Economics 420: **Mathematical Economics**
Spring Semester 2009
TR 9:00-10:15
Kuykendall Hall Room 301

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Office Hours: 10:30-11:30 TR
or by appointment

**Text:** Alpha C. Chiang & Kevn Wainwright, *Fundamental Methods of Mathematical Economics*, (4th ed.) McGraw-Hill, 2005.

**Prerequisites:** Econ 300, 301; Math 203, 215, 215A, 241 or 251A

Most undergraduate courses in economics are very timid about the use of mathematics. Here, we make full use of basic differential and integral calculus listed as pre-requisites. Differential calculus allows us to derive all the results of the core of economics–the theory of consumer behavior and the theory of the firm, as well as the effect of market structures. We also introduce linear algebra, leading to input-output analysis and basic econometric results; and differential and difference equations, taking us into the realm of dynamic optimization.

Pure mathematicians may cringe at the shortcuts we take, but the overall goal of this course is to translate basic micro- and macro-economic theory into mathematical language, rather than to dot all the i's and cross all the t's of all the mathematical theorems we put to use. In the process, we hope to extend students' understanding of economic theory as well as to develop some common economic models for which a mathematical presentation is pretty much unavoidable.

**Stated Learning Outcomes**: Through the semester, students will

- ...write a simple demand-supply model in mathematical form, find equilibrium price and output
- ...formulate economic and statistical models in terms of matrices and solve matrix equations for, e.g., equilibrium investment and interest rates in macroeconomic models.
- ...use differentiation rules to evaluate the effects of, e.g., a change in income on equilibrium price and quantity via the Slutsky equations
- ...refresh their understanding of exponential and logarithmic models, particularly for analysis of growth, discounting and other dynamic processes
- ...use quadratic forms and derive first- and second-order optimization criteria, and apply these concepts to the theory of the household and theory of the firm
- ...use integral calculus in discounting and growth contexts
- ...apply Kuhn-Tucker conditions to obtain optimum values of complex models
- ...have an introduction to optimal control theory as used in resource economics

**Evaluation and Grading:** Your course grade will be based on three midterms (100 points each); regular homework assignments (100 points in total); and a final exam (200 points). For the final course grade, I will assign plus/minus modifiers to the standard letter grades.

Class participation will be a consideration in marginal cases. Blatant flattery probably won't hurt, either. Students are responsible for attending all class meetings, to submit homework (if called for), participate in discussion, receive occasional handouts, and to hear announcements about adjustments to the schedule. Lectures will sometimes present material not in the textbook. You are nonetheless responsible for understanding such material. If you don't understand it, ask for further explanation or additional references; you're probably not alone.

Homework assignments, when collected, are due at the beginning of the class period. Be prepared to submit the homework every day, although I will not collect every daily assignment, and will *not* announce in advance which ones will be collected. I will not accept late homework assignments. Make-up exams will not be offered except in the most dire, tragic and *well-documented* circumstances.

On homework assignments, students are encouraged to work together. The written narrative submission, however, should be your individual work, and it is this narrative that will form the basis of your grade.

Exams, whether in class or take-home, are to reflect *individual* work. Any copied submission will result in a semester grade of *F*.

**Disability Access:** If you feel you need reasonable accommodations because of the impact of a disability, please 1) contact the KOKUA Program (V/T) at 956-7511 or 956-7612 in room 013 of the QLCSS; 2) speak with me privately to discuss your specific needs. I will be happy to work with you and the KOKUA Program to meet your access needs related to your documented disability. Unhappily, missing one's habitual lunch hour or failing to get out of bed in time for the scheduled class meeting is not considered to generate a documentable disability.