# Advanced Algebra

## Prof.ssa Clara Franchi

***COURSE AIMS AND INTENDED LEARNING OUTCOMES***

The aim of the course is to present to students a general comprehension of the fundamental facts of the Galois Theory of algebraic extensions and of its applications to finite fields and to the solution of algebraic equations.

At the end of the course, a student is expected to know the fundamental concepts and results of Galois Theory and he will be able to apply them to solve simple problems.

***COURSE CONTENT***

* Recall on cyclic groups and permutation groups.
* Group actions.
* Recall on fields and polynomial rings.
* Algebraic and trascendental field extensions.
* Splitting fields and algebraic closure.
* Normal and separable extensions.
* Galois extensions.
* Fundamental Galois Theorem.
* Finite fields.
* Cyclotomic polynomials.
* Solvability by radicals of algebraic equations.

***READING LIST***

Notes given by the teacher.

***TEACHING METHOD***

Lectures and exercise sessions.

***ASSESSMENT METHOD AND CRITERIA***

The exam is divided into two parts, both of them compulsory:

1. A written test in which the student is requested to solve some exercises. To proceed to the oral test, the student must have passed the written test with at least 18/30.
2. An oral test in which the student is asked on the programme of the course.

In the written test the student is requested to solve some exercises, doing which he must show that he has learnt the basic notions of the course and he is able to apply them to specific situations, similar or close to those presented as examples by the teacher in the classes.

Evaluation of the written test will be based on the correctness of the results and of the methods used to obtain them, and their quality.

The aim of the oral exam is to test the degree of assimilation of the concepts, the results and the proofs presented during the course, by means of an exposition and a discussion of some items of the program, not excluding references to prerequisites or links to different topics.

Evaluation of the oral test will be based on the correctness of the concepts and results presented, their logic and methodologic accuracy, and the correctness and strength of the exposition. Assimilation of the concepts and the personal reworking will also be considered.

There will be a unique final mark, based for the 40% on the evaluation of the written test and for the 60% on the oral test.

***NOTES AND PREREQUISITES***

A sufficient knowledge of the basic notions of the Algebra course is expected.

Prof. Clara Franchi meets the students in her room, before or after every lecture, and on appointment.

*Further information can be found on the lecturer's webpage at http://docenti.unicatt.it/web/searchByName.do?language=ENG or on the Faculty notice board.*