SUBJECT TEACHING GUIDE

G91 - Galois Theory

Double Degree in Physics and Mathematics
Degree in Mathematics

Academic year 2019-2020

1. IDENTIFYING DATA					
Degree	Double Degree in Physics and Mathematics Degree in Mathematics			Type and Year	Compulsory. Year 4 Compulsory. Year 3
Faculty	Faculty of Sciences				
Discipline	Subject Area: Algebra Module: Compulsory Subjects				
Course unit title and code	G91 - Galois Theory				
Number of ECTS credits allocated	6	Term		Semester based (1)	
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. MATEMATICAS, ESTADISTICA Y COMPUTACION
Name of lecturer	DANIEL SADORNIL RENEDO
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Office	Facultad de Ciencias. Planta: + 3. DESPACHO PROFESORES (3003D)
Other lecturers	

3.1 LEARNING OUTCOMES
- To know the concepts and basic results of field theory; especially, in the case of finite algebraic extensions and to know how to apply them to the study of simple extensions of Q, finite fields and cyclotomic fields.
- To know how to operate with algebraic numbers and determine intermediate fields in simple cases of number , finite or cyclotomic fields
- To determine the Galois correspondences between the subfilds of the algebraic extension and the subgroups of the Galois group.

4. OBJECTIVES

Understand the resolution of polynomial equations and their historical proposal.
Train in the calculation with polynomials and algebraic numbers.
Understand and relate the concepts and basic properties of the Galois Theory, analyze these properties in simple cases or in concrete examples, and perform demonstrations of some theoretical properties.
Know the classic problems on constructions with ruler and compass

6. COURSE ORGANIZATION

	CONTENTS
1	1.1 History and theory of the resolution of the equations of degree 1, 2,3 and 4. 1.2 Basic results on polynomial rings, polynomial factorization and irreducibility criteria. 1.3 Symmetric polynomials.
2	2.1. Fields extensions. General Theory: Basis and degree of an extension, simple extensions, K-homomorphisms 2.2. Galois group of an extension. Galois extensions and Galois Correspondences. 2.3. Normal extensions and splitting fields. Normal closure of a finite extension
3	3.1. Finite Fields. 3.2. Cyclotomic fields. 3.3. Ruler-and-compass constructions. 3.4 Galois group of a ploynomial. Resolution by radicals

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Partial Exam	Written exam	No	Yes	50,00
Final Exam	Written exam	Yes	Yes	50,00
TOTAL				100,00

Observations

Final exam will be divided into two parts: the part corresponding to the subject of the partial exam and the rest of the subject.

1.- Students who have passed the partial exam or have obtained a grade higher than 4, will only have to be examined in the final exam of the rest of the subject.
In addition, they may also repeat the part corresponding to the partial if they wish to improve the grade. In this case, to obtain the final grade, the average between the two parts will be calculated, using for it the grade obtained in the last exam.

2.- Students who have obtained a grade lower than 4 in the partial must be submitted to both parts of the final exam. Your overall score will be the arithmetic mean of the marks obtained in each of the two parts of the final exam.

3.- In September, exam will be, for all students, a single exam of all the subject (100%)

Observations for part-time students

Same conditions that other students

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

1.- Mª Pilar Fernández.-Ferreirós Erviti. Apuntes de Teoría de Galois.
2.- Escofier, J.P. "Galois Theory". Springer GTM nº 204 (1997)
3.- Fernando, José F.; Gamboa, J. Manuel. ``Ecuaciones Algebraicas:Extensiones de Cuerpos y Teoria de Galois". Ed. Sanz y Torres (2015)