



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Matematica e Informatica
ACADEMIC YEAR	2023/2024
BACHELOR'S DEGREE (BSC)	MATHEMATICS
SUBJECT	GEOMETRY 2
TYPE OF EDUCATIONAL ACTIVITY	B
AMBIT	50198-Formazione Teorica
CODE	15567
SCIENTIFIC SECTOR(S)	MAT/03
HEAD PROFESSOR(S)	DI BARTOLO ALFONSO Ricercatore Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	9
INDIVIDUAL STUDY (Hrs)	145
COURSE ACTIVITY (Hrs)	80
PROPAEDEUTICAL SUBJECTS	13751 - ALGEBRA 1 03678 - GEOMETRY 1 - INTEGRATED COURSE
MUTUALIZATION	
YEAR	2
TERM (SEMESTER)	1° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	DI BARTOLO ALFONSO Thursday 15:00 17:00 Studio n. 107, sito al primo piano del Dipartimento di Matematica e Informatica, via Archirafi n. 34, Palermo.

DOCENTE: Prof. ALFONSO DI BARTOLO

PREREQUISITES	Linear algebra, elementary group theory, Euclidean and affine geometry.
LEARNING OUTCOMES	The learning outcomes are achieved whether the students - demonstrate knowledge and understanding in projective Geometry, and general and algebraic Topology; - can apply their knowledge and understanding in a manner that indicates a professional approach to their work or vocation, and have competences typically demonstrated through devising and sustaining arguments and solving problems within Geometry; - have the ability to gather and interpret relevant data in projective geometry and topology to inform judgements that include reflection on scientific issues; - can communicate information, ideas, problems and solutions to both specialist and non-specialist audiences; - have developed those learning skills that are necessary for them to continue to undertake further study within a high degree of autonomy.
ASSESSMENT METHODS	There is a mid-term exam and another test when the student takes the final exam. The mid-term is given during the mid-term break. Each of these two tests lasts 75 minutes. The topics covered by the mid-term are projective geometry, conics and quadrics. The second test will be on the topics of general topology and algebraic topology seen during the lectures. The grades of the two intermediate tests sum up to give the grade of the written exam. There is no lower bound to pass the mid-term; it is possible to take the oral exam if the sum of the two grades is at least 18. The exam lasts 120 minutes and presents 3 problems. The pass grade is 18/30. The oral exam may last at most 20 minutes and the pass grade for the whole exam is 18/30. If you fail the exam, you need to take the written exam once again. The evaluation is expressed out of thirty (the minimum pass grade for the written test is 18/30 and the minimum pass grade for the whole exam is 18/30). Evaluation criteria: Mark 28 to 30 - 30 with distinction: Learning outcomes have been achieved to a very good/excellent level. Excellent knowledge of the concepts, methods and techniques of the discipline. Excellent critical abilities and ability to communicate knowledge. The student is strongly able to apply the knowledge acquired for solving the proposed problems. Mark 25 to 27: Learning outcomes have been achieved to a good level. Good knowledge of the concepts, methods and techniques of the discipline. Good critical abilities and ability to communicate knowledge. The student is able to apply the knowledge acquired for solving the proposed problems. Mark 18 to 24: Learning outcomes have been achieved to an acceptable/basic level. Acceptable/basic knowledge of the concepts, methods and techniques of the discipline. Acceptable/basic critical abilities and ability to communicate knowledge. The student is able to apply the knowledge acquired for solving the proposed problems but with limited level of autonomy and effectiveness. Mark below 18: Learning outcomes have not been met. Insufficient knowledge and understanding of concepts, methods and techniques of the discipline. Insufficient critical abilities and ability to communicate knowledge. Inadequate application of theoretical and technical knowledge for solving the proposed problems.
EDUCATIONAL OBJECTIVES	The educational objectives are both to extend to more general contexts some concepts acquired in the courses of mathematical analysis with respect to the Euclidean context, and to study from an affine point of view, as well as from a projective one, the geometry.
TEACHING METHODS	The course is based on lectures and problem sessions (lectures (56 hours), class exercises (24 hours)), as well as on home assignments.
SUGGESTED BIBLIOGRAPHY	1. Edoardo Sernesi - Geometria 1 (ISBN 88-339-5447-1) - Bollati Boringheri 2. Edoardo Sernesi - Geometria 2 (ISBN 88-339-5548-6) - Bollati Boringheri

SYLLABUS

Hrs	Frontal teaching
8	Introduction to projective geometry. The projective line. Projective geometry in higher dimension.
8	Collineations and projectivities. Affine spaces obtained from a projective space.
8	Affine and projective conics.
6	Elements of general topology. Open and closed sets. Closure, interior, exterior, boundary of a set. Induced topology. Continuous functions. Homeomorphisms.
6	Topological properties: separateness, connection, arc-wise connection, compactness. Product topology and quotient topology.
6	Arcs and loops in topological spaces. Continuous maps that are homotopically equivalent. Homotopic topological spaces. Retracts and deformation retracts.
6	Homotopic equivalence classes of arcs. The fundamental group of a pointed topological space: definition and functorial description.

SYLLABUS

Hrs	Frontal teaching
8	Contractible and simply connected topological spaces. The fundamental group of a circle.

Hrs	Practice
4	Determination of projective elements and projectivities.
6	Determining conics and quadrics of given properties.
4	Implementation of the theory; special topologies.
4	Classical topological spaces obtained by means of quotients.
6	omotopy and the fundamental group.