

AAE771 (Module I)
Theory to Practice:
Fundamentals of Resource and Energy Demand Analysis
Syllabus

Fall 2017
Monday/Wednesday, 11:00am – 12:15pm
B30, Taylor Hall

Instructor:

Guanming Shi, 329 Taylor Hall, Email: gshi@wisc.edu
OH: Tuesday and Thursday 12:15-1pm, or by appointment

Teaching Assistant:

Ethan Young, 315 Taylor Hall, Email: eryoung2@wisc.edu
OH: TBA

Overview:

Microeconomics studies 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. In this class, with the focus on resource and energy demand analysis, we will cover the following topics:

1. Firm profit maximization and cost minimization;
2. Utility Maximization problem of the consumer;
3. Duality in analyzing production and consumption behavior;
4. Consumer Welfare.

Primary Reference:

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

Homework:

There will be two problem sets. Students may form study groups to work out the homework, but each student must submit own answers.

Grading:

Homework	40%
Exam	60%

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. Firm Theory (Sept. 6, 11, 13, 18, 20)
 - a. Introduction

- b. Profit Maximization
 - c. Cost Minimization
 - d. Monopoly, entry/exit and long run equilibrium
 - e. Primal-dual approach
2. Consumer Theory (Sept. 25, 27, Oct. 2, 4)
- a. Utility Maximization
 - b. Expenditure Minimization
 - c. Duality in Consumer Theory
 - d. Consumer Welfare
3. Exam (Oct. 9)

AAE 771
Module 2
October 11 – November 10

Professor: Jeremy Foltz
Jeremy.Foltz@wisc.edu

Overview

This module will provide further explorations of microeconomic theory and an introduction to the theory and practice of technology adoption and diffusion. The technology adoption part will provide an introduction to the theory and then will focus on the key empirical model of the diffusion process, the Bass model, which is used in much of the industry. The final lecture will match some of the theory to empirical modeling exercises.

Learning Goals: You can expect to develop:

- 1) An understanding of supply and demand equilibrium analysis
- 2) An understanding of monopoly, oligopoly models
- 3) An understanding of technology adoption including Bass models
- 4) The ability to employ #1, #2, and #3 to analyze real world problems

Assignments:

- 1) Three homework assignments
- 2) Mid-term exam at the end (November 10)

Grading: This module is worth 33% of your total grade for AAE 771. Your 33 points will be allocated as follows:

- 1) Three homework assignments: 15 points (5 points each)
- 2) Mid-term exam at the end 18 points.

Readings:

Varian, Hal. *Microeconomic Analysis 3rd Edition*. New York: W.W. Norton. 1992

Varian, Hal. *Intermediate Microeconomics With Calculus*. New York: W.W. Norton. 2014.

Readings on technology adoption available on the website

Lectures:

October 11 Equilibrium of supply and demand

Readings: Varian Microeconomic Analysis ch. 13; Varian Int. Microeconomics ch 16

October 13 Discussion: Supply and Demand: Examples, intro to homework #1

October 16 Monopoly

Readings: Varian Microeconomic Analysis ch 14; Int. Microeconomics ch 2

October 18 Monopoly pricing, behavior and natural monopolies

Readings: Int. Microeconomics Ch 26

**October 20 Discussion: Monopoly pricing, intro to homework #2
(Homework #1 due)**

October 23 Oligopoly

Reading: Varian MA ch 16; IM ch 28

October 25 Technology adoption 1: Theory

Reading: Rodgers, *The Diffusion of Innovations*. Chapter 1, 7

October 27 Discussion: Oligopoly and Technology adoption

October 30 Bass Model intro

(Homework #2 due)

Reading:

“The Bass Model home page.pdf”

Deepa Chandrasekaran, Gerard J. Tellis (2007), A Critical Review of Marketing Research on Diffusion of New Products, in Naresh K. Malhotra (ed.) *Review of Marketing Research* (Review of Marketing Research, Volume 3) Emerald Group Publishing
Pages 39-57 only

November 1 Technology adoption 3: Bass models examples

Reading

Bass et al-“DIRECTV Forecasting diffusion of a new tech prior to product launch”-*Interfaces*-2001

Supplemental reading (Grey literature example of a report using Bass)

Holland, Christine “Are LEDs the Next CFL:A Diffusion of Innovation Analysis”. Northwest Energy Efficiency Alliance.

