SUBJECT TEACHING GUIDE

G90 - Algebraic Structures

Double Degree in Physics and Mathematics
Degree in Mathematics

Academic year 2023-2024

1. IDENTIFYING DATA					
Degree	Double Degree in Physics and Mathematics Degree in Mathematics			Type and Year	Compulsory. Year 2 Compulsory. Year 2
Faculty	Faculty of Sciences				
Discipline	Subject Area: Algebra Module: Compulsory Subjects				
Course unit title and code	G90 - Algebraic Structures				
Number of ECTS credits allocated	6	Term		Semester based (2)	
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. MATEMATICAS, ESTADISTICA Y COMPUTACION
Name of lecturer	JESUS JAVIER JIMENEZ GARRIDO
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Other lecturers	

3.1 LEARNING OUTCOMES
- Understand the basics of group and ring theory.
- Understand, demonstrate and use the fundamental theorems of group and ring theory and handle with ease the most common examples of this type of structure.

4. OBJECTIVES
Understand the basic concepts of group and ring theory, as well as the handling of concrete models that are necessary to tackle subsequent Algebra subjects.

6. COURSE ORGANIZATION

CONTENTS	
1	GROUP THEORY. Basic notions. Subgroups. Order of an element and order of a group. Cyclic groups. Permutations Groups. Alternating groups. Dihedral groups. Cosets: Lagrange's theorem. Normal subgroups. Factor groups. Group homomorphisms. Isomorphism theorems. Classification of groups.
2	RING THEORY. Basic notions: rings and subrings. Ideals and factor ring. Ring homomorphisms. Isomorphism theorems. Characteristic of a ring. Domains and fields. Prime and maximal ideals. The field of quotients of a domain. Factorization in a domain. Unique factorization domains. M.C.D. and M.C.M. Principal Ideals Domains. Euclidean domains. Polynomial Rings. Irreducibility criteria.

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
The student must carry out, independently, in a group or individually, and supervised by the teachers of the subject, various problem-solving tasks proposed by the teacher.	Others	No	Yes	40,00
The exam will consist of an evaluation on theoretical and practical contents of mathematics presented throughout the course.	Written exam	Yes	Yes	60,00
TOTAL				100,00

Observations

(A) The final grade for the subject, both in the ordinary and extraordinary sessions, is the maximum between:
(1) The weighting of the continuous assessment grade (EC) and the final exam grade (EF), ordinary or extraordinary, according to the percentages indicated.
(2) The grade of the final exam (EF), ordinary or extraordinary, that is, give it a 100% weight.

(B) To pass the course it is necessary that the final grade obtained with the procedure indicated in section (A) is at least 5 points and that the grade of the final exam (EF), ordinary or extraordinary, is at least 4 points out of 10.

(C) In accordance with current regulations:
- If a student does not obtain the minimum grade required in the final exam, the grade for the subject will be the lowest value between 4.9 and the grade obtained according to section (A).
- When a student has not carried out evaluation activities whose weight exceeds 50% of the grade for the subject, it will appear in their minutes as not presented and that when they have taken tests that involve the aforementioned 50% or more, the minutes will include the corresponding rating. The weighting of the various evaluation methods is set so that whoever does not take the final exam obtains the grade of not presented.
- The fraudulent performance of the tests or evaluation activities will directly result in a failure grade '0' in the subject in the corresponding call, thereby invalidating any grade obtained in all the evaluation activities for the extraordinary call.

Observations for part-time students

A part-time student will have the same evaluation procedure as the full-time student, which allows the student, in particular, to undergo a one-time evaluation process.

8. BIBLIOGRAPHY AND TEACHING MATERIALS
BASIC
Apuntes de la asignatura: "Estructuras Algebraicas" Javier Jiménez Garrido