

**AAE635**  
**Applied Microeconomic Theory**  
**Syllabus**

Fall 2025  
B30 Taylor Hall  
T, Th 9:30am-10:45am

**Instructor:**

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Office Hours: W, 1:30pm-2:30pm, or by appointment

**Teaching Assistant:**

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Office Hours: M, 10:00am-12:00pm, room 215  
Sections: B30 Taylor Hall, M 4:00pm-4:50pm

**Credit hours: 3 credits**

This class meets for two 75-minute class periods each week over the fall semester and carries the expectation that students will work on course learning activities (reading, writing, problem sets, studying) for about 3 hours out of classroom for every class period. The syllabus includes more information about meeting times and expectations for student work.

**Instructional mode: Face-to-face**

**Prerequisites:**

Intermediate Micro (Econ. 301), one semester of calculus and one semester of linear algebra.

**Learning Goals and Outcomes:**

Microeconomics studies systematically the economic decision rules followed by consumers and firms in solving their constrained optimization problems. It also evaluates the welfare consequence of such decisions in the context of a society or a sector. We will cover the following topics:

1. Optimization theory for firms and consumers;
2. Duality in analyzing economic behavior;
3. Welfare consequences of economic decisions; and
4. General equilibrium analysis applying to a sector or an economy.

Learning outcomes:

1. Acquaint students with formal models of economic problems such as production and consumption allocations and the efficiency consequences.
2. Develop students' analytical and mathematical skills for conducting such analyses.
3. Articulate and critique theories and practices in such analyses.
4. Communicate clearly economic and policy issues related to such analyses.

## **Primary Reference:**

The primary “textbook” is the detailed lecture notes specifically designed for this class. They are posted on the canvas class website (in a timely manner).

## **Optional References:**

Some students found the following books useful in helping them walk through this course:

Eugene Silberberg and Wing Suen, "The Structure of Economics: A Mathematical Analysis," Third Edition, McGraw-Hill, 2001. (A review of basic mathematical tools is provided in chapters 2, 3, 5 and 14)

Hal R. Varian, “Microeconomic Analysis,” Third Edition, Norton & Company Ltd., NY. (A nice feature of this book is the compactness of how the basic concepts are presented, although some may view it as its “weakness”)

Sydsater, K., A. Strom and P. Berck, “Economists’ Mathematical Manual”, Springer-Verlag Berlin, Heidelberg 1999. (Collection of mathematical and statistical formulas and definitions, as well as economic results and theorems, very handy and useful in and beyond this class)

## **Homework:**

There will be a total of six problem sets. Students may form study groups to work on the homework together, but each student must submit their own answers.

## **Writing Assignment (Bonus):**

There will be an opportunity to receive extra credit (up to an equivalent of 5% of your total grade). The assignment is due on the last day of class, but you can turn it in anytime during the semester. The assignment entails finding a newspaper article published by a reputable source that describes an economic phenomenon that has relevance to consumers, producers or policymakers. Based on this economic phenomenon, you should develop a research question and derive hypotheses using microeconomic theory. Your objective is to transform a practical issue into an economic problem that enables you to make theoretical predictions using the tools of the course. Your analysis does not need to be a complete treatment but should provide enough structure so that the reader can follow the logic of your preferred hypothesis. The assignment should consist of no more than two pages of text, not including references, figures or mathematical appendices. You should provide a title, clearly state the economic problem, specify and motivate the research question, set up your analysis and derive a hypothesis.

To help this process along, throughout the semester, we will periodically do similar analysis in class. You are encouraged but not required to share any newspaper articles that you find interesting with the class.

## **Grading:**

Midterm Exam I	35%
Midterm Exam II	35%
Homework	30%

Grading Scale: 100-90 A, 89-85 AB, 84-76 B, 75-72 BC, 71-63 C, 62-56 D, 55-0 F

## Overview of Contents:

1. Introduction (Lecture 1; Lecture Note 1)
  - a. Overview of course
  - b. What is Microeconomics?
2. Introduction to the Theory of Firms (Lecture 2; Lecture Note 2)
  - a. Neoclassical Theory of the Firm
  - b. Mathematical Analysis of Firm Decision
  - c. Single Input Optimization Problem
3. Unconstrained Optimization (Lecture 3; Lecture Note 3)
  - a. Single Output Multiple Inputs Model
  - b. Mathematical Tools
4. Theory of Firms (I) (Lectures 4-6; Lecture Note 4)
  - a. Profit Maximization
  - b. Production Behavior
    - i. Homogeneity Property
    - ii. Input Demand Function
    - iii. Output Supply Function
    - iv. Hotelling's Lemma
    - v. LeChatelier Principle
5. Constrained Optimization (Lecture 7; Lecture Note 5)
  - a. Mathematical Tools
  - b. Unconstrained Approach
  - c. Lagrange Approach
6. Theory of Firms (II) (Lectures 8-9; Lecture Note 6)
  - a. Cost Minimization
  - b. Production Behavior
    - i. Input Demand Function
    - ii. Comparative Statics
    - iii. Shepherd's Lemma
7. Duality in the Theory of the Firm (Lecture 10-11; Lecture Note 7)
  - i. Cost Function
  - ii. Profit Function
  - iii. Primal-Dual Results
8. Theory of Firms (III) (Lectures 12-13; Lecture Note 8)
  - a. Production Function and Returns to Scale
  - b. Input Substitution and Output Effects
  - c. Long Run Equilibrium
  - d. Market Structure

- i. Imperfect Competition

*Interlude: Discussion Paper*

- 9. Consumer Theory (I) (Lectures 14-17; Lecture Note 9)
  - a. Consumption Decisions
    - i. Utility Function
  - b. Consumption Behavior
    - i. Marshallian Demand Function
    - ii. Hicksian Demand Function
    - iii. Property of Demand
  - c. Primal Dual Approach
    - i. Indirect Utility Function
    - ii. Expenditure Function
    - iii. Slutsky Equation
- 10. Consumer Theory (II) (Lectures 18-20; Lecture Note 10)
  - a. Duality in Consumer Theory
  - b. Implication for Welfare Analysis
    - i. Price Changes
    - ii. Quantity Changes
    - iii. CV, EV, and Consumer Surplus
  - c. Household Production
    - i. Time and Labor Allocation
- 11. Economic Efficiency (Lectures 21-24; Lecture Note 11)
  - a. Pareto Efficiency
  - b. Market Equilibrium
    - i. First and Second Welfare Theorems
  - c. Market Distortion
    - i. Externalities and Public Goods
    - ii. Uncertainty, Risk and Ambiguity
    - iii. Imperfect and Asymmetric Information
  - d. Government Intervention
    - i. Benefit Cost Analysis

*Interlude: Discussion Paper*