



### ALGEBRA 2

<b>Enrollment year</b>	2013/2014
<b>Academic year</b>	2014/2015
<b>Regulations</b>	DM270
<b>Academic discipline</b>	MAT/02 (ALGEBRA)
<b>Department</b>	DEPARTMENT OF MATHEMATICS "FELICE CASORATI"
<b>Course</b>	MATHEMATICS
<b>Curriculum</b>	PERCORSO COMUNE
<b>Year of study</b>	2°
<b>Period</b>	2nd semester (02/03/2015 - 12/06/2015)
<b>ECTS</b>	6
<b>Lesson hours</b>	56 lesson hours
<b>Language</b>	ITALIAN
<b>Activity type</b>	ORAL TEST
<b>Teacher</b>	FREDIANI PAOLA (titolare) - 6 ECTS
<b>Prerequisites</b>	The courses of Linear algebra and Algebra 1.
<b>Learning outcomes</b>	The course is an introduction to Galois theory, with the necessary complements of group theory and of the theory of modules over a ring.
<b>Course contents</b>	<p>Modules over a ring. Group actions. Sylow theorems. Soluble groups. Field extensions. Splitting fields. Galois theory.</p> <p>Extended summary Modules over a ring. Structure of a finitely generated module over a principal ideal domain. Applications: Jordan canonical form and rational canonical forms.</p> <p>Group actions. Sylow theorems and applications. Semidirect products. Soluble groups.</p>

	<p>Field extensions. Splitting fields: existence and unicity. Galois correspondence. Normal extensions. Separable and inseparable extensions. Galois extensions. The fundamental theorem of Galois theory.</p> <p>Primitive Element Theorem. Galois theory for finite fields. Cyclotomic polynomials and their irreducibility. Galois group of a cyclotomic polynomial. Cyclic extensions. Polynomial solvable by radicals. The general polynomial of degree <math>&gt;4</math>. Equations with integer coefficients which are not solvable by radicals. Cubics and quartics.</p>
<b>Teaching methods</b>	Lectures and exercise sessions
<b>Reccomended or required readings</b>	<p>I.N. Herstein, Algebra, terza edizione, Editori Riuniti, Roma 1993.</p> <p>D.J.H. Garling, A Course in Galois Theory, Cambridge University Press</p> <p>C. Procesi, Elementi di Teoria di Galois, Zanichelli</p> <p>M.F. Atiyah, I.G. MacDonald, Introduzione all'algebra commutativa, Feltrinelli, 1981.</p> <p>M. Artin, Algebra, Bollati Boringhieri, Torino 1997.</p> <p>I.N. Stewart, Galois Theory, second edition, CRC Press.</p>
<b>Assessment methods</b>	Written and oral exam
<b>Further information</b>	Written and oral exam
<b>Sustainable development goals - Agenda 2030</b>	<a href="#">\$lbl legenda sviluppo sostenibile</a>