# AAE635
# Applied Microeconomic Theory
# Syllabus

Fall 2023
Lecture: Tuesday/Thursday, 11:00am – 12:15pm
Section: Monday, 4:00 – 5:00pm
B30 Taylor Hall

## Instructor:
Guanming Shi, 429 Taylor Hall, Email: gshi@wisc.edu
OH: T/TH 12:15-1:00pm, or by appointment

## Teaching Assistant:
Ziheng Liu, 517 Taylor Hall, Email: zliu533@wisc.edu
OH: TBA

## 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. It is your choice whether to refer to these books or not:

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")

Another useful handbook you may consider:

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 out the homework, but each student must submit your own answers.

## 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)
           a.  What is Microeconomics?
           b.  Neoclassical Theory of the Firm
           c.  Mathematical Analysis of Firm Decision

2.     Theory of Firms (I) (Lecture 2)
           a.  Single Input Optimization Problem
           b.  Analytical Solutions

3.     Unconstrained Optimization (Lecture 3)
           a.  Single Output Multiple Inputs Model
           b.  Mathematical Tools

4.  Theory of Firms (II) (Lectures 4-6)
    a. Profit Maximization
    b. Production Behavior
        i. Input Demand Function
        ii. Output Supply Function
        iii. Comparative Statics
    c. Homogeneity Property
    d. LeChatelier Principle

5.  Constrained Optimization (Lecture 7)
    a. Mathematical Tools
    b. Unconstrained Approach
    c. Lagrange Approach

6.  Theory of Firms (III) (Lectures 8-11)
    a. Cost Minimization
    b. Production Behavior
        i. Input Demand Function
        ii. Comparative Statics
    c. Duality
        i. Cost Function
        ii. Profit Function
        iii. Primal-Dual Results
    d. Market Structure
        i. Imperfect Competition

7.  Theory of Firms (IV) (Lectures 12-14)
    a. Production Function and Returns to Scale
    b. Input Substitution and Output Effects
    c. Long Run Equilibrium
        i. Nash Game
        ii. Property of the Equilibrium

8.  Consumer Theory (I) (Lectures 15-18)
    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

9.  Consumer Theory (II) (Lectures 19-22)

      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

10.     Economic Efficiency (Lectures 23-26)
      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