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Dipartimento Architettura e Territorio
Corso di Laurea magistrale a c.u. in Architettura (Classe LM-4 c.u.)

Degree course
LM4_Architettura quinquennale c.u.

Course code 65NC5

Lecturer: Bruno Antonio Pansera

Course name: Istituzioni di
Matematica

Disciplinary area: Mathematics

Disciplinary field of science: MAT/05
ICAR

University credits – ECTS: 8

Teaching hours: 80

Course year: First

Semester: First

Synthetic description and specific course objectives

The aim of the course is to present mathematical analysis, i.e. differential and integral calculus and its applications, in its logical development starting from the properties of the system of real numbers, passing through set theory, analytical geometry and linear algebra. The course of Institutions of Mathematics is dedicated to the study of the real functions of a real variable; it also provides an introduction to ordinary differential equations.

The objective is to provide some fundamental tools of Analysis, to develop in students the aptitude for rigorous reasoning and to enable them to solve some problems using the course material.

Course entry requirements

Basic knowledge in mathematics:
- Algebra: algebraic, logarithmic, exponential, trigonometric, transcendent equations and inequalities;
- Trigonometry: fundamental trigonometric functions;
- Plane analytic geometry: equations of lines, circumference, parabola, ellipse, hyperbola.

Course programme

- Set theory
- Functions
- Limits of sequences and limits of functions
- Derived of a function
- Integrals
- Optimization problems
- Ordinary differential equations

Expected results

The expected results are the following:
- Achieve in-depth knowledge of the basic topics of Mathematical Analysis, such as differential and

integral calculus for functions of a real variable, and acquire the ability to use correct mathematical language both in carrying out exercises and in presenting proofs.
- To acquire inductive and deductive reasoning skills and the ability to schematize simple problems deriving from physics and geometry in rigorous terms.
- Be able to recognize the correctness of simple proofs and to produce simple proofs; be able to identify the most appropriate methods for analyzing and addressing problems that can be solved with the techniques acquired.
- Be able to present topics related to mathematical analysis in correct language.
- Be able to autonomously acquire and manage new information relating to techniques and problems relating to Mathematical Analysis.

The educational objective is achieved to the extent that the student proves capable of solving exercises of a level comparable to those proposed in the hours of teaching practice and has knowledge of the basic teaching contents.

Course structure and teaching

Lessons (hours / year in the classroom): 60
Exercises (hours / year in the classroom): 20

Student's independent work

Students will be directed to an independent study of the topics covered through a series of exercises that allow them to acquire the required skills.

Testing and exams

The exam consists of a written test and an oral test on the topics covered in the course.

Suggested reading materials

- Marco Bramanti, Carlo Domenico Pagani, Sandro Salsa, ANALISI MATEMATICA 1 con elementi di geometria e algebra lineare, Zanichelli, Ed. 2014 https://www.zanichelli.it/ricerca/prodotti/analisi-matematica-1-bramanti-pagani-salsa?hl=bramanti

- Sandro Salsa, Annamaria Squellati, ESERCIZI DI ANALISI MATEMATICA, Vol. 1 & 2, Zanichelli, Ed. 2011 https://www.zanichelli.it/ricerca/prodotti/esercizi-di-analisi-matematica?hl=salsa

- Marcellini, C. Sbordone, Elementi di Calcolo, Liguori Editore, Ed. 2004

- P. Marcellini, C. Sbordone, Esercitazioni di Matematica, 1° Volume, Parte Prima, Liguori Editore, Ed. 2013 (nuova edizione)

- P. Marcellini, C. Sbordone, Esercitazioni di Matematica, 1° Volume, Parte Seconda, Liguori Editore, Ed. 2017

- Marco Bramanti, Carlo Domenico Pagani, Sandro Salsa, ANALISI MATEMATICA 2, Zanichelli, Ed. 2009 https://www.zanichelli.it/ricerca/prodotti/analisi-matematica-2?hl=Bramanti