



UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Mathematics I

2223-1-E2701Q001

Aims

The aims are:

Knowledge and understanding. The student will learn the basic concepts of Calculus.

Applying knowledge and understanding. By means of several examples and exercises, the student will develop the ability of applying theoretical results to specific problems.

Making judgements. The student will be able to critically tackle the study of function of one variable and related problems.

Communication skills. The student will become familiar with the language and formalism of Calculus, which will make him/her able to communicate with precision and clarity the acquired knowledge.

Learning skills. The student will be able to apply the acquired knowledge to different contexts and to examine in depth some related topics by reading books of Calculus.

Contents

Sets and functions; sequences and series; limits; derivatives; integrals; basic differential equations.

Detailed program

- Sets and functions: real numbers; basic definitions about functions.

- Numerical sequences: basic definitions, properties, and limits.
- Numerical series: basic definitions; convergence; convergence tests.
- Limits for functions: definition; limit from the left and the right; uniqueness; techniques for the calculus of limits.
- Derivatives: basic definitions and rules for their calculus; relation with the monotonicity and convexity of functions; Taylor formula.
- Integrals: techniques for finding primitives; Riemann integral; Fundamental Theorem of calculus; applications to the calculus of area and volumes.
- Differential equations: basic introduction with examples; linear equations.

Prerequisites

Basics of algebraic calculus: basic operations with fractions, radicals, and powers.

Teaching form

Language: Italian.

- Lessons (42 hours)
- Tutorials (24 hours)

Textbook and teaching resource

- M. Conti, D.L. Ferrario, S. Terracini, G. Verzini: *Analisi matematica, Vol I, dal calcolo all'analisi*, Apogeo, 2006.

Semester

First year, first period.

Assessment method

The exam consists in a written part, composed by two parts.

- **Part A.** The student is required to solve some exercises in rigorous way.
- **Part B.** The student is required to answer to questions about theoretical concepts: statements of definitions and theorems, proofs of theorems, validity of propositions.

During the teaching period, there will be two partial tests (not mandatory). If the student will pass both of them, then he will have the possibility to record the final grade of the exam directly.

The partial tests will be composed by multiple choice questions and by questions related to the theory.

Additional information can be found in the dedicated page on the e-learning platform.

Office hours

On appointment (via e-mail)

Sustainable Development Goals
