UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Ingegneria
ACADEMIC YEAR	2018/2019
BACHELOR'S DEGREE (BSC)	CIVIL AND BUIDING ENGINEERING
SUBJECT	MATHEMATICAL ANALYSIS II
TYPE OF EDUCATIONAL ACTIVITY	A
AMBIT	50279-matematica, informatica e statistica
CODE	13712
SCIENTIFIC SECTOR(S)	MAT/05
HEAD PROFESSOR(S)	TRIOLO SALVATORE Professore Associato Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	6
INDIVIDUAL STUDY (Hrs)	96
COURSE ACTIVITY (Hrs)	54
PROPAEDEUTICAL SUBJECTS	13711 - MATHEMATICAL ANALYSIS I
MUTUALIZATION	MATHEMATICAL ANALYSIS 2 - Corso: INGEGNERIA DELL'INNOVAZIONE PER LE IMPRESE DIGITALI MATHEMATICAL ANALYSIS 2 - Corso: DIGITAL ENTERPRISE INNOVATION ENGINEERING
YEAR	2
TERM (SEMESTER)	1° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	**TRIOLO SALVATORE** Wednesda 10:00 12:00 Dip Metodi e modelli matematici primo piano.

DOCENTE: Prof. SALVATORE TRIOLO

PREREQUISITES	Contents of the course of Mathematical Analysis I; matrix algebra, eigenvalues and eigenvectors of a matrix, diagonalization; knowledge of the space R3.
LEARNING OUTCOMES	Knowledge and understanding: The student will learn the differential calculus of more variables, series of functions, Fourier series, multiple integrals, curves in plane and in space. He will recognise e solve some type of differential equations. He will acquire a rigorous method of reasoning and the ability to use the specific language. This knowledge is achieved by participation in lectures and integrative teaching activities in the classroom. The achievement of objectives is verified by the specific tests and final exams. Applying knowledge and understanding: Solve problems of moderate difficulty. Capacity of application of the resolution techniques of the exercises in more general fields of Mathematics. These objectives are achieved using the theory for the resolution of problems of moderate difficulty regarding the topics taught. Making judgements: Learners must be able to develop logical arguments with a clear identification of assumptions and conclusions; They must understand mathematical models associated with concrete situations arising from other disciplines and to use these models to facilitate the study of the original situation. Communication skill: Knowing how to exhibit in the written and oral, with logical rigor, with property of language and competently ideas, problem-solving methods and the main theorems of the course. Discuss asymptotic behavior and the character of solutions of a linear differential equation. Know mathematically formalize situations of practical interest, in industry or in economics. Lifelong learning skills: Capacity to acquire information contained in texts of Mathematics and are able to deepen independently the study of mathematical problems and of applications
ASSESSMENT METHODS	Final assessment consists of a written test of two hours and an oral test. The written exam can be replaced by two course tests and consists in solving four / five exercises, which tend to ensure that they possess the resolution methods related to the arguments explained during the lectures. The oral exam consists of two / three questions on all parties covered by the program and on written exam. Final assessment aims to evaluate whether the student has knowledge and understanding of the topics, possesses property of language, mathematical rigor and language and reasoning skills. The criteria for evaluation are as follows: Rating: Excellent. Rating: 29-30 cum laude. Outcome: excellent knowledge of the topics, excellent property of language and analytical skill; the student is able to apply the knowledge to solve the exercises. Rating: very good. Rating: 26-28. Outcome: good knowledge of the topics, full ownership of language and analytical ability; the student is able to apply the knowledge to solve the exercises. Rating: Good. Rating: 22-25. Outcome: Basic knowledge of the main topics, discreet property of language and limited analytical capacity; the student is able to apply partially the knowledge to solve the exercises. Rating: enough. Rating: 18-21. Outcome: minimum basic knowledge of the main topics and language; the student is able to solve very elementary exercises. Rating: Not enough. Rating: <18. Outcome: does not have an acceptable knowledge of the contents of the course topics and is not able to solve the exercises.
EDUCATIONAL OBJECTIVES	The goal of the course is to deepen the knowledge of differential and integral calculus of more variable and the series of functions and Fourier series, to increase the knowledge of differential equations with their applications to physical phenomena, to study part of complex analysis and how to use it in classical math analysis. The mathematical way of thinking will be helping the student for ensuing studies.
TEACHING METHODS	Lectures and exercises in classroom. Lectures and educational activities last half academic year. At the middle of the semester and before the end of

	semester there are a written test (not compulsory), whose positive results can replace in whole or in part the final written test.
SUGGESTED BIBLIOGRAPHY	Pagani, Salsa – Analisi matematica 1 e 2 – Zanichelli Marcellini - Sbordone, Esercitazioni di Matematica, II volume, parte prima e parte seconda, Liguori M. Bertsch, Dal Passo, Elementi di Analisi Matematica, Aracne

SYLLABUS

Hrs	Frontal teaching
6	Differential equations, Cauchy problem, local existence and uniqueness, regularity of solutions, global existence and uniqueness, continuous dependence of solution from the initial data, integration of equation of first order, linear differential equations, method of variation of constants, linear differential equations with constant coefficients homogeneous and not homogeneous, method of similarity
6	Local inversion theorem, implicit functions, Dini theorem, constrained optimization, Lagrange multipliers,
6	Homogeneous functions, curves and integrals on curves, linear differential forms, forms closed and esact
8	Formulae of Gauss-Green and change of variables, surfaces and integral of surfaces, Stokes formula, divergence theorem and its application

Hrs	Practice
6	Sequences of functions: pointwise and uniform convergence. Exchange of limits; limit and derivative, limit and integral. Series of functions. Power series. Analytic functions, outline of Fourier series,
8	Topology of Rn, limits, continuity , derivability and differentiability of two or more variables, tangent plane, gradient, direction of maximal variation, derivate of second or higher order, Taylor formula for multi-variable function, free optimization, Hessian matrix, critical points. Multiple integrals in normal domains and reduction formula, change of variables, Jacobian Matrix
14	Calculus of limits of functions with two variables, calculus of maximum and minimum for functions with two variables free and with constrain, calculus of length of a curve, work of a vector field, solution of differential equation of first order, second order and higher order with constant coefficients homogeneous and not homogeneous.