SUBJECT TEACHING GUIDE

G111 - Algebraic Topology

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	Optional. Year 5 Optional. Year 4
Faculty	Faculty of Sciences			
Discipline	Subject Area: Further Algebra and Geometry Mention in Pure and Applied Mathematics			
Course unit title and code	G111 - Algebraic Topology			
Number of ECTS credits allocated	6	Term	Semester based (1)	
Web				
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. MATEMATICAS, ESTADISTICA Y COMPUTACION
Name of lecturer	NURIA CORRAL PEREZ
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Other lecturers	DAVID SENOVILLA SANZ

3.1 LEARNING OUTCOMES
- To learn the notion of homotopy between topological spaces and to be able to give homotopies between maps.
- To recognise if two topological spaces are homotopically equivalents.
- To compute the fundamental group of a closed surface and similar topological spaces.
- To compute the homology groups of a simple triangulated space.

4. OBJECTIVES
To learn more about topological spaces, studying them from their global properties and some combinatorial invariants.
To get used to deal with algebraic invariants which allow to distinguish different spaces.
To learn how to use methods of this subject to prove results coming from other areas
Recall the importance of a correct formalization of arguments to prove a statement

6. COURSE ORGANIZATION

	CONTENTS
1	Homotopy and the fundamental group of a topological space.
2	Covering spaces.
3	Retracts and homotopy equivalence.
4	Seifert-Van Kampen theorem.
5	Introduction to homology
6	Final exam

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Partial exams	Written exam	No	Yes	40,00
Final exam	Written exam	Yes	Yes	60,00
TOTAL				100,00

Observations
The final grade will be the maximum of the result achieved in the final exam and that obtained by a weighted combination of the different proofs described above. The final grade in the extraordinary exam will be determined by the grade achieved in the corresponding final exam. Use of notes or written material is not allowed during the exam.

Observations for part-time students
These students can choose between the evaluation system of regular students and one in which they only need to do the final exam and receive its grade as their final grade.

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC
John M. Lee, "Introduction to Topological Manifolds", Springer, 2000.
James R. Munkres, "Topología", 2a edición, Prentice-Halla, Madrid 2001.