

SUBJECT TEACHING GUIDE

G107 - Further Analysis

Double Degree in Physics and Mathematics
Degree in Mathematics

Academic year 2021-2022

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 Mathematical Analysis and Differential Equations Mention in Pure and Applied Mathematics				
Course unit title and code	G107 - Further Analysis				
Number of ECTS credits allocated	6	Term	Semester based (1)		
Web	https://personales.unican.es/granero/index.html				
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. MATEMATICAS, ESTADISTICA Y COMPUTACION				
Name of lecturer	RAFAEL GRANERO BELINCHON				
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Office	Facultad de Ciencias. Planta: + 1. DESPACHO RAFAEL GRANERO BELINCHON (1049)				
Other lecturers					

3.1 LEARNING OUTCOMES

- To get used to some tools and techniques of mathematical analysis. In particular, Fourier series and transforms, functional spaces that appear in the study of partial differential equations. Finally, the students will learn about some of the common ideas when studying differential equations.

4. OBJECTIVES

To learn some techniques in harmonic analysis and functional analysis

6. COURSE ORGANIZATION	
CONTENTS	
1	L^p spaces, Fourier series, Fourier transform
2	Sobolev spaces, Sobolev inequality, Trace operator, Poisson equation, Existence and uniqueness of solution, singular integrals
3	Heat equation, existence and uniqueness, convergence to equilibrium, Moser iteration, transport and Airy equations, basic properties, dispersion
4	Oral exposition of the project

7. ASSESSMENT METHODS AND CRITERIA				
Description	Type	Final Eval.	Reassessn	%
Project	Work	No	Yes	60,00
Exposition	Others	Yes	Yes	40,00
TOTAL				100,00
Observations				
Observations for part-time students				
Part time students can chose between the porject and its exposition or a unique final exam at the end of the course				

8. BIBLIOGRAPHY AND TEACHING MATERIALS
BASIC
Lieb, E. H., & Loss, M. (2001). Graduate studies in mathematics. Analysis, 14.
Evans, L. C. (1998). Graduate studies in mathematics. In Partial differential equations. Am. Math. Soc..
Apuntes de la asignatura facilitados por el profesor