UNIVERSITÀ DI PAVIA

Anno Accademico 2015/2016

MATHEMATICAL ANALYSIS 2

Enrollment year	2014/2015
Academic year	2015/2016
Regulations	DM270
Academic discipline	MAT/05 (MATHEMATICAL ANALYSIS)
Department	DEPARTMENT OF CIVIL ENGINEERING AND ARCHITECTURE
Course	
Curriculum	PERCORSO COMUNE
Year of study	2°
Period	1st semester (28/09/2015 - 22/01/2016)
ECTS	6
Lesson hours	80 lesson hours
Language	ITALIAN
Activity type	WRITTEN AND ORAL TEST
Teacher	GIANAZZA UGO PIETRO - 2 ECTS VENERONI MARCO - 4 ECTS
Prerequisites	The student has to master the contents of the Calculus I, Geometry and Linear Algebra courses.
Learning outcomes	The course is the natural prosecution of the Calculus I course, and aims at giving the students, who will not have the possibility to take another Analysis course in the future, a comprehensive expertise of analytical tools, to be used in the more technical courses to come. It does not reduce to a simple recipe book: the focus is on teaching ideas and methods, along with the most significative theorems, all supplied by a large number of examples and exercises, both at introductory and advanced level.
Course contents	1. Power series Definition, radius of convergence, properties on the real line. Integration and derivation of a power series.

	Taylor series. 2. Multivariate Calculus Basic notion of topology and metrics in n-dimensional spaces. Continuous functions: properties. Partial and directional derivatives; gradient. Higher order derivatives. Local extrema and main results. Vector-valued functions: main properties. 3. Curves Definition of regular curve: main properties. Rectifiable curves and how to compute their length. Arc-length function. Arc integrals for real valued functions. 4. Irrotational vector fields Arc integral of a vector-valued function. Irrotational vector fields: main properties. Arc integral of an irrotatioal vector field: the fundamental theorem. Conditions for a vector field to be irrotational. 5. Implicit functions Implicit function theorem, and regularity of the implicitlt defined function. Constrained extrema and the Lagrange multiplier method. 6. Ordinary differential equations Existence and uniqueness theorems. Linear equations and systems, how to compute the general solution, and how to solve a Cauchy problem. A first approach to boundary value problems for simple equations and systems. 7. Multiple integrals Definition of a double integral in a rectangle, and how to compute it. Extension to a Peano-Jordan measurable set. Change of variables. Geometric applications. Green and divergence theorems for two-variable functions. Triple integrals: extension of the methods considered for double integrals. 8. Surfaces Regular surfaces: main properties. Area of a regular surface. Surface integrals and how to compute them. Divergence and Stokes theorems for three-variable functions.
Teaching methods	Lectures (hours/year in lecture theatre): 53 Practical class (hours/year in lecture theatre): 32 Practicals / Workshops (hours/year in lecture theatre): 0
Reccomended or required readings	N. Fusco, P. Marcellini, C. Sbordone. Analisi Matematica due. Liguori. M. Bramanti, C.D. Pagani e S. Salsa. Analisi matematica 2. Zanichelli.
Assessment methods	The final test consists of a written and an oral exam, which have to be taken in the same session.
Further information	A more detailed description can be found on the web page at the URL

	http://www.imati.cnr.it/%7Egianazza/anmat2.html
Sustainable development goals - Agenda 2030	$lbl_legenda_sviluppo_sostenibile