.

I am adamant about giving each student an equal opportunity to perform well in the course, so there will be no extra credit opportunities that are not offered to the entire class. You should focus your efforts on learning the material and doing well on the exams.

Final Exam Conflicts:

If you have three or more final exams scheduled on the same day, you are entitled to arrange an alternative exam time for the **last** exam or exams scheduled on that day. To qualify for rescheduling final exam times, you must provide evidence that you have three or more exams on the same day, and arrangements must be made with your instructor no later than the end of the sixth week of the semester (Friday, October 3rd, 2008).

Honor Code

All students of the University of Colorado at Boulder are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. All incidents of academic misconduct shall be reported to the Honor Code Council (honor@colorado.edu; 303-725-2273). Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions from the faculty member and non-academic sanctions (including but not limited to university probation, suspension, or expulsion). Additional information on the Honor Code can be found at http://www.colorado.edu/policies/honor.html and at http://www.colorado.edu/academics/honorcode

Disabilities

If you qualify for accommodations because of a disability, please submit a letter to the instructor from Disability Services in a timely manner so that your needs may be addressed. Disability Services determines accommodations based on documented disabilities. Contact: 303-492-8671, Willard 322, or www.Colorado.EDU/disabilityservices

Religious holidays

A comprehensive calendar of the religious holidays most commonly observed by CU-Boulder students can be found at http://www.interfaithcalendar.org/ Review this list and the class syllabus. After reviewing the syllabus, please see the instructor if you believe that you need an accommodation for religious reasons. The instructor should be notified within the first two weeks of classes. Campus policy regarding religious observances states that faculty must make *reasonable* accommodation for them and in so doing, be careful not to inhibit or penalize those students who are exercising their rights to religious observance. For more information see http://www.colorado.edu/policies/fac_relig.html

Code of Behavior
Students and faculty each have responsibility for maintaining an appropriate learning environment. Students who fail to adhere to behavioral standards may be subject to discipline. Faculty have the professional responsibility to treat students with understanding, dignity and respect, to guide classroom discussion and to set reasonable limits on the manner in which students express opinions. See policies at http://www.colorado.edu/policies/classbehavior.html and at http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student_code

Policy on Sexual Harassment
The University of Colorado Policy on Sexual Harassment applies to all students, staff and faculty. Sexual harassment is unwelcome sexual attention. It can involve intimidation, threats, coercion, or promises or create an environment that is hostile or offensive. Harassment may occur between members of the same or opposite gender and between any combination of members in the campus community: students, faculty, staff, and administrators. Harassment can occur anywhere on campus, including the classroom, the workplace, or a residence hall. Any student, staff or faculty member who believes s/he has been sexually harassed should contact the Office of Sexual Harassment (OSH) at 303-492-2127 or the Office of Judicial Affairs at 303-492-5550. Information about the OSH and the campus resources available to assist individuals who believe they have been sexually harassed can be obtained at: http://www.colorado.edu/sexualharassment/