

# ECON 1101 Mathematical Methods in Economics I

A: Mon 4:30-6:15pm ELB LT2

B: Tue 8:30-10:15am ELB LT2

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## Purpose of this Course

We will introduce basic mathematical tools that are indispensable in modern economics. Topics include sets, matrix algebra, exponential and logarithmic functions, differentiation and unconstrained optimization. Related economic applications will also be discussed.

## Learning Outcomes

Upon completing this course, students are expected to be familiar with basic mathematical tools such as matrix and differentiation, and should be able to use them to analyze basic mathematical models in economics. They should also be able to use computer programs to aid their analysis.

## Textbook

Required textbooks:

- Ron Larson: [Elementary Linear Algebra 8th Edition](#)
- James Stewart: [Calculus, International Metric Version 8th Edition](#)

Optional reference:

- Alpha C. Chiang and Kevin Wainwright: Fundamental Methods of Mathematical Economics, fourth edition, McGraw-Hill Book Company (2005)

## Python

We will frequently use the Python programming language to solve mathematical problems in class. You are required to bring a laptop to class. We will use the Anaconda Scientific Python Distribution for Python 3.6 (<https://www.anaconda.com/download/>), which supports all major operating system platforms. Please download and install Anaconda before the second class, and preferably before the first class.

## Tentative Grading

Assignments - 50%

Final Exam - 50%

### *Assignments*

There will be in-class assignments in most of the weeks, plus several take-home assignments. When calculating your course grade, the assignment with the lowest grade will be dropped.

### *Make up exam*

A student who does not show up in an exam will be given a zero for that exam. Except in an emergency, I do not want to give make-up exams.

### *Re-grades*

If you feel that an error has been made in the grading of the question on an examination you can submit the exam in question for a regrade. Regrade requests have to be submitted no more than one week after the examination in question was returned to you. Please note that the entire exam will be reviewed for accuracy.

## Class Schedule

1. Introduction
  - a. Number Systems
  - b. Sets
  - c. Functions
  
2. Linear Models and Matrix Algebra
  - a. Gauss-Jordan Elimination (Larson 1.2)
  - b. Matrix Operations (Larson 2.1, 2.2)
  - c. Markov Process (Larson 2.5)
  - d. Determinant (Larson 3.1-3.3)
  - e. Inverse (Larson 2.3, 3.4)
  - f. Cramer's Rule (Larson 3.4)
  - g. Ordinary Least Square (Larson 5.4)
  
3. Differentiation
  - a. Definition of Derivative
  - b. Limit and Continuity
  - c. Differentiation Rules
  
4. Unconstrained Optimization
  - a. First-Order Condition
  - b. Second-Order Condition
  
5. Partial Differentiation (If time permits)