November 3 Discussion: Empirically testing the Bass model: Intro to Homework #3

“Which Bass Model should I use.pdf”

ICT Facts and Figures.pdf

Statwizards. “Estimating Diffusion Curve Parameters”

Jiang Bass & Bass-Table only-Int J of Res in Marketing-2006

Excel sheets:

Explore Bass model equations.xlsx

Example Est of Bass Parameters-Cellphones.xlsx

Mobile_cellular_2000-2013.xlsx

November 6 Economics of Information Technology: Problem of complements, Technology lock-in, Network externalities, Two-sided markets, & Intellectual Property management.

Reading: Varian IM w/ Calc Chapter 36

November 8 Empirical measurement of the theory

Reading: Varian MA ch 12

Timma et al. Innovation and adoption of energy efficient lighting. 2015

Andrews & Krogmann “Adoption of energy efficient tech in US

Commercial buildings” *Energy and Buildings* 41 (2009) 287–294

Opinion Dynamics. “LED Lighting Pricing Trials” 2012.

(Homework #3 due)

November 10 MID-TERM in discussion period

AAE 771
Module 3, Cost-Benefit Analysis
November 13-December 15, 2017

Instructor: Prof. Corbett Grainger
Department of Ag and Applied Economics
412 Taylor Hall
E-mail: corbett.grainger@wisc.edu
Phone: 262-3651
Office Hours: by appointment

TA Ethan Young

Class Website: Canvas (Check for announcements, readings, assignments, grades, etc.)

Course Goals and Assessment: My goal for this course is to introduce students to how economists use cost-benefit analysis to analyze economic choices. Successful students will learn

- the basic framework of cost-benefit analysis.
- how and why economists discount future benefits and costs.
- how to critically analyze environmental and energy problems as well as proposed solutions;
- how economists compare costs and benefits of generations that live centuries apart;
- how to account for equity considerations.

Expectations: Students are expected to work through the readings and come to class prepared to participate. Students are assumed to be familiar with basic mathematics (algebra, geometry) and principles of economics and statistics covered so far in the REDA curriculum. Most importantly, students should be prepared to be challenged and to ask questions. Students can expect the professor and the teaching assistant to facilitate learning through class time, assignments, and office hours.

Readings: There are good treatments of cost-benefit analysis available, but I will try to make critical readings available in pdf format on the course website and through handouts. Case studies will also be posted on the course website. Students will be responsible for understanding all material from required readings.

Academic Honesty: I have *zero* tolerance for cheating of any kind. If I find you cheating, not only will you receive a zero for that assignment, quiz or exam, but I will also do my best to pursue harsher treatment through the university. Consult the University's policy regarding academic misconduct.

While I encourage students to work together on homework, you must *turn in a write-up that represents your own work and understanding of the material*. Verbatim (or suspiciously similar) copies of homework answers will be considered cheating. Do your own work and everything will be fine.

Special Accommodations: Please contact me directly if you have a disability that requires special accommodations.

Email: Please use email sparingly, and write clearly and professionally. Keep in mind that many questions cannot properly be answered via email. Although I try to reply in a timely manner, do not expect an immediate response. Questions of clarification should be sent to your *Teaching Assistant*.

Lecture Notes: I will do my best to make lecture notes available prior to each lecture. The notes are meant to complement (not substitute) your attendance in class. The notes cover some of the main points in class but are by no means exhaustive.

Announcements: Any announcements regarding this class will be posted online and/or sent to your university e-mail account. Please check your e-mail and the course website regularly.

Homework (and/or Quizzes): Homework problems will be assigned in class, and they will be due at the beginning of class on the due date (no exceptions!). If you cannot come to class on the day it is due, you should drop it in my mailbox **before** class starts.

Although I generally do not do so, I reserve the right to have a quiz on the day that the assignment is due. The quiz would be based on (or even taken directly from) the homework questions.

Late homework will not be accepted.

Exams: There will be one comprehensive final exam. The exam will cover questions from class, notes, discussion section, or assigned readings. With the exception of *calculators*, all electronic devices must be turned off and out of reach during exams, no exceptions.

Policy on Missed Quizzes or Exams: Out of fairness to everyone in the class, exams are only given at the assigned time and cannot be made up afterward. If you cannot attend an exam due to a personal emergency outside your control, please let me know beforehand if at all possible. If you miss an exam for a non-emergency, you will receive a zero.

Grading: Your final grade will be based on the following components and weights.

Participation:	3%
Assignments:	15%
Final Exam:	15%

Nota Bene: I retain the right to change the schedule and structure of this course. Any changes will be announced in class and posted on the course website.