

SUBJECT TEACHING GUIDE

G111 - Algebraic Topology

Double Degree in Physics and Mathematics
Degree in Mathematics

Academic year 2020-2021

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				
E-mail	nuria.corral@unican.es				
Office	Facultad de Ciencias. Planta: + 3. DESPACHO NURIA CORRAL PEREZ (3003C)				
Other lecturers					

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 equivalent.
- 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

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				
<p>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.</p> <p>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.</p>				
Observations for part-time students				
<p>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.</p>				

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.