

MATHEMATICS FOR ECONOMICS

Fall, 2003
ECON 627 (001)
MW 3:00 -4:15 Saunders 244
Instructor: Professor S.-H. LEE

Course Description: This course introduces mathematical concepts and techniques commonly used in the graduate economics theory courses. This course covers the mathematics that is most frequently used by economists. Topics to be covered include linear algebra, vector calculus, unconstrained and constrained static optimization theory, differential and difference equations, and dynamic optimization theory.

Text:

Simon and Blume (1994) and Chiang (1992) are primary textbooks. Since the course will proceed rapidly, and much will hopefully be material you have covered before, you are encouraged to review what you can. An undergraduate textbook such as Chiang (1984) is good for quick review. All these books are required and available on the bookstore for purchase. Hoy et. al. (2001) includes a lot of application and very useful.

Simon, Carl P. and Lawrence Blume. 1994. *Mathematics for Economists*, W.W. Norton and Co.

Chiang, Alpha C. 1992. *Elements of Dynamic Optimization*, Waveland Press. (required)

Chiang, Alpha C. 1984. *Fundamental Methods of Mathematical Economics*, McGraw-Hill.

Hoy, Michael, John Livernois, Chris McKenna, Ray Rees, and Thanasis Stengos. 2001. *Mathematics for Economics*. 2nd ed. MIT Press.

<u>Grading:</u>	1 mid-term exam	32%
	1 final exam	40%
	7 homework	28%

There will be one midterm exam and one final exam. The mid-term exam will count for 32% and the final exam will count for 40% of the final grade. Seven homework assignments will count for 28% of the final grade. Those homework assignments are designed to help you prepare more effectively for the exams. Those homework assignments are due at the beginning of the class.

Exam Policy: Unless otherwise notified, there will be no makeup exam for the exams. You will receive grade 0.0 if you miss the final exam. If you cannot take the exam on the

scheduled time, you should contact me at least a week in advance to schedule a makeup exam. The mid-term exam will be at our regular class time. Final exam is scheduled at 2:15 - 4:15, December 15 (Monday).

Help: Office Hours: MW 1:15-2:30 or by appointment
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TA: Ming Liu
Office Hours: MW 9:00-10:30

<u>Important Dates:</u> August 25	First day of Instruction
October 19	Midterm Exam
December 10	Last day of Instruction
December 15	Final Exam

Schedule:

Outline for the Course

Chapters in the Textbook

Linear Algebra

Gaussian Elimination & Rank condition	Ch. 7
Matrices	Ch. 8
Inverse, Determinants, and Cramer's Rule	Ch. 9
Vector Spaces, Eigenvalue, Quadratic forms	Ch. 10

Multivariate Calculus

Implicit Function, Level Set, Taylor Expansion	Ch. 11
Unconstrained Optimization	Ch. 12
The Lagrange Multiplier Theorem	Ch. 13
Shadow Prices, The Envelope Theorem	Ch. 14
The Kuhn-Tucker Theorem	Ch. 15

Dynamic Methods

Difference Equations	Ch. 17, 18, 19
Systems of Difference Equations	Ch. 20, 24
Differential Equations	Ch. 21, 22
Systems of Differential Equations	Ch. 23, 24

Dynamic Programming

Introduction	Ch. 25, Chiang Ch. 1
The Calculus of Variations	Chiang Ch. 2, Ch. 3, Ch. 6
The Hamiltonian Function	Chiang Ch. 7
More on Optimal Control	Chiang Ch. 8
Infinite-Horizon Problems	Chiang Ch. 5, Ch. 9