

## Fundamentals of Algebra

Academic Year: ( 2022 / 2023 )

Review date: 19-04-2022

Department assigned to the subject: Mathematics Department

Coordinating teacher: BRANDLE CERQUEIRA, CRISTINA

Type: Basic Core ECTS Credits : 6.0

Year : 1 Semester : 1

Branch of knowledge: Engineering and Architecture

## REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

None

## DESCRIPTION OF CONTENTS: PROGRAMME

1. Logic and mathematical proofs
2. Elementary set theory and functions
3. Integer numbers and modular arithmetic
4. Groups

## LEARNING ACTIVITIES AND METHODOLOGY

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THEORETICAL-PRACTICAL CLASSES. [44 hours with 100% classroom instruction, 1.76 ECTS]

Knowledge and concepts students must acquire. Students receive course notes and will have basic reference texts to facilitate following the classes and carrying out follow-up work. Students partake in exercises to resolve practical problems and participate in workshops and evaluation tests, all geared towards acquiring the necessary capabilities.

TUTORING SESSIONS. [4 hours of tutoring with 100% on-site attendance, 0.16 ECTS]

Individualized attendance (individual tutoring) or in-group (group tutoring) for students with a teacher.

STUDENT INDIVIDUAL WORK OR GROUP WORK [98 hours with 0 % on-site, 3.92 ECTS]

FINAL EXAM. [4 hours with 100% on-site, 0.16 ECTS]

Global assessment of knowledge, skills, and capacities acquired throughout the course.

## METHODOLOGIES

THEORY CLASS. Classroom presentations by the teacher with IT and audiovisual support in which the subject's main concepts are developed while providing material and bibliography to complement student learning.

PRACTICAL CLASS. Resolution of practical cases and problems, posed by the teacher, and carried out individually or in a group.

TUTORING SESSIONS. Individualized attendance (individual tutoring sessions) or in-group (group tutoring sessions) for students with a teacher as a tutor.

## ASSESSMENT SYSTEM

SE1 - FINAL EXAM. [60 %]

Global assessment of knowledge, skills, and capacities acquired throughout the course.

SE2 - CONTINUOUS EVALUATION. [40 %]

Assesses papers, projects, class presentations, debates, exercises, internships

and workshops throughout the course.

It consists of two mid-term exams held along the course to assess the student's progression. The continuous evaluation also allows students themselves to modify their learning strategies, in case it is necessary. In addition, short tests, of no more than 10 minutes, will be given in each week.

<b>% end-of-term-examination:</b>	60
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	40

#### BASIC BIBLIOGRAPHY

- Joseph A. Gallian Contemporary Abstract Algebra, Chapman and Hall/CRC (10ed), 2020
- Kenneth H Rosen Discrete Mathematics and Its Applications, McGraw-Hill Education, 2011 (7ed)
- Martin Liebeck A concise Introduction to Pure Mathematics, CRC Press, 2016 (4ed)
- Thomas W. Judson Abstract Algebra: theory and applications, orthogonal publishing, 2019

#### ADDITIONAL BIBLIOGRAPHY

- Bruce N. Cooperstein An Introduction to Groups, Rings, and Fields, Worldwide Center of Mathematics, 2012
- Fernando Q. Gouvêa A Guide to Groups, Rings, and Fields, Mathematical Association of America, 2012
- Susanna S. Epp Discrete Mathematics with Applications, Cenage Learning, 2011

#### BASIC ELECTRONIC RESOURCES

- Tom Judson . Abstract Algebra: Theory and Applications: <http://abstract.ups.edu/>