# Algebra

## prof.ssa Clara Franchi

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

The aim of the course is to present to students the basic concepts of the fundamental algebraic structures.

At the end of the course, a student is expected to know the fundamental algebraic structures and their main properties. He will be able to use the basic concepts and properties of the different structures to formulate logic deductions and solve easy exercises.

***COURSE CONTENT***

- Set theory: equivalence relations, order relations, functions.

- Integer numbers: Euclidean division algorithm, fundamental theorem of arithmetic, congruences modulo n.

- Monoids and groups: definition and basic properties, examples, subgroups, normal subgroups and quotients groups, omomorphisms, permutation groups, Lagrange Theorem.

- Rings and fields: definitions and examples, omomorphisms, ideals and quotient rings, Euclidean domains, polynomial rings.

***READING LIST***

D. Dikranjan - M. S. Lucido, *Aritmetica e Algebra*, Liguori Editore (2007)

***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 lectures.

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 Algebra course, by means of an exposition and a discussion of some items of the programme, 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***

Being introductory, the course does not need any prerequisites about the content. A good knowledge of secondary school maths 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.*