INTRODUCTION TO MATHEMATICAL ECONOMICS, Econ 4808-200

Lectures: MTWRF 1245 P.M. to 220 P.M. @ Econ 13
Instructor: Vijaya R. Sharma, Ph.D.
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Textbook
Fundamental Methods of Mathematical Economics, by Alpha C. Chiang

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
Equations, Roots, and Repeated Substitution Method of Solving Simultaneous Equations (Chapter 3): July 9, 10
  Roots of Linear and Quadratic Equations, Repeated Substitution Method for Solving Simultaneous Equations, Applications to Economic Models and Comparative Static
Matrix Algebra and Solving System of Equations (Chapters 4,5): July 11, 12, 15, 16, 17
  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 (Chapters 6,7): July 18, 19, 22, 23
  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 (only the relevant pages of Chapter 9)
Multivariate Differential Calculus (Chapters 7,8): July 24, 25, 26
  Partial Derivatives and Rules for Partial Derivatives, Economic Applications
  Total Differential and Implicit Function Theorem
Unconstrained Optimization Techniques: July 29, 30, 31
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 (Chapter 12): Aug 1, 2, 5, 6
  Substitution Method, Lagrange Multiplier Method, Economic Applications
  Homogeneity, Homotheticity, and Euler's Theorem
Integral Calculus (Chapter 13): Aug 6, 7, 8, 9
  Basic Rules, Indefinite, Definite and Improper, Economic Applications

**Examinations and Grading**
The course grade will be determined from five quizzes given each Tuesday (July 16, 23, 30, Aug 6) and on the last day of the class (Friday, Aug 9). Each quiz will be of 30-40 minutes duration and will test the students on materials covered during the week preceding the quiz. Practice questions will be suggested for each chapter.