

## **Math for Econ (Econ 3620 - 001)**

Class Time: Monday and Wednesday 8:05 – 9:25 am

Place: BUC 106

Instructor: Naphon Phumma

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Office: OSH 213

Office Hours: Monday and Tuesday 10:30 – 11:30 am or by appointment

### **Overview**

Nowadays, economists use mathematics as a major tool in their analyses, and, hence, many advanced mathematical techniques have been developed and applied in the makings of economics knowledge. Therefore, learning how mathematics is used in economics is as important as learning economics theories. This course is intended to introduce students to how mathematics is applied to economics theories and develop students' abilities to use mathematical techniques to solve problems in economics. In addition, students must be aware that the real use of mathematics in economics is far more advanced than what they see in the class, so this course is intended to be the 'first step' for those who are interested in mathematical economics.

### **Goal**

Students can express simple economic problems in mathematics. Also, they can understand basic mathematical techniques often used in economics such as linear algebra, derivative, differential, optimization with and without constraints, and matrix algebra, and can use these techniques to solve economic problems.

### **Required Textbook**

*Schaum's Outline Introduction to Mathematical Economics* by Edward Thomas Dowling

### **Course Requirements:**

Three Homework assignments      3 x 14% = 42% (2 for extra credits)

Three Exams                              3 x 20% = 60%

### **Policy for late assignments**

Turning in assignments as hard copies at the beginning of the class is preferable. If they cannot attend the class when the assignments are due, they must drop their work at my office by themselves before 5 pm of the due date. Or, if they do not come to the school, they must scan their work and send to my email before 5 pm of the due date. Late assignments will be accepted within one week after the due date, and they will be penalized for 20% from their full points. Please note that no work will be accepted after one week from the due date.

### **Schedule**

Week 1

August 20 Nature of Mathematical Economics & Economic Models

August 22 Economic Model: Function

Week 2

August 27 Constructing a model: Single Commodity

August 29 Constructing a model: General Market

Week 3

September 3 Labor Day: No Class

September 5 Difference Quotient and Slope (**Assignment 1 Given**)

Week 4

September 10 Rules of Differentiation

September 12 Rules of Differentiation (**Due for Assignment 1**)

Week 5

September 17 Optimization: First Derivative

September 19 Optimization: Second and Higher Derivatives, and Second-Derivative Test

Week 6

September 24 Review for Exam 1

September 26 Exam 1

Week 7

October 1 Partial Differentiation and Multivariable Calculus

October 3 The Uses of Partial Differentiation in Economics

Week 8

October 8 Fall Break

October 10 Fall Break

Week 9

October 15 Total Derivatives

October 17 Differentials

Week 10

October 22 Optimization: Second-Order Partial Derivatives

October 24 Optimization of Multivariable Functions (**Assignment 2 Given**)

Week 11

October 29 Effects of a Constraint: Lagrange – Multiplier method

October 31 Effects of a Constraint: Lagrange – Multiplier method (**Due for Assignment 2**)

Week 12

November 5 Review for Exam 2

November 7 Exam 2

Week 13

November 12 Matrices and Matrix Operations

November 14 Determinants

Week 14

November 19 Matrix Inversion (**Assignment 3 Given**)

November 21 Thank Giving Holiday: No Class

Week 15

November 26 Solving Linear Equations with Matrix Inversion

November 28 Cramer's rule (**Due for Assignment 3**)

Week 16

December 3 Review for Exam 3

December 5 Exam 3 in the class time