

Mathematics for Economists
PEPM U8120. Summer 2012
Syllabus

Lectures: MW 9:00am-10:50am, and two Fridays only (F 7/13 and F 7/20).

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Objectives:

The objective of this course is to provide a review of the uses of mathematics in the study and application of economics. We will approach mathematics as a way of demonstrating relationships and formalizing concepts in economics. By the end of the course you should be familiar with the mathematical tools covered in class and be able to use these tools in formalizing and solving problems in economics.

Required Textbook:

Fundamental Methods of Mathematical Economics, 4th Edition, 2005, Alpha C. Chiang and Kevin Wainwright, University of Connecticut, ISBN-13: 9780070109100, McGraw-Hill/Irwin, New York. One copy of this book is shelved in the Lehman Library Course Reserves. (Referred to as **CW**)

Recommended Textbook (for the first half of the course):

Schaum's Outline of Mathematical Methods for Business and Economics, Edward T. Dowling, Fordham University, ISBN-13: 9780071635325, 2009, McGraw-Hill (Referred to as **D**)

Exam dates and Problem sets:

The midterm will take place in class on Monday July 30th. The final will take place in class on Wednesday August 15th.

You will be assigned 5 problem sets. You are encouraged to work in groups (composed of not more than 4-5 students). If you work in a group, submit only one problem set for each group. Your problem sets will not be returned to you.

Grading

Test	Points
Midterm exam	35 points
Final exam	35 points
Best grade between midterm and final	10 points
Problem sets	20 points
Total	100 points

Outline of the course

- Overview and Basics: Exponents, Polynomials, Factoring.
Assigned readings: **D** Ch. 1, **CW** Ch. 1, Ch. 2, Ch. 10.1-10.4.
- Functions and Economic Models: Vocabulary of Functions, Types of functions, Monotonic Transformation, Homogenous Functions.
Assigned readings: **D** Ch.3, Ch.11.1-11.6, **CW** Ch.2, 3, 12.6.
- Equations and Graphs: Cartesian Coordinates, Slope, Intercept, Determining a Straight Line
Assigned readings: **D** Ch. 2
- Systems of Equations: Solution by Substitution, by Elimination, Algebraic, and Graphical
Assigned readings: **CW** Ch.3
- Derivatives and Rules of Differentiation of Function with One Variable: Rate of Change and Derivative, Slope and Derivative, Limits, Continuity and Differentiability.
Assigned readings: **D** Ch.9, **CW** Ch.6, Ch.7
- Differentials, Total Differentials and Total Derivatives. Rules for Differentials, Derivatives of Implicit Functions.
Assigned readings: **D** Ch.11.7-11.9, **CW** Ch.8, Ch. 10.5
- Optimization.
Assigned readings: **D** Ch.7.1-7.2, **CW** Ch.9.1-9.4, Ch.11.1-11.2.
- Optimization with Constraints.
Assigned readings: **CW** Ch.12.1-12.3
- Topics in Optimization (Nonlinear Programming): Kuhn-Tucker Conditions, Maximum-Value Functions and the Envelope Theorem.
Assigned readings: **CW** Ch.13.1, Ch.13.5.
- Dynamics and Integration: Indefinite Integrals and Definite Integrals.
Assigned readings: **CW** Ch.14
- First-Order Differential Equations First-order Linear Differential Equations with Constant Coefficient and Constant Term, Dynamic Stability, First-order Linear Differential Equations with Variable Coefficient and Variable Term, Methods of Solution
Assigned readings: **CW** Ch.15
- *Time permitting*: First-order Difference Equations Solving First-order Difference Equations, Dynamic Stability of Equilibrium, Qualitative and Graphical Approach to Non-linear Difference Equations.
Assigned readings: **CW** Ch.17