

# INSTITUTO TECNOLÓGICO AUTÓNOMO DE MÉXICO

## Department of Economics

Eco-11121-001  
Advanced Microeconomic Theory I  
*Microeconomía Avanzada I*  
Time: Monday, Wednesday 8:30 – 10:00  
Place: Rio Hondo, Salon 103

Professor Andrei M. Gomberg  
e-mail: gomberg@itam.mx  
Phone: 5628-4000, extension 2917  
Office Hours: Monday, Wednesday 17:00 –  
18:00 **and by appointment**  
Place: Santa Teresa, CIE

### INTRODUCTION

This is the first part of a two-semester sequence of microeconomic theory for students specializing in political economy and/or financial economics. The principal object of study in this course is the behavior of rational economic agents (consumers and producers), facing a given economic environment. The material of this class will form the basis for further study of microeconomics, as well as for understanding modern foundations of other branches of economic analysis.

The formal subject matter of this course is similar to that of the Intermediate Microeconomics classes you may have taken in the past. This class, however, will provide a more in-depth presentation of the material. While we are not going to get too deeply into formal side of the subject matter, a major goal of this class is to equip students with the technical "machinery" required for understanding modern research in economics. Still, it is essential, that students try to see the economic intuition behind the, sometimes, somewhat mathematical language.

The formal mathematical prerequisites for the class are limited to the standard topics in calculus and probability, which should be familiar to most of the students. If, on occasion, additional material is needed it will be fully developed in class.

### TEXTS

#### Math Review

- Chiang, A.: *Fundamental Methods of Mathematical Economics*, 3<sup>rd</sup> edition, McGraw Hill, Inc., 1984 (or an equivalent Spanish-language edition).

#### Main Advanced Textbook

- Jehle, G. and P. Reny: *Advanced Microeconomic Theory*, 2<sup>nd</sup> edition, Addison Wesley, 2001.

#### Back-up (if you need a more basic text)

- Nicholson, W.: *Microeconomic Theory*, 7<sup>th</sup> edition, The Dryden Press, 1998 (or theequivalent Spanish-language edition)

#### Recommended Alternative Advanced Textbooks

- Varian, H.: *Microeconomic Analysis* Norton Co., 1992, W.W.

- Rubinstein, A., *Lecture Notes in Microeconomic Theory: The Economic Agent*, Princeton University Press 2005

The first part of this class will be a math review, which will roughly follow the *Fundamental Methods of Mathematical Economics* by A. Chiang. By the end of the review **you should be very comfortable** with the material in the first twelve chapters of the book.

The “main” textbook for this class is *Advanced Microeconomic Theory* by Jehle and Reny. This is a clear, self-contained and up-to-date book that I strongly suggest you make sure to have access to for your reference. However, for the most part this book is too advanced for our purposes. Therefore, while I shall broadly draw on the exposition of the material in the text, we will avoid most technical details, and completely eliminate a number of topics. On occasion you may want to consult a more basic microeconomic theory text, such as the Nicholson’s book. Additional handouts will also be circulated in class.

## **EXERCISES AND HOMEWORKS**

You will find that proper understanding of the material of this class is impossible without solving exercises. Therefore, these will be assigned regularly throughout the semester (sometimes informally). Additional exercises can be found after every chapter of the textbook.

**Formal homeworks** will be assigned on a regular basis, and some of them **may be graded**. You are encouraged to consult me about any problems you may have while working on them. All homeworks will be solved in class and written solutions to the more important exercises will be provided on request.

## **WEB PAGE**

All relevant materials for the class, such as exercises, notes, past exams, grades, etc. will be posted at the course web page at <http://ciep.itam.mx/~gomberg/AMI>

## **EXAMS AND GRADING**

There will be two midterm examinations and one final examination in this class. The final examination will be cumulative, in the sense that the exam questions may refer to any material covered from the beginning of the semester. No make-up opportunities will be provided, unless an **extremely** valid medical or other reason can be documented. The final grade will be determined as follows:

Grade on each midterm - 25%

Grade on the final - 50%

class participation, homeworks etc. may be used in difficult cases to decide on the ties between the grades.

Keep in mind, that while homework does not form a major part of the grade, experience shows, that the effort applied to doing them is highly correlated with the performance on the exams. Also, while I will not record your attendance regularly, attendance *is* encouraged.

### **OFFICE HOURS**

Besides the scheduled office hour, students are encouraged to schedule appointments to discuss any matters relevant to the class. I can always be reached by e-mail and will respond as soon as possible.

### **LANGUAGE AND OTHER MATTERS**

The language of instruction in this class is **English**. However, homeworks, exams, etc. could be submitted either in English or in Spanish. If you do not understand anything I say or write in class or in a private discussion after class and during the office hours, feel free to interrupt at any time and ask for clarification (you may ask your questions in Spanish). I would also appreciate any comments on the material and style of the class that you can make.

## **APPROXIMATE OUTLINE OF THE CLASS**

*(Note: This is an outline based on a previous version of this class. I will update the outline within the next week)*

*Introduction.* Microeconomics as a behavioral science.

### **Part I. Math Review**

1. Elements of set theory and logic (Chiang 2.3, Jehle and Reny A1.1 – 1.2)
2. Relations and functions (Chiang 2.4 – 2.7, Jehle and Reny A.1.2.3 – 1.3.1)
3. Vectors and Matrices (Chiang 4 – 5)
4. Calculus of one variable (Chiang 6, Jehle and Reny A2.1.1)
5. Exponential and Logarithmic Functions (Chiang 10)
6. Calculus of many variables (Chiang 7-8, Jehle and Reny A2.1.2)
7. Optimization (Chiang 9 – 12, Jehle and Reny A2.2- 2.3)

### **Part II. Consumer Theory**

1. Preferences and their utility representation (Jehle and Reny 1.2, handout)
2. Utility maximization (Jehle and Reny 1.3)
3. Indirect utility and expenditure (Jehle and Reny 1.4)
4. Consumer demand and duality (Jehle and Reny 1.5, 2.1)

### **Part III. Decisions under Uncertainty**

Jehle and Reny 2.5, handout

### **Part IV. Theory of a Competitive Firm**

1. Production technology and returns to scale (Jehle and Reny 3.2)
2. Minimizing costs and conditional input demand (Jehle and Reny 3.3, 3.4)
3. Perfect competition and profit maximization
4. Maximizing profits: supply and input demand (Jehle and Reny 3.5)

### **Part V. Partial Equilibrium and Applications**

*(exact coverage subject to time constraints at the end of the semester)*