

Carnegie Mellon University  
Tepper School of Business

45-750  
(6 units)

Managerial Economics

Fall 2006

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|                 |            |                    |                 |                      |
|-----------------|------------|--------------------|-----------------|----------------------|
| Class Meetings: | Section A2 | Monday & Wednesday | 1:30pm - 3:20pm | rm 153               |
|                 | Section B2 | Monday & Wednesday | 3:30pm - 5:20pm | rm 153               |
|                 | Section M2 | Tuesday & Thursday | 6:00pm - 7:50pm | rm 240 (2-way video) |
|                 | Section F2 | Tuesday & Thursday | 8:00pm - 9:50pm | rm 152               |

### **TEXTBOOK (optional)**

Microeconomics: An Integrated Approach Second Edition (2005), (ISBN 0-471-45769-8) by David Besanko and Ronald R. Braeutigam, published by John Wiley and Sons, Inc. (Because the book is optional, I have not asked the CMU bookstore to stock it. The best price for this book is on Amazon.com. A used copy will likely meet your needs.)

Note that the textbook is optional. The classroom lectures will be a combination of theory, models and applications. The book should be viewed as a complement to the lectures for those individuals who need, or would like to see, additional applications. The mathematical presentation in the class is more advanced than in the book. However, the book is full of wonderful examples.

### **PROBLEM SETS**

Managerial economics is only learned through working problems. This means you must understand the homework problems and the examples worked in class. Individually working and understanding the problems is beneficial for two reasons. First, this is what you must do to learn economics and be able to apply these concepts in future courses and in your career. Second, the problem sets and the class examples are similar to the problems on the midterm and the final, therefore understanding the problems is needed to earn a satisfactory course grade.

There will be weekly problem sets to give you practice working problems. Each problem set is worth 100 points. Answers will be made available. Although I do not encourage it in this course, you may work in small groups on the problem sets. However, each person must submit their own answers. Copies of another person's work are not acceptable. The problem sets are due at the beginning of class on the due date. Late problem sets are not acceptable, i.e. you will receive a zero. As an added incentive, if all six problem sets are turned in with serious attempts made on each problem, then your lowest problem set grade will be dropped. If someone does not turn in a problem set then their problem set average will be the average of six grades, of which at least one is a zero. If all the problem sets are turned in, the problem set grade will be the average of the five highest grades.

Your course packet contains last year's problem sets and exams. It is inappropriate to use course packets from previous years. Note that this prevents the course from becoming too mathematical.

## GRADING

The final course grades will be determined by the following method:

|                             |      |
|-----------------------------|------|
| Problem Set Average         | 20%  |
| Mid-Term Grade              | 35%  |
| Cumulative Final Exam Grade | 45%. |

This will not be changed under any circumstances. Please take your midterm seriously. Final letter grades will be determined by the following scale:

|            |             |
|------------|-------------|
| A          | 90 - 100    |
| B          | 80 - 89.999 |
| C          | 70 - 79.999 |
| R(failure) | Below 70.   |

I may choose to curve the final class grades; however, this will not hurt anyone. A curved grade can only be higher than the grade given by the above scale. Plus or minus will be assigned on natural breaks in the distribution of final grades.

## GRADING PROBLEMS

If there is a mistake in grading one of your papers (problem sets or exams) you may have your paper regraded. To get a paper regraded, submit a clearly written explanation of the mistake with the entire paper. The statute of limitations for having your paper regraded is two weeks after the problems set is returned. I will not change a grade after that time. This is to encourage looking over problems sets and the midterm during the mini. This keeps you familiar with the material and will make studying for the final easier.

## INTRODUCTION AND OVERVIEW

This is a course in managerial economics. The focus is on how a business manager can use microeconomics to make better decisions. This means that you will not only be expected to understand the theory of microeconomics but you must also be able to apply it.

The basic questions of microeconomics are related to three general topics consumers, producers and markets. After you leave the Tepper School you will typically get a job working for a firm that produces some good or service to sell to consumers. Producers and the consumers typically agree on prices in a market. There are different types of firms and different types of consumers and different types of markets. What we will cover are the general characteristics common to each.

We will begin with the study of consumers; the people you hope will buy your product. We will see how an individual's tastes and limited income lead to demand curves which show how much of each good a particular consumer wants to purchase. We then learn what happens to the consumer's wants when income and prices change. This allows you to predict the effect that world events will have on the demand for your product. We will also study how and why consumers trade. The focus will be on identifying gains from trade and the recognition that trade is not a zero-sum game.

The second major section is the study of producers. We learn how a business firm takes inputs and combines them to make a final good. The important questions are: "How much of each input should be used?," "How should the inputs be combined?" and "How much should the firm produce?" These basic questions are fundamental to every firm.

The final section deals with what happens when consumers and producers meet in a market. We will concentrate on the different types of markets and how the production decision of a firm changes with these different markets.

These questions are fairly basic and their solutions are relatively simple. In class I will present the general approach to these problems and work some examples. In the problem sets you will learn to solve different problems with similar procedures. The goal is for you to be able to take a verbal description of a problem and know how to solve it.

We will use mathematics to solve problems in class and you will be expected to use mathematics to solve problems on problem sets and exams. It is assumed that each of you is familiar with calculus. On exams, I do not want to test your mathematics, hence you can earn "some" credit by giving an answer in which you only set up a mathematics problem which you cannot solve, if you correctly explain how you would have used the answer. It is not possible to pass this course by always using this procedure, but you can get partial credit on some problems.

