



COURSE OF STUDY	TWO-YEAR MASTER OF SCIENCE PROGRAMME IN MATHEMATICS
ACADEMIC YEAR	2023-2024
ACADEMIC SUBJECT	ELEMENTARY MATHEMATICS FROM AN ADVANCED POINT OF VIEW

General information	
Term	First semester (September 25, 2023 – December 22, 2023)
European Credit Transfer and Accumulation System credits (ECTS)	7
SSD	MAT/04 – Complementary Mathematics
Language	Italian
Mode of attendance	Not mandatory

Lecturer	
Name and surname	Michele Fiorentino
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Department and office	Department of Mathematics, room 1 third floor
Virtual meeting room	TEAMS code: go5m0k8
Web page	https://www.dm.uniba.it/it/members/fiorentino
Office hours	Monday 11.15-13.15 (The teacher also receives on other days by agreeing the appointment via email)

Work schedule				
	Total	Lectures	Hands-on learning	Self-study
Hours	175	56		119
ECTS credits	7	7		

Learning objectives	
	The course aims to consider related geometric and algebraic topics in a structured view from a theoretical point of view. A discussion of geometry through the use of the vector structure of space and geometric transformations in their axiomatic approach will be accompanied by the reading of this mathematical treatment in reality.

Course prerequisites	
	Knowledge of Euclidean Geometry; knowledge required in the courses of Geometry of a degree course in Mathematics of the class L-35. In particular, concepts of Transformation Group and Vector Space

Syllabus	
Course contents	The role of geometry in the teaching of mathematics in pre-university schools: problems and perspectives. Klein's Erlangen program and the geometry of transformations.



	<p>The geometry of space according to the axiomatics of G. Choquet: Axioms of incidence; lines and planes in the space; Parallelism; Ordering axioms; Axioms of metric structure; Properties.</p> <p>Real vector space structure of a line. The group of isometries and similes of a straight line. The group of isometries and similes of a plane. Angles and their properties; Real vector space structure of a plane. Group of the similes of a plane. Field structure on one plane. Similarity criteria. The group of isometries in space. Perpendicularity in space. Real vector space structure in space.</p>
Reference books	<p>Choquet, G., L'insegnamento della Geometria, Ed. Feltrinelli.</p> <p>Linati, P., L'algoritmo delle occasioni perdute, Ed Erickson, Trento.</p> <p>Villani, V., Cominciamo dal punto, Pitagora Editrice, Bologna.</p>
Additional course materials	Notes, slide and materials from the teacher
Repository	

Expected learning outcomes	
Knowledge and understanding	Possession and knowledge of Geometry based on an axiomatic treatment directed towards the algebraic structure of the plane and space
Applying knowledge and understanding	Analyze and become aware of the course contents. Read, interpret and analyze research articles on the topics of the course, demonstrating the ability to grasp, evaluate and use the results of empirical studies in order to build knowledge and improve interventions.
Soft skills	<p><i>Making judgements:</i> Understanding the relationships between the various structures studied and knowing how to make the most appropriate choices with respect to the objectives set</p> <p><i>Communication skills:</i> Communicate and argue mathematical concepts with clarity and relevance, with formulations suited to the target audience. Be able to draw conclusions accurately in both written and oral form</p> <p><i>Learning skills:</i> Acquire a flexible mentality, capable of abstracting and relating different formal theories, rapidly acquiring the necessary specific skills.</p>

Teaching methods	
	Lecture Laboratorial activity

Assessment	
Assessment methods	Evaluation of the activities proposed during the course and final oral exam
Evaluation criteria	Learning will be assessed at various levels, through the final oral exam, and possibly exercises administered during the course. The student will have to demonstrate mastery in the use of mathematical concepts, the relationships between the different structures studied, communicate and argue clearly.
Grading policy	

Further information	