

Economics 420  
**Mathematical Economics**  
Spring Semester 2005  
MWF 1:30-2:20  
Kuy 307

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Office Hours: 12:30-1:20 MW  
or by appointment

**Text:** A.C. Chiang, *Fundamental Methods of Mathematical Economics*, (2<sup>nd</sup> ed.) McGraw-Hill, 1984.

**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 core 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.

**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.

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.

**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 mid-day nap due to the class meeting schedule is not considered to generate a documentable disability.

The following schedule is subject to revision, as announced in class meetings. Do the reading before the date indicated.

FMx = Chiang, Fundamental Methods, chap x.

Date		Reading Assignment	Topic
10Jan05	Mon	Introduction	Procrastination
12-Jan-05	Wed	FM1&2	the nature of math in econ
14-Jan-05	Fri	FM3	Equilibrium analysis
17-Jan-05	Mon	Holiday: Martin Luther King Day	
19-Jan-05	Wed	FM4	Linear models & matrix algebra
21-Jan-05	Fri		
24-Jan-05	Mon		
26-Jan-05	Wed	FM5	More Linear Models & matrix algebra
28-Jan-05	Fri		
31-Jan-05	Mon	Handout	Input-output models
02-Feb-05	Wed		
04-Feb-05	Fri	Quiz 1	Chapters 1 - 5 + handout(s)
07-Feb-05	Mon	FM6	Comparative statics & derivatives
09-Feb-05	Wed		
11-Feb-05	Fri	FM7	Rules of differentiation
14-Feb-05	Mon		
16-Feb-05	Wed	FM8	Implicit-function theorem; Market & National Income models
18-Feb-05	Fri		
21-Feb-05	Mon	Holiday: Presidents' Day	
23-Feb-05	Wed	FM9	Optimization models
25-Feb-05	Fri		
28-Feb-05	Mon	FM10	Exponential & Logarithmic models
02-Mar-05	Wed		Growth/trend rates; interest compounding
04-Mar-05	Fri	FM11	Mutli-variable functions; partials Quadratic forms; convexity
07-Mar-05	Mon		
09-Mar-05	Wed	Quiz 2	Chapters 6 - 11 + handout(s)
11-Mar-05	Fri	FM12	Constrained optimization
14-Mar-05	Mon	Handout	Second-order conditions
16-Mar-05	Wed		Theory of the household; Slutsky equations
18-Mar-05	Fri		Theory of the firm; production functions; elasticity of substitution
21-Mar-05	Mon	Spring Break	
23-Mar-05	Wed	Spring Break	
25-Mar-05	Fri	Spring Break	
28-Mar-05	Mon	FM13	Dynamics & integral calculus: present value of cash flow
30-Mar-05	Wed	FM14	First-order differential equations
01-Apr-05	Fri		
04-Apr-05	Mon	FM15	Higher-order differential equations
06-Apr-05	Wed		
08-Apr-05	Fri	Quiz 3	Chapter 12 - 15.2 + handouts
11-Apr-05	Mon		Complex-roots cases
13-Apr-05	Wed	FM16	First-order difference equations
15-Apr-05	Fri		
18-Apr-05	Mon	FM17	Higher-order difference equations
20-Apr-05	Wed		
22-Apr-05	Fri	FM19&20	Linear programming; Kuhn-Tucker conditions
25-Apr-05	Mon		
27-Apr-05	Wed	Dynamic Optimization - handout	Resource economics & optimal control theory
29-Apr-05	Fri		
02-May-05	Mon		
04-May-05	Wed	Last day of instruction	Review
<b>13-May-05</b>	<b>Fri</b>	<b>Final Quiz: 2:15 - 4:15 pm</b>	<b>Final Quiz</b>