UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Istituzioni di Matematica II

2526-2-E3002Q002

Aims

The course aims to ensure the acquisition and mastery of its contents, as well as the ability to solve problems and to apply the methods learned in different contexts.

More specifically, the educational objectives (according to the Dublin Descriptors) are as follows:
(1) Knowledge and understanding: to acquire the fundamental concepts;
(2) Applying knowledge and understanding: to be able to analyze and reproduce the proofs presented during the lectures, and to solve some basic problems using the techniques learned;
(3) Making judgements: to be able to explore some of the results presented in the course in greater depth, including independently;
(4) Communication skills: to be able to express oneself appropriately and rigorously using mathematical language;
(5) Learning skills: to be able to contextualize the knowledge acquired for use in subsequent courses.

Contents

Sequences and series. Differential calculus for functions of several variables. Elements of linear algebra and geometry in space.

Detailed program

1. Sequences and Series. Numerical sequences, numerical series, geometric series, convergence criteria. Power series, Taylor and Maclaurin series. Function approximation in one variable.
2. Differential Calculus for Functions of Several Variables. Limits and continuity. Directional derivatives, partial derivatives, and differentiable functions. Higher-order derivatives. Maxima and minima.

3. Systems of Linear Equations: Gaussian elimination, Rouché–Capelli theorem.
4. Matrix Calculus: matrix multiplication, matrix rank, the ring of square matrices, and invertible matrices.
5. Linear Maps: Matrix representation, eigenvalues and eigenvectors of an endomorphism. Characteristic polynomial and diagonalizability of endomorphisms.
6. Elements of Geometry in Space.

Prerequisites

First year math course.

Teaching form

Lessons (40 h - 5 CFU), exercise classes (36 h - 3 CFU).

The course is in italian

Textbook and teaching resource

Textbooks:

- J. Stewart, Calcolo. Funzioni di più variabili, Apogeo.
- G. Anichini e G. Conti. Algebra Lineare e Geometria Analitica. Pearson, Prentice-Hall

• J. Stewart, Calcolo. Funzioni di più variabili, Apogeo.

Supplementary Text (eBook available in the library):

- V.Barutello, M.Conti, D.L.Ferrario, S.Terracini, G.Verzini, Analisi Matematica Volume 2, Zanichelli

Semester

Second year first semester

Assessment method

Written Exam. Grading on a scale of 18 to 30 out of 30.

The written exam consists of several exercises and theoretical questions related to the course content.

An optional oral exam may follow, consisting of a discussion of the written work and possible questions aimed

primarily at clarifying any errors. The oral exam is held at the discretion of the instructor or upon the student's request.

Throughout the academic year, there are 6 exam sessions, scheduled in the following months: January, February, April, June, July, and September.

Office hours

By appointment scheduled by e-mail: michele.rossi@unimib.it

Sustainable Development Goals

QUALITY EDUCATION