VNIVERSITAT ÖIDVALÈNCIA

COURSE DATA

Data Subject

Code	34176
Name	Ring theory
Cycle	Grade
ECTS Credits	6.0
Academic year	2023 - 2024

Study (s)

Degree	Center	Acad. year	Period
1107 - Degree in Mathematics	Faculty of Mathematics	4	Second term

Subject-matter

Degree	Subject-matter	Character
1107 - Degree in Mathematics	16 - Seminar on Algebra	Optional

Coordination

Name	Department
BALLESTER BOLINCHES, ADOLFO	5 - Algebra

SUMMARY

Modules study focuses on the influence thereof in a ring structure. In particular, the non-commutative rings chapter emphasizes the study of simple and semisimple modules with a view to the Representation Theory of Groups modules. The contents of the section of commutative rings are motivated by two of its main fields of application: algebraic geometry and number theory. In this part knowledge of the subjects of Algebraic Equations Algebraic Structures and they complement and basic and specific concepts of commutative rings are studied emphasizing the relationship of these with the corresponding concepts of algebraic geometry and number theory.

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PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

Linear Algebra I and II, and Algebraic Equations Algebraic Structures.

OUTCOMES

1107 - Degree in Mathematics

- Capacity for analysis and synthesis.

- Solve problems that require the use of mathematical tools.

- Learn autonomously.

- Possess and understand the mathematical knowledge.

- Apply the knowledge in the professional world.

- Expressing mathematically in a rigorous and clear manner.

- Knowing the time and the historical context in which occurred the great contributions of women and men in the development of mathematics.

- Visualize and interpret the solutions obtained.

LEARNING OUTCOMES

Students should develop those learning skills necessary to undertake further studies with autonomy.

Students should know how to use search tools library resources.

Students should learn how to do presentations and expose their work in public.

DESCRIPTION OF CONTENTS

1. Preliminary on ring and ideals

Revision of some basic concepts of ideal rings and ring homomorphisms. Prime and maximal ideals. Radicals.

2. Modules

Modules and module homomorphisms. Submodules and quotient modules. Sums and direct products. Free modules. Chain conditions. Finitely generated modules over a PID.

3. Noncommutative rings

Simple and semisimple modules. Maschke theorem.

4. Commutative rings

Neperian and Artinian rings. Integer dependence. Dedekind domains.

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	37,50	100
Classroom practices	15,00	100
Other activities	7,50	100
Study and independent work	16,50	0
Readings supplementary material	8,00	0
Preparation of evaluation activities	16,50	0
Preparing lectures	24,80	0
Resolution of case studies	8,50	0
TOTAL	134,30	

TEACHING METHODOLOGY

Attendance is strongly recommended both the lectures and classes of problems. In the lectures we give the necessary and important for understanding and troubleshooting tools. In the classes of problems will deepen the assimilation and understanding of the concepts developed in the lectures by solving problems and exercises. This job are to fruition by the explanations made by the teacher on board and the active participation of students in the discussion of the various arguments used in solving problems. This course will also provide resources through the Virtual Classroom. In the same we will incorporate statements of the lists of issues and additional material that may complement the lectures and problems.

EVALUATION

The mark obtained in the Xamen count 80% of the final grade. The seminar will note the 10% and 10% participation.

To pass you must obtain a minimum grade of 4 out of 10 on the test.

In the second call, the evaluation system will be the same.

REFERENCES

Basic

- Referencia b1:   Atiyah-MacDonald, Introducción al Álgebra Conmutativa. Reverté, 2005
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  Referencia b2:Herstein, Noncommutative rings. Reprint of the 1968 original. Carus Mathematical Monographs, 15, 1994
- Referencia b3:Isaacs: Character theory of finite groups, Academic Press, 1976
- Referencia b4:Lam: A first course in noncommutative rings, Springer, 2001
- Referencia b5:Matsumura: Commutative ring theory. Cambridge Univ. Press, 1992

Additional

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  Referencia c1:Anderson y Fuller, Rings and categories of modules, Springer-Verlag, 1992.
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  Referencia c2:Dummit-Foote: Abstract Algebra. Prentince-Hall, 1991.
-
  Referencia c3:Hungerford: Algebra. Springer-Verlag, 1974
-
  Referencia c4:Isaacs: Algebra. Brooks/Cole Publications, 1994.
-
  Referencia c5:Jacobson: Basic Algebra I. Freeman and Co., 1980