

ECONOMICS 500
QUANTITATIVE METHODS IN ECONOMIC ANALYSIS I
FALL 2005
MTWRF 11-11:55, F 1:10-2:00 – 274 HEADY

Arne Hallam - Instructor

1. OBJECTIVES

The main objective of the first part of this course is for the student to be able to comfortably work standard problems in beginning graduate level micro and macroeconomic theory using tools from single and multi-variable calculus, elementary matrix algebra, and classical non-linear programming. Upon completion of the course students will be able to set up and analytically solve constrained and unconstrained non-linear optimization problems. The student will be able to address first and second order optimality conditions for such problems and use techniques from linear algebra to solve implied systems of equations. The student will also be able to perform comparative statics exercises on equilibrium or first order conditions arising from economic problems.

The main objective of the second half of this course is for the student to be able to comfortably work standard problems in beginning mathematical statistics. Topics to be covered include basic notions of probability, random variables, probability distributions for discrete and continuous random variables, expected value, multivariate distributions, functions of random variables, sampling distributions, estimation, confidence intervals, hypothesis testing, and properties of estimators. Based on this material the students will be prepared for an M.S. level course in econometrics and economic models of decision making under uncertainty.

The student will also demonstrate competence in using a mathematical analysis package (Mathematica) to solve economic and statistical problems.

Instructor:

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Office Hours:

MW 10:00-11:00 266B Heady
M 15:00-16:00 266B Heady
T 14:00-15:30 266B Heady

Office Hours:

R 13:00-16:00 83 Heady Hall

Date: August 19, 2005.

2. TEXTS

Sydsaeter, Knut and Peter Hammond. *Essential Mathematics for Economic Analysis*, Harlow, England: Pearson Education Limited, 2002.

Sydsaeter, Knut, Peter Hammond, Atle Seierstad and Arne Strøm. *Further Mathematics for Economic Analysis*, Harlow, England: Pearson Education Limited, 2005.

Wackerly, D.D., William Mendenhall III, Richard L. Scheaffer. *Mathematical Statistics with Applications*, 6th edition, Pacific Grove, CA: Duxbury, 2002.

3. WORLD WIDE WEB RESOURCES

The homepage for the course is at <http://www.econ.iastate.edu/classes/econ500/hallam>. The page contains a copy of this syllabus, problem sets, and other material.

4. EVALUATION

Students will be evaluated based on their ability to analyze problems in mathematics, mathematical economics and statistics. Students will demonstrate competence in a variety of ways including examinations, problem sets and in-class exercises. The following evaluation instruments will be used.

Class examinations - There will be seven in-class examinations. These examinations will be on 2 September, 16 September, 3 October, 14 October. The final exam for the course (over the statistics part only) will be on 14 December at 9:45 a.m. 700 points

Problem sets - There will be thirteen problem sets. They will be worth 25 points each. The highest 12 scores will count. Problem sets will be collected at the beginning of class on the due date. Late problem sets will not be accepted unless you have informed me prior to the due date that you will be unable to meet the deadline due to circumstances beyond your control. You may hand the problem sets in early. 300 points

