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

2 - Quadratic forms

3 - Functions of several Variables
3a) Partial differentiation

3b) Concavity and Convexity
3c) Unconstrained and Constrained Optimization for Functions of several Variables: the method of Lagrange multipliers
3d) Comparative Statics
3e) The envelope theorem

4 - Difference Equations
4a) Linear First Order Difference Equations
4b) Nonlinear First Order Difference Equations
4c) Systems of Difference Equations
4d) 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 written exam covering lectures topics. The exam contains both theoretical questions and numerical exercises.

## 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