SUBJECT TEACHING GUIDE

344 - Numerical Computation

Master's Degree in Mathematics and Computing

Academic year 2026 - 2027

1. IDENTIFYING DATA					
Degree	Master's Degree in Mathematics and Computing			Type and Year	Compulsory. Year 1
Faculty	Faculty of Sciences				
Discipline					
Course unit title and code	344 - Numerical Computation				
Number of ECTS credits allocated	3	Term		Semester based (1)	
Web					
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. MATEMATICA APLICADA Y CIENCIAS DE LA COMPUTACION
Name of lecturer	EDUARDO CASAS RENTERIA
E-mail	eduardo.casas@unican.es
Office	E.T.S. de Ingenieros Industriales y de Telecomunicación. Planta: - 4. DESPACHO PROFESORES (S4019)
Other lecturers	

3.1 LEARNING OUTCOMES
Knowledge of the efficient methods and their correct programming
Knowledge of the various methods of approximation and data processing.
Knowledge of the computational difficulties associated with problems of large size and alternative methods for their resolution
Identification of the difficulties of the numerical computing related to the limitations of the computers.
Identification of well and ill conditioned problems, and stable and unstable algorithms.

4. OBJECTIVES
To deepen in the knowledge of the numerical computation, identifying the difficulties motivated by the rounding error of the computer, and the ill conditioning or the large size of the problems.

6. COURSE ORGANIZATION	