UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Advanced Calculus - 1

2425-2-E1802M118-E1802M130M-T1

Learning objectives

The aim of this course is to provide the basic tools and concepts of series, linear algebra and integrals.

Contents

Sequences and series, linear algebra and integrals.

Detailed program

1. **Sequences and series:** sequences, concept of series, convergence and necessary condition for convergence, series with nonnegative terms, harmonic series, geometric series, alternating series, telescoping series, absolute convergence.
2. **Linear algebra:** matrices, operations with matrices, determinant, inverse matrix, rank, systems of linear equations, Gaussian method, Rouché-Capelli theorem.
3. **Integrals:** Riemann integral, properties, mean value theorem and fundamental theorem of calculus, indefinite integral, integration rules, generalized integrals and criteria of convergence.

Prerequisites

The course "Metodi Quantitativi per l'Amministrazione delle Imprese" is a prerequisite for the "Matematica Finanziaria" course.

Teaching methods

The teaching method is based on lectures, exercises and tutoring in preparation for the exam.
Lectures will take place mainly in presence.

Assessment methods

The final assessment will be carried out with a **compulsory written exam**, either divided into two parts or in one unique exam.
The written exam is formed by exercises and theory questions.

There may be an **oral examination** in the following three cases:

1. exam requested by the professor
2. exam requested by the student
3. exam in order to have 30 cum laude

The exam evaluates the formal correctness of the passages, the adequacy of the mathematical language adopted, the skills
and knowledge acquired during the course.

Textbooks and Reading Materials

-“Successioni, serie e integrali”, Manuale modulare di Metodi Matematici, vol. 5, a cura di Giovanna Carcano, edizioni Giappichelli Torino

-“Algebra lineare”, Manuale modulare di Metodi Matematici, vol. 4, a cura di Maria Ida Bertocchi, edizioni Giappichelli Torino

Semester

First semester.

Teaching language

Italian.

Sustainable Development Goals

QUALITY EDUCATION