Anno Accademico 2021/2022

ALGEBRA 1	
Enrollment year	2020/2021
Academic year	2021/2022
Regulations	DM270
Academic discipline	MAT/02 (ALGEBRA)
Department	DEPARTMENT OF MATHEMATICS "FELICE CASORATI"
Course	MATHEMATICS
Curriculum	PERCORSO COMUNE
Year of study	2°
Period	1st semester (29/09/2021 - 14/01/2022)
ECTS	9
Lesson hours	84 lesson hours
Language	Italian
Activity type	WRITTEN AND ORAL TEST
Teacher	CANONACO ALBERTO (titolare) - 6 ECTS SPELTA IRENE - 3 ECTS
Prerequisites	The contents of the course of Linear Algebra.
Learning outcomes	The course is an introduction to some fundamental algebraic structures: groups, rings and fields.
Course contents	The integers. Integer division. Greatest common divisor and the Euclidean algorithm. Unique factorization of integers. Congruences. Groups: definition and examples; abelian groups. Subgroups. Homomorphisms and isomorphisms of groups; kernel of a homomorphism. Direct product of groups. Cyclic groups and generators of a group. Order of an element. Index of a subgroup and Lagrange's theorem. Normal subgroups; quotient group modulo a normal subgroup. Symmetric groups and Cayley's theorem. Homomorphism and isomorphism theorems for groups. Rings (commutative and non-commutative), integral domains, division

rings and fields. Homomorphisms of rings. Ideals and operations on ideals. Quotient ring modulo a two-sided ideal. Homomorphism and isomorphism theorems for rings. Chinese remainder theorem. Prime and maximal ideals. Polynomials with coefficients in a ring. Euclidean domains, principal ideal domains and unique factorization domains. Factorization of polynomials with coefficients in a unique factorization domain. Irreducibility criteria for polynomials. Algebraically closed fields; the "fundamental theorem of algebra".

Teaching methods	Lectures and exercise sessions
Reccomended or required readings	Notes provided by the teachers. I.N. Herstein: "Algebra", Editori Riuniti. M. Artin: "Algebra", Bollati Boringhieri.
Assessment methods	The exam consists of a written test, during which the student must solve some exercises, and of an oral examination, during which the student must answer some questions, mainly of a theoretical nature.
Further information	
Sustainable development goals - Agenda 2030	$lbl_legenda_sviluppo_sostenibile