UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Mathematics

2526-1-F5603M001-F5603M001-1

Learning objectives

The course is intended for students who wish to learn mathematical techniques suitable for economic analysis. The course aims at showing students how to apply a number of mathematical skills they require for a successful study of economics. A number of economic applications and models are presented.

Dublin descriptors are in the syllabus of Mathematical Methods and Programming (https://elearning.unimib.it/course/view.php?id=55056).

Contents

Fundamental topics in mathematical economics

Detailed program

1 - Linear Algebra
1a) Vectors, Matrices and Systems of Linear Equation
1b) Determinants and the Inverse Matrices
1c) Vector spaces
1d) Eigenvalues and eigenvectors
1e) Quadratic forms

2 - Functions of several Variables
2a) Partial differentiation
2b) Concavity and Convexity

2c) Unconstrained and Constrained Optimization for Functions of several Variables: the method of Lagrange multipliers
2d) Comparative Statics
2e) The envelope theorem

3 - Difference Equations
3a) Linear First Order Difference Equations
3b) Nonlinear First Order Difference Equations
3c) Systems of Difference Equations
3d) discrete-time dynamical models for economic analysis

Prerequisites

Basic Real Analysis and Linear Algebra.

As a textbook, students might be willing to choose: *Essential Mathematics for Economics Analysis* - Knut Sydsaeter, Peter Hammond, Arne Strom & Andrés Carvajal

With respect to the fifth edition of this book, Chapters to be reviewed are from the first to the eight and the fifteenth

For all other editions, topics to be reviewed are:

- Essentials of Logic and Set Theory
- Algebra
- Solving Equations
- Functions of One Variable
- Properties of Functions
- Differentiation
- Derivatives in Use
- Single-Variable Optimization
- Matrix and Vector Algebra

Teaching methods

In-class lectures. No interactive activities are scheduled.

Assessment methods

A 120-minute written exam composed of nine questions, three for each of the topics in the detailed program. The exam contains both theoretical questions and numerical exercises.

A mandatory oral exam on instructor's request.
An oral exam on student' s request.

The oral exam is to be scheduled very close to the day of the written one.

In case a student undergoes the oral exam, the final grade is the mean of the grades of the written and oral exams.

Textbooks and Reading Materials

LORENZO PECCATI , SANDRO SALSA , ANNAMARIA SQUELLATI
MATHEMATICS - Corso di International Economics - Università Milano-Bicocca (https://www.egeaonline.it/ita/prodotti/metodi-quantitativi/mathematics.aspx)

Semester

First semester

Teaching language

English

Sustainable Development Goals