



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## COURSE SYLLABUS

### Microeconomics M

2223-1-F8204B005

---

#### Learning objectives

This (42h and 6 CFU) course intends to offer specialized training in the following areas of microeconomics (Assuming that basic knowledge has already been acquired by attending students):

- a) Duality in consumption and production: theory and applications;
- b) Choices under uncertainty;
- c) Auctions and applications.

#### Contents

Starting from the assumption that students (are supposed to) have already acquired a sound background in basic general microeconomics, the first part of this graduate course intends to provide a comprehensive treatment of duality theory and its applications in modern microeconomics. Problems of consumer and producer optimization will be analysed in both primal and dual versions and functional relations among relevant variables will be discussed as a theoretical introduction to the methods and results of microeconomic analysis of both consumer demand and production or cost functions.

The second part of the course will provide a graduate treatment of individual choice under uncertainty starting from expected utility and including topics such as measures of risk aversion, risk spreading and risk pooling.

The last part of the course deals with the basic issues of auction theory starting from the single object IPV models and the Revenue Equivalence Theorem under both risk neutrality and risk aversion. Multiunit auctions will be discussed with some reference to utility or procurement/permission markets organized as auctions (electricity, gas, CO<sub>2</sub>, etc.). CV models will be only briefly discussed.

Students should bear in mind that

a) Topics such as games and oligopoly form part of the program of another microeconomic course (Advanced Microeconomics) delivered during the second year. In order to avoid useless duplications they are not considered here.

b) Topics such as moral hazard and adverse selection in the field of insurance will be covered in other courses (in particular Economics of Insurance/Economia delle Assicurazioni).

## **Detailed program**

### **Details of the topics covered**

#### **Individual consumer behaviour and demand**

- Direct and indirect utility functions
- Roy's identity
- Expenditure function and Slutsky decomposition
- Functional forms and estimations
- Hotelling-Wold identity
- Distance function and its properties
- Relations between distance and direct utility functions

#### **Producer behaviour and efficiency**

- Direct and indirect production functions
- The cost function and Slutsky decomposition
- Profit functions (unrestricted; restricted)
- Functional forms and estimations
- Input and Output Distance Function and their properties
- Measurement and estimation of production efficiency

#### **Uncertainty**

- Notion of uncertainty
- Choice under uncertainty and Axioms
- Properties of the utility function, risk premium and measures of risk aversion
- Measure of risk
- Comparative statics under uncertainty
- Production under uncertainty
- Price and technological uncertainty

#### **Auctions**

- Basic single unit auction formats
- IPV vs CV
- Bidding models and optimal bids for risk neutral bidders
- Revenue Equivalence
- Risk aversion
- Multiunit auctions

## Prerequisites

Intermediate mathematics including constrained optimization in RN (Calculus I and basic matrix algebra) and basic microeconomics. Students are recommended to avoid "maths for economists" textbooks.

Undergraduate reference text: H. R. Varian, *Intermediate Microeconomics. A modern approach*, Norton, 8th (Eighth) edition.

## Teaching methods

Frontal class lectures (if sanitary conditions will allow). Individual exercises with class solutions. Two hours of weekly small group tutorials will be organized according to circumstances. On line material available (E-Learning course website).

At the beginning of the course an entry test paper will be organized.

## Assessment methods

Final written exam (6 questions with 3 exercises; each question includes subquestions) if sanitary conditions are satisfied. No differences between attending and non-attending students. No mid-term exam.

## Textbooks and Reading Materials

### Reading List

#### duality

H. Gravelle and R. Rees, *Microeconomics*, Prentice Hall, third edition, 2004 (Chapters 2, 3, 5, 6).

R. Cornes, *Duality and modern economics*, Cambridge University Press, 1992 (Chapters 2 – 8)

Or equivalent chapters in graduate textbooks. (For production a good reference is: R. Sickles and V. Zelenyuk, *Measurement of Productivity and Efficiency*, C.U.P., 2019)

#### uncertainty

H. Gravelle and R. Rees, *Microeconomics*, Prentice Hall, third edition, 2004 (Chapters 17 – 19). Or equivalent chapters in graduate textbooks.

#### auctions

Lecturer's notes (e learning page)

Basic online material with exercises will be provided (please visit the E-Learning platform of the course). Language: Italian and English

**Semester**

1st semester

**Teaching language**

Italian

**Sustainable Development Goals**

RESPONSIBLE CONSUMPTION AND PRODUCTION

---