### Course Schedule for Managerial Economics Fall 2006

| Class Meeting | DATES     | TOPICS  | TEXT                                       | COMMENTS          |
|---------------|-----------|---|--|-------------------|
| 1             | Oct 25/26 | Overview and Modelling<br>Consumer Behavior   | Chapters 1, 3 and 4                        |                   |
| 2             | Oct 30/31 | (continuation)                                |  | Problem Set 1 due |
| 3             | Nov 1/2   | Solving the<br>Consumer's Problem             | Chapter 4<br>Appendix                      |                   |
| 4             | Nov 6/7   | (continuation)                                |  | Problem Set 2 due |
| 5             | Nov 8/9   | The Effects of<br>Price Changes               | sections 2.2-2.3 and 5.1                   |                   |
| 6             | Nov 13/14 | Consumer Surplus                              | sections 5.2-5.3                           | Problem Set 3 due |
| 7             | Nov 15/16 | Modelling a Firm's<br>Behavior                | Chapter 6                                  |                   |
| 8             | Nov 20/21 | Midterm                                       |  |                   |
| 9             | Nov 27/28 | Modelling a Firm's<br>Behavior (continuation) | Chapter 6                                  | Problem Set 4 due |
| 10            | Nov 29/30 | Minimizing Costs                              | Chapters 7 and 8                           |                   |
| 11            | Dec 4/5   | Solving the<br>Producer Problem               | Chapter 9 &<br>section 2.1                 | Problem Set 5 due |
| 12            | Dec 6/7   | Monopoly                                      | Chapter 11                                 |                   |
| 13            | Dec 11/12 | Oligopoly                                     | Chapter 13                                 | Problem Set 6 due |
| 14            | Dec 13/14 | Review Course and the<br>Practice Final Exam  |  |                   |
|               | Dec 15    | Section M                                     | Cumulative Final Exam – 6:00 PM - 9:00PM   |                   |
|               | Dec 16    | Sections A, B, and F                          | Cumulative Final Exam – 9:30 AM - 12:30 PM |                   |

## Objectives for Managerial Economics by Fallaw Sowell

Managerial Economics has many goals. The three most important are: (a) introduce students to basic Microeconomic topics (understand the terminology), (b) teach students the approach of Microeconomics (understand a quantitative approach to problem solving) and (c) get students to where *they can apply* the approach of Microeconomics.

### 1 Prerequisites

No previous knowledge of Economics is expected. The mathematical topics students are expected to know are: (1) algebraic rules of logs and exponents, (2) solving systems of equations, (3) the product rule of differentiation, (4) the chain rule of differentiation, (5) derivatives of logs, (6) derivatives of exponents, (7) derivatives of polynomials, (8) the statement of the fundamental theorem of calculus, (9) integration of logs and (10) integration of polynomials.

### 2 Economic Topics

After Managerial Economics, students should have a clear understanding of the basic principles and terminology of Microeconomics. The most general economic principles are those of marginal analysis (that results from constrained optimization) and equilibrium. The topics covered are

#### Consumer Theory

1. Budget constraints, not only financial budget but general constraints such as time constraints.
2. Utility functions, including the characteristics of preferences that permit the use of utility functions.
3. The derivation of demand functions as the solution of a consumer maximizing happiness subject to a budget constraint.
4. Demand curves, cross price demand curves, Engle curves.
5. Normal goods, inferior goods, substitutes, complements, Giffen goods.
6. Elasticities; income, own price and cross price.
7. Income effect and substitution effect.
8. Hicksian demand curves, compensating variation, consumer surplus. Calculating pricing schemes which include “membership fees”.
9. Edgeworth boxes to demonstrate competitive equilibrium in an endowment economy. Equilibrium prices and quantities.

## **Producer Theory**

1. Production functions (technology constraints).
2. Short run and long run time frames.
3. Fixed costs, variable costs.
4. Conditional input demand functions.
5. The cost function.
6. Shutdown rules.
7. Competitive markets. Profit maximizing output for a competitive firm.
8. Market demand curves and market supply curves.
9. Competitive equilibrium.
10. The profit maximizing output level for a monopoly firm.
11. Social harm of a monopoly. Social benefit of competitive markets.
12. Oligopoly markets. The Cournot assumption, reaction function and the Cournot equilibrium. The Stackelberg assumption and the Stackelberg equilibrium.

### **3 Teaching The Methodology**

A second goal is to teach the methodology of Microeconomics. Students learn this methodology in lectures. Microeconomics is presented, as the quantitative approach applied to “The Basic Consumer Problem” and then “The Basic Firm Problem.” Using this organization, the topics of Microeconomics are presented as useful byproducts of the quantitative approach which is the methodology of Microeconomics.

### **4 Teaching Students To Use The Methodology**

A third goal is getting students to where they can apply the methodology of Microeconomics to new problems. Students should learn this by working the problem sets. As extensions of the topics covered in class, students are required to perform the basic steps of the quantitative method on new problems. The steps are: begin with a word problem, represent (i.e., model) the word problem as a constrained optimization problem, solve the constrained optimization problem (calculus and algebra) and finally interpret the solution in terms of the original problem.

Students should look at business problems and start thinking about the first order conditions that characterize the optimal decision. This implies that the students have identified the objective of the organization and the tradeoffs, marginality conditions, that the firm faces when it makes its decisions.