UNIVERSITÀ DI PAVIA

Anno Accademico 2016/2017

MATHEMATICAL ANALYSIS 1 (SURNAMES A-K)

Enrollment year	2016/2017
Academic year	2016/2017
Regulations	DM270
Academic discipline	MAT/05 (MATHEMATICAL ANALYSIS)
Department	DEPARTMENT OF ELECTRICAL,COMPUTER AND BIOMEDICAL ENGINEERING
Course	ELECTRONIC AND COMPUTER ENGINEERING
Curriculum	PERCORSO COMUNE
Year of study	1°
Period	(26/09/2016 - 13/01/2017)
ECTS	9
Lesson hours	98 lesson hours
Language	ITALIAN
Activity type	WRITTEN AND ORAL TEST
Teacher	MORA MARIA GIOVANNA - 9 ECTS
Prerequisites	Mathematics prerequisites required for the enrollment into the Engineering Faculty
Learning outcomes	The course aims at providing the basic knowledge of differential and integral calculus for real functions of one real variable, and an introduction to ordinary differential equations. Lectures will be mainly focused on the understanding of definitions and results, although some proofs will be given in full details. A variety of examples and exercises will be provided. At the end of the course students are expected to solve and compute correctly limits, derivatives, drawing of graphs, integrals, differential equations, and to know the main theoretical results.
Course contents	1. Recalls and complements on: set theory, mathematical logic, real numbers. Complex numbers: algebraic, trigonometric, and exponential form; operations on complex numbers; algebraic equations on the

	complex field. 2. Functions: definition; graph of a function; invertible functions; odd and even functions; monotone functions; periodic functions; operations on functions; composition of functions. Elementary functions and their graphs. Limits of functions: definition; operations on limits. Continuous functions. Discontinuity points and their classification. Global properties of continuous functions. Sequences of real numbers: definition of limit and properties. Series of real numbers: series with positive terms; absolute and simple convergence. 3. Derivative of a function: definition and properties; applications to Geometry and Physics. Derivation rules and computation of derivatives. Fundamental theorems of differential calculus. Primitives and indefinite integrals. Higher order derivatives. Study of a function graph: extrema, monotonicity, concavity, convexity, inflexion points. De l'Hopital rules. 4. Definite integrals: definitions and basic properties; applications to Geometry and Physics. Fundamental theorems of integral calculus. Integration techniques and computation of integrals. Improper integrals of first and second type. 5.Introduction to ordinary differential equations. The Cauchy problem. Separation of variables. Linear ordinary differential equations of the first order. Linear ordinary differential equations of the second order with constant coefficients. Linear systems of ordinary differential equations (outline).
Teaching methods	Lectures (hours/year in lecture theatre): 90 Practical class (hours/year in lecture theatre): 0 Practicals / Workshops (hours/year in lecture theatre): 0
Reccomended or required readings	M. Bramanti, C.D. Pagani e S. Salsa. C.E. Zanichelli, Bologna, 2008-2009. Analisi Matematica I . C.E. Zanichelli, Bologna, 2008-2009.
Assessment methods	Finals consist in a written exam made of two parts: the first part is about resolution of exercises; the second part contains theoretical questions. An additional oral examination may be requested by the committee for further evaluation.
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Sustainable development goals - Agenda 2030	$lbl_legenda_sviluppo_sostenibile