UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Architettura		
ACADEMIC YEAR	2024/2025		
MASTER'S DEGREE (MSC)	ARCHITECTURE		
INTEGRATED COURSE	MATHEMATICS 1 AND 2 - INTEGRATED COURSE		
CODE	18528		
MODULES	Yes		
NUMBER OF MODULES	2		
SCIENTIFIC SECTOR(S)	MAT/05		
HEAD PROFESSOR(S)	CAPONETTI DIANA	Professore Associato	Univ. di PALERMO
OTHER PROFESSOR(S)	CAPONETTI DIANA SCIAMMETTA ANGELA	Professore Associato Ricercatore a tempo determinato	Univ. di PALERMO Univ. di PALERMO
CREDITS	12		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	1		
TERM (SEMESTER)	Annual		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	**CAPONETTI DIANA** Tuesday 9:00 11:00 DMI-Via Archirafi 34-II piano-Studio 221. Per ricevimenti nel mese di luglio 2024 gli Studenti sono invitati a concordare un appuntamento via e-mail. Si puo richiedere un appuntamento anche in giorni ed orari differenti da quelli previsti. During july 2024 Students are invited to fix appointments via e-mail. Appointments in a different day or time can be requested. **SCIAMMETTA ANGELA** Thursday 14:00 15:00 Modalita telematica tramite piattaforma Microsoft Teams e previa prenotazione da effettuare tramite il portale della didattica. Nome gruppo Teams: "Ricevimento studenti - Prof.ssa Sciammetta"codice: bjgsa1s. Telematic mode via Microsoft Teams platform and upon reservation to be made via the teaching portal. Name Teams: "Ricevimento studenti - Prof.ssa Sciammetta"code: bjgsa1s.		

DOCENTE: Prof.ssa DIANA CAPONETTI

PREREQUISITES	The prerequisite needed in order to follow this teaching is the basic mathematical knowledge requested for the access to the CdL.
LEARNING OUTCOMES	KNOWLEDGE AND UNDERSTANDING: The student must acquire the knowledge of the language, the formalism and the basic theoretical concepts and methods of mathematical analysis. APPLYING KNOWLEDGE AND UNDERSTANDING: The student must acquire the ability of applying the techniques presented in the course in various contexts in which the mathematical analysis is required, both from the point of view of representation of mathematical models and from that of pure computation. MAKING JUDGEMENT: The student must be able to analyze and formalize a problem and identify the mathematical tools and strategies to solve it. COMMUNICATION SKILL: The student must be able to express with logical rigor, with properties of language and competence the concepts and the topics of the discipline. The student must be able to write the solution of problems in a rigorous and correct way, both in form and in substance. LEARNING SKILLS: The student must be able of using independently the acquired knowledge and must have the ability of developing more advanced mathematical concepts, in particular through independent consultation of scientific texts.
ASSESSMENT METHODS	EXAMINATION: Final exam consists of two written tests (one for each module) and an oral test. Written tests can be taken at the same session or in two different sessions of the same exam period. The oral exam will be on both modules and must be taken within the same period as the written tests. The written tests and the oral test are evaluated out of thirty, each test will be considered passed with an evaluation of not less than 18, and the final mark will be the average of the marks obtained in the two written tests and the oral test. The written test of each module is generally based on the resolution of 3 exercises and 1 multiple choice question concerning the main topics covered during the module, and usually lasts 2 hours. Written tests are intended to evaluate the computing capacity, the degree of knowledge of the concepts presented in the course and the ability of the students to apply them autonomously. The oral exam consists of discussion of the topics of the written tests and in an interview concerning the main results presented in the whole course. The oral test will also allow to evaluate the acquired properties of language and reasoning skills. INTERMEDIATE WRITTEN TEST: The course includes an "in itinere written test", not mandatory but strongly recommended, which will take place in the January-February period when teaching activities are suspended. The in itinere test coincides with the written test of the first module. Students who pass the ongoing test, at the end of the course and during the written test of the ordinary exam, will only have to take the written test of the second module. The oral exam and the final assessment will be as in the case of the ordinary exam. Furthermore, to facilitate passing the written tests, there may be, an intermediate written test for each module. Compensatory tools and dispensatory measures will be guaranteed by the Disability and Neurodiversity Center - University of Palermo (Ce.N.Dis.) to students with disabilities and neurodiversity, based on specific needs and in implementation of current legislation. FINAL ASSESSMENT: The final assessment, properly graded, will be made on the basis of the following criteria: - Excellent 30-30L. In-depth knowledge of the topics, excellent properties of language and analytical skill, the student is able to apply authonomausly the knowledge to solve the proposed problems. - Very good 26-29. In-depth knowledge of the topics, good mathematical language; the student is able to apply the knowledge to solve the proposed problems. - Good 24-25. Good knowledge of the main topics and properties of language, the student has a fairly good capacity to apply the knowledge to solve the proposed exercises. - More than sufficient 21-23. Discrete knowledge of the main topics and sufficient command of the language, the student has a sufficient capacity of apply the knowledge autonomausly, is able to solve basic exercises. -Sufficient 18-20. Minimum basic knowledge of the main topics and minimum command of the language, the student has a just enough capacity to apply the knowledge authonomausly, is able to solve basic exercises. - Insufficient: the student does not have the minimum acceptable knowledge of

	the main topics of the program and of the scientific language, the student does not show the ability to solve basic exercises.
TEACHING METHODS	The course consists of two modules, MATHEMATICS - module 1 (6 credits) and MATHEMATICS - module 2 (6 credits), which take place respectively in the first and second semester of the first year of the degree course. Didactic activity is based on lectures and exercises delivered in classroom.

