

27011 - Algebraic Structures

Syllabus Information

Academic year: 2024/25

Subject: 27011 - Algebraic Structures

Faculty / School: 100 - Facultad de Ciencias

Degree: 453 - Degree in Mathematics
647 - Degree in Mathematics

ECTS: 6.0

Year: 2

Semester: Second semester

Subject type: Compulsory

Module:

1. General information

The goal of this course is to introduce the students to abstract algebra. This is done starting with the algebraic structures of commutative rings, extending their more concrete knowledge of integers and polynomials.

2. Learning results

- Be familiar with quotient structures.
- Operate in abelian groups.
- Make groups operate on sets and understand the induced decomposition.
- Operate in commutative rings, with special emphasis on the rings of integers and of polynomials.
- Construct new rings from known ones and check the properties that are inherited.
- Factorize as a product of irreducible elements.
- Manipulate algebraic expressions with algebraic elements.

3. Syllabus

1. Arithmetic.
 - Integers.
 - Congruences.
2. Structures with one binary operation
 - Groups and monoids
 - actions of groups on sets
3. Rings
 - Basics on rings: homomorphisms, ideals
 - Universal constructions: direct products, polynomials and rings of fractions,
 - Factorization on integral domains
 - Factorization on rings of polynomials.

4. Academic activities

Master classes: 45 hours.

Problem solving: 15 hours.

Study: 87 hours.

Assessment tests: 3 hours.

5. Assessment system

- The evaluation will be composed of the following parts:
 - Partial exams and/or resolution in class of questions or problems proposed during the course, delivered to the teacher (attendance will be positively evaluated): grade C.
 - A final exam: grade F.
- The grade will be the maximum of $0.5 \cdot C + 0.5 \cdot F$ and F.

At any rate, the student has the right of being graded on the ground of a single global exam instead of the previous procedure.

6. Sustainable Development Goals

- 4 - Quality Education
- 5 - Gender Equality
- 8 - Decent Work and Economic Growth