



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Biomedicina, Neuroscienze e Diagnostica avanzata		
ACADEMIC YEAR	2023/2024		
MASTER'S DEGREE (MSC)	MEDICINE AND SURGERY		
INTEGRATED COURSE	MATHEMATICS II - INTEGRATED COURSE		
CODE	21799		
MODULES	Yes		
NUMBER OF MODULES	2		
SCIENTIFIC SECTOR(S)	MAT/05, MAT/03		
HEAD PROFESSOR(S)	TRIOLO SALVATORE	Professore Associato	Univ. di PALERMO
OTHER PROFESSOR(S)	TRIOLO SALVATORE	Professore Associato	Univ. di PALERMO
	SPADARO SANTI DOMENICO	Professore Associato	Univ. di PALERMO
CREDITS	6		
PROPAEDEUTICAL SUBJECTS	04900 - MATHEMATICS I		
MUTUALIZATION			
YEAR	2		
TERM (SEMESTER)	1° semester		
ATTENDANCE	Mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	<p>SPADARO SANTI DOMENICO Wednesday 12:00 - 14:00 Ufficio del docente. Studio 1219, Ex Dipartimento di Metodi e Modelli Matematici, Primo Piano, viale delle Scienze Ed.8.</p> <p>TRIOLO SALVATORE Wednesday 10:00 - 12:00 Dip Metodi e modelli matematici primo piano.</p>		

PREREQUISITES	Classical knowledge of the concepts of mathematical logic. Solution of equation, system of equation, inequalities, system of inequalities. Basic knowledge of trigonometry. Classical knowledge of the concepts of mathematical analysis of function of one real variable.
LEARNING OUTCOMES	<p>Knowledge and Understanding The student will have a knowledge of systems of applied vectors, and will be able to solve problems of differential and integral calculus of real functions of two or more real variables and problems of linear algebra. The student must also know and understand the theorems and their proofs on the above topics. The student gains knowledge and understanding via class attendance, participation in classrooms and individual study.</p> <p>Applying knowledge and understanding At the end of the course, the student will be able to use the differential and integral calculus of two or more real variables . The student well be able to determine the fundamental characteristics of a field of forces and to discern whether this field is conservative or non conservative. The students will know how to calculate multiple integrals, partial derivatives and limits, and apply them in the study of a function and in the calculation of volumes. The student will be able to solve problems on systems of applied vectors and problemes of linear algebra. The verification of the acquired abilities is made by means of assets participation of the students to the problem solving and examples during the hours of lesson and discussion.</p> <p>Making judgements The student will develop a critical ability in characterizing the suitable and relevant solution to the proposed problem.The student will acquire the ability to formalize and analyze new problems in full autonomy, both in qualitative way and in rigorous way. The formative objectives will be reached using frontal lessons and problems and exercises solved in classroom. The attainment of the objectives is verified by written test and oral examination.</p> <p>Communication skills The student will acquire the ability to expose in clear and rigorous way, using adequately the disciplinary lexicon, the results of the characterized qualitative solution and problem analysis. The communication abilities will be verified in the oral examination.</p> <p>Learning skills The student will acquire the ability to contextualize own knowledges, eventually adapting in an independent way, in wide and multidisciplinary area of interests. The students will be able to determine if a field of forces is conservative. The student will know to apply the mathematical knowledge of the systems of applied vectors and linear algebra . The methodologies and the arguments developed in this course will contribute also to form the interested students to continue in scientific research.</p>
ASSESSMENT METHODS	<p>The final verification aims to estimate: the knowledge and the understanding of the student about the contents of the course; the competence of the student to apply this knowledge and understanding; if the student owns autonomy of judgments and suitable communication and learning skills. The final verification consists of a written test and an oral examination. In the written test the resolution of four/six exercises is demanded. The exercises make reference to all the objects of the program and are consistent to the examples and the discussion hours developed during the course. During the oral examination the student should correctly answer to two/three questions based on all the contents of the course. Moreover, the student should give a critical explanation of the exercises' resolution proposed in the written test. The final evaluation will be based on both the written test and the oral examination and it will be scaled according to the following conditions: a) does not possess an acceptable knowledge of the contents of the presented topics (no sufficient); b) minimal base knowledge of the contents of the course and of the technical language, most insufficient or null ability to independently apply the acquired knowledge (18-20); c) not have full mastery of the main contents of the course but possesses knowledge, satisfactory property of language, insufficient ability to independently apply the acquired knowledge (21-23); d) knowledge of base treated contents, discrete property of language, with</p>