MODULE
MATHEMATICS - MODULE 1

Prof.ssa ANGELA SCIAMMETTA

SUGGESTED BIBLIOGRAPHY

P. Marcellini - C. Sbordone, Esercitazioni di Matematica, Ed. Liguori, Napoli. ISBN: 9788820716844 (consigliata qualsiasi edizione del testo).
P. Marcellini, C. Sbordone, Esercitazioni di Matematica, 1° volume, parte
prima e parte seconda, Liguori Editore, Napoli (consigliata qualsiasi edizione dei testi).

AMBIT	50661-Discipline matematiche per l'architettura
INDIVIDUAL STUDY (Hrs)	96
COURSE ACTIVITY (Hrs)	54

EDUCATIONAL OBJECTIVES OF THE MODULE

This module aims to provide the student with fundamental concepts of linear algebra, geometry in Euclidean spaces Rn, and mathematical analysis for functions of one variable. It seeks to develop calculation skills and geometric intuition regarding vectors and matrices, and to impart the techniques of differentiation and integration. This module encourages the student to develop skills and rely on the use of mathematical methods for problem-solving.

SYLLABUS

Hrs	Frontal teaching
2	Number sets: natural numbers, integers, rational numbers, real numbers. Complex numbers and solving quadratic equations
8	Elements of linear algebra. Matrices and determinants. Vector spaces. Linear systems. Eigenvalues and eigenvectors.
6	Elements of plane and space geometry. Lines in the plane, conditions for parallelism and orthogonality. Changes of reference in the plane. Polar coordinates. Lines and planes in space. Conditions for parallelism and orthogonality between lines, between planes, and between lines and planes
16	Introduction to functions. Elementary functions and their graphs. Limits of functions and continuous functions. Differential calculus: derivative of real functions of a real variable, derivatives of elementary functions, differentiation rules, tangent line to the graph, applications of derivatives (finding maxima and minima, theorems of Fermat, Rolle, Lagrange, consequences of theorem of Lagrange), study of functions. Integral calculus: Riemann integral, antiderivatives and indefinite integrals, immediate and almost immediate integrals, integral function, fundamental theorem of calculus, integration methods, area calculation

Hrs	Practice
4	Linear algebra exercises.
6	Exercises in plane and space geometry.
12	Exercises in differential and integral calculus for functions of one variable

MODULE
MATHEMATICS - MODULE 2

Prof.ssa DIANA CAPONETTI

SUGGESTED BIBLIOGRAPHY

P. Marcellini - C. Sbordone, Calcolo, Liguori Editore, Napoli (qualunque edizione).
P. Marcellini - C. Sbordone, Esercitazioni di Matematica, 2° volume, parte prima e parte seconda, Liguori Editore (qualunque edizione).
Dispensa della docente.

AMBIT	50661-Discipline matematiche per l'architettura
INDIVIDUAL STUDY (Hrs)	96
COURSE ACTIVITY (Hrs)	54

EDUCATIONAL OBJECTIVES OF THE MODULE

The module in addition to a cultural training goal, essentially aimed at refining logical-critical and synthesis skills, provides students with methodologies and tools developed by mathematics for the study of forms in the plane and in the space, and the temporal evolution of phenomena.

SYLLABUS

Hrs	Frontal teaching
5	Conics: ellipse and circumference, hyperbola and parabola, classification of conics, conics in canonical form and reduction of a conic in canonical form.
5	Quadrics: ellipsoid and sphere, elliptical paraboloid and hyperbolic paraboloid, elliptical hyperboloid and hyperbolic hyperboloid and their equations. Some rotation surfaces.
9	Topology elements in R^2; Real functions of 2 real variables; Limits and continuity; partial derivatives and directional derivatives; differentiability; total differential theorem; derivatives of higher order; Schwarz theorem; Hessiana matrix; tangent plane; local maximum and local minimum for functions of several variables.
7	Integration theory in R^2; doubles integrals; integration methods, applications as centers of gravity, moments of inertia, areas and volumes.
6	Differential equations; Cauchy problem; differential equations of the first order; linear differential equations of n order at constant coefficients. Some models.

Hrs	Practice
5	Exercices on conics and quadrics.
7	Exercices on limits and continuity, differentiability, tangent plane, local maximum and local minimum values for two variables function.
5	Exercices on doubles integrals.
5	Exercices on ordinary differential equations and Cauchy problems