INTRODUCTION TO MATHEMATICAL ECONOMICS, Econ 4808-200

Class Hours: MTWRF 1245 P.M. to 220 P.M. @ HLMS ROOM 137

University of Colorado, Summer 2001

Instructor: Vijaya R. Sharma, Ph.D.

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Textbook


Course Description

Prerequisites: Math 1050, 1060, 1070, 1080, 1090, or 1100; or Math 1300 or higher; or Econ 1078 or 1088

This course provides basic mathematical tools and techniques required for studying economics. Methods of static analysis, comparative static analysis, and optimization techniques will be introduced. Emphasis would be on illustrations and practical problems related to economic decisions of households, firms, and markets.

Tentative Schedule

Introduction (Chapters 1 and 2 and Pages 282-292 of Chapter 10): July 10, 11
Real Numbers, Sets, Univariate and Multivariate Functions and Types of Functions (Linear, Quadratic, Power, Polynomial, Exponential, Logarithmic) Rules of Exponents and Logarithms

Compounding and Discounting Methods (Chapter 10: Pages 280-281, Chapter 13: Pages 462-464): July 11, 12, 13
Discrete versus Continuous Growth
Compounding Formulas and Applications
Discounting Formulas and Applications

Equations, Roots, and Repeated Substitution Method (Chapter 3): July 16, 17, 18
Roots of Linear and Quadratic Equations
Repeated Substitution Method for Solving Simultaneous Equations
Applications to Economic Models and Comparative Static
Definitions and notations

Basic matrix operations

Determinant and Inverse of a Square (2x2) Matrix

Solving Univariate Systems of Linear Equations and Applications

Determinant and Inverse of higher order matrices

Cramer's rule and Applications

Characteristic roots and vectors of square matrices

Univariate Differential Calculus: July 27,28,31 (Chapters 6,7): July 26,27,30,31

Difference Quotient and Derivative

Concept of Limit and Differentiability of a Function

Rules of Differentiation, First and Second Derivatives

Tests of Continuity and Monotonicity of a Function

Average versus Marginal (Slope of Ray versus Slope of Curve)

Economic Applications

Taylor Series Expansion of a Polynomial Function (Pages 256-257 of Chapter 9)

Multivariate Differential Calculus: Aug 1,2 (Chapters 7,8): Aug 1,2,3

Partial Derivatives and Rules for Partial Derivatives

Economic Applications

Total Differential and Implicit Function Theorem

Unconstrained Optimization Techniques: Aug 3,6,7

Univariate Functions (Chapters 9 and 10)

Stationary Point, Extreme Value (Global versus Local) Convexity/Concavity

First Order and Second Order Conditions for Extreme Value

Economic Applications

Multivariate Functions (Chapter 11)

First Order and Second Order Conditions for Extreme Value

Economic Applications

Equality-Constrained Optimization Techniques: Aug 8,9,10 (Chapter 12)

Substitution Method
Examinations and Grading

The course grade will be determined from five quizzes, each of equal weight, given on each Monday (July 16, 23, 30, Aug 6) and on the last day of the class (Friday, Aug 10). Each quiz will test the students on materials covered during the week preceding the quiz. Note that the quizzes will be given in the class towards the last 30 to 40 minutes of the class period. Practice questions will be suggested for each chapter, but they will not be counted towards grading. Students are encouraged to solve the practice questions and consult the instructor for any help.