	<p>limited ability to independently apply the competence to solve the proposed problems (24-25);</p> <p>e) good mastery of the contents of the course, very good property of language, good competence in problem-solving (26-29);</p> <p>f) optimal knowledge of the contents of the course, optimal property of language, very good analytic abilities and competence in problem solving (30-30 with honors).</p>
TEACHING METHODS	<p>The objective of the course is to supply the students the foundations for a rigorous approach to mathematical analysis of multi-variable real functions, to differential problems and linear algebra. The students will acquire the following knowledge:</p> <ul style="list-style-type: none"> - Differential calculus in multi-variable real functions. - Curve and integration over a curve. - Surface and volume integral. - Solution of differential equations. - Applied vectors. - Linear algebra. <p>These arguments will be introduced and analyzed in rigorous way during the frontal lessons. Through the exercises the students will acquire greater understanding of the presented topics.</p>

MODULE CALCULUS <i>Prof. SALVATORE TRIOLO</i>	
SUGGESTED BIBLIOGRAPHY	
M. Bertsch, R. Dal Passo, L. Giacomelli, Analisi Matematica (2Ed) McGraw-Hill Isbn 8838662819 Mathematical Analysis II Edizione Inglese di V. A. Zorich , Roger Cooke, e al	
AMBIT	20949-Attività formative affini o integrative
INDIVIDUAL STUDY (Hrs)	45
COURSE ACTIVITY (Hrs)	30
EDUCATIONAL OBJECTIVES OF THE MODULE	
At the end of the course the student will acquire the knowledge on the main topics, methodologies on infinitesimal differential calculus for functions of two or more variables. In particular, the student will be able to understand the issues arising from the needing to create a rigorous language using the logical-deductive method to deal with intuitively simple math problems. The students will be also able to understand simple physical problems and to convert them in the correct mathematical language, for instance through differential equation.	

SYLLABUS

Hrs	Frontal teaching
1	Objectives of the discipline.
5	Limits for functions of multiple real variables: definitions, main properties and theorem. Continuity of a function.
5	Differential calculus for functions of multiple real variables.
5	Integration theories.
Hrs	Practice
4	Differential equations.
5	Differential calculus.
5	Conservative and non conservative fields. Work of a conservative field.

MODULE GEOMETRY

Prof. SANTI DOMENICO SPADARO

SUGGESTED BIBLIOGRAPHY

- GIUFFRIDA S., RAGUSA A., "Corso di Algebra Lineare con esercizi svolti", Ed. Il Cigno G. Galilei, Roma, 1998. ISBN: 8878310697.
- GRECO S., VALABREGA P., "Algebra Lineare", Levrotto & Bella, Torino, 2009. ISBN: 8882181367.
- GRECO S., VALABREGA P. "Geometria Analitica", Levrotto & Bella, Torino, 2009. ISBN: 8882181375.
- PAXIA G., "Lezioni di Geometria", Spazio Libri, Catania, 2000. (Scaricabile gratuitamente all'indirizzo: http://www.giuseppexaxia.it/Prof_Paxia/Home_files/px.pdf).

AMBIT	20949-Attività formative affini o integrative
INDIVIDUAL STUDY (Hrs)	45
COURSE ACTIVITY (Hrs)	30

EDUCATIONAL OBJECTIVES OF THE MODULE

The course aims to present the basics of linear algebra and analytic geometry, training students to mathematical rigor and refining their abstraction ability, two abilities which are fundamental in the study of any scientific discipline.

SYLLABUS

Hrs	Frontal teaching
5	Vector spaces.
5	Matrices and linear systems.
5	Linear maps.
5	Elements of analytic geometry.
Hrs	Practice
10	Exercises on the course topics.