Total possible 1000 points

Economics 500 - Fall 2005 Course Schedule

Month	Date	Day	Lec	Lecture Topic	Reading
Aug	22	M	1	Simple Univariate Optimization	SH I 8.1-8.4
Aug	23	T		No Class	
Aug	24	W	2	Simple Univariate Optimization	SH I 8.5-8.7
Aug	25	R	3	Multivariate Calculus	SH I 11.1-11.4
Aug	26	F	4	Multivariate Calculus (*)	SH I 11.5-11.8
Aug	29	M	5	Multivariate Optimization	SH I 13.1-13.2
Aug	30	T	6	Multivariate Optimization	SH I 13.3-13.4
Aug	31	W	7	Multivariate Optimization	SH I 13.5
Sep	1	R	8	Convexity and Optimization	SH II 2.1-2.5
Sep	2	F		Exam I	
Sep	5	M		Labor Day	
Sep	6	T	9	Matrix Algebra	SH I 15.1-15.5, SH II 1.1
Sep	7	W	10	Matrix Algebra and Systems of Equations	SH I 15.6, 16.1-16.3
Sep	8	R	11	Matrix Algebra and Systems of Equations	SH I 16.4-16.8
Sep	9	F	12	Geometry of Matrices (*)	SH I 15.7-15.8, SH II 1.3-1.4
Sep	12	M	13	Geometry of Matrices	SH I 15.9, SH II 1.5
Sep	13	T		No Class	
Sep	14	W	14	Quadratic Forms and Definite Matrices	SH II 1.8
Sep	15	R	15	Quadratic Forms and Definite Matrices	SH II 1.9
Sep	16	F		Exam II	
Sep	19	M	16	Simple Constrained Optimization	SH I 14.1-14.2
Sep	20	T	17	Simple Constrained Optimization	SH I 14.3-14.5
Sep	21	W	18	General Constrained Optimization	SH I 14.5, SH II 2.6-2.8
Sep	22	R	19	General Constrained Optimization	SH II 2.7-2.10
Sep	23	F	20	General Constrained Optimization (*)	SH II 3.1-3.4
Sep	26	M	21	Comparative Statics	SH I 12.1-12.4
Sep	27	T		No Class	
Sep	28	W	22	Comparative Statics	SH II 13.6, 14.6
Sep	29	R	23	Comparative Statics	SH I 12.5-12.7
Sep	30	F	24	Comparative Statics	SH I 12.8-12.10
Oct	3	M		Exam III	
Oct	4	T	25	Economics and Optimality	SH II 13.6, 14.6
Oct	5	W	26	Economics and Optimality	SH II 3.5, 3.6
Oct	6	R	27	Economics and Optimality	SH II 3.5, 3.6
Oct	7	F	28	Economics and Optimality (*)	SH II 3.7, 3.8
Oct	10	M	29	Univariate Integral Calculus	SH I 9.1-9.4
Oct	11	T		No Class	
Oct	12	W	30	Univariate Integral Calculus	SH I 9.5-9.6
Oct	13	R	31	Multivariate Integral Calculus	SH II 4.1-4.4
Oct	14	F		Exam IV	
Dec	14	W		Final Exam – 9:45-11:45	

* Lab at 11:00, Lecture at 13:10, ** Lecture by Sherry Qiao

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Month	Date	Day	Lec	Lecture Topic	Reading
Oct	17	M	1	Probability Concepts	WMS 2.1-2.2
Oct	18	T	2	Probability Concepts	WMS 2.3-2.5
Oct	19	W	3	Probability Concepts	WMS 2.6-2.8
Oct	20	R	4	Probability Concepts	WMS 2.9-2.10
Oct	21	F	5	Probability Concepts (*)	WMS 2.11-2.13
Oct	24	M	6	Random Variables	WMS 3.1-3.3
Oct	25	T		Exam V	
Oct	26	W	7	Random Variables	WMS 3.9-3.11
Oct	27	R	8	Random Variables	WMS 4.1-4.2
Oct	28	F	9	Random Variables (**)	WMS 4.3
Oct	31	M	10	Random Variables	WMS 4.9-4.10
Nov	1	T	11	Common Probability Distributions	WMS 3.4-3.5,3.8
Nov	2	W	12	Common Probability Distributions	WMS 4.4-4.7
Nov	3	R	13	Multivariate Probability Distributions	WMS 5.1-5.2
Nov	4	F		No Class	
Nov	7	M	14	Multivariate Probability Distributions	WMS 5.3-5.4
Nov	8	T	15	Multivariate Probability Distributions	WMS 5.5-5.6
Nov	9	W	16	Multivariate Probability Distributions	WMS 5.7-5.8
Nov	10	R	17	Multivariate Probability Distributions	WMS 5.11-5.12
Nov	11	F	18	Transformations of Random Variables	WMS 6.1-6.2
Nov	14	M	19	Transformations of Random Variables	WMS 6.3-6.4
Nov	15	T		Exam IV	
Nov	16	W	20	Transformations of Random Variables	WMS 6.5-6.6
Nov	17	R	21	Sample Moments	WMS 7.1-7.2
Nov	18	F	22	Sample Moments (*)	WMS
Nov	28	M	23	Basic Statistics	WMS 8.1-8.2
Nov	29	T	24	Basic Statistics (**)	WMS 8.3-8.4
Nov	30	W	25	Basic Statistics	WMS 9.1-9.4
Dec	1	R	26	Basic Statistics	WMS 9.6
Dec	2	F		Exam VII	
Dec	5	M	27	Basic Statistics	WMS 9.7
Dec	6	T	28	Confidence Intervals and Hypothesis Testing	WMS 8.5-8.6,8.9
Dec	7	W	29	Confidence Intervals and Hypothesis Testing	WMS 10.1-10.3
Dec	8	R	30	Confidence Intervals and Hypothesis Testing	WMS 10.4-10.7
Dec	9	F	31	Confidence Intervals and Hypothesis Testing	WMS 10.8-10.12
Dec	14	W		Final Exam – 9:45-11:45	

* Lab at 11:00, Lecture at 13:10, ** Lecture by Sherry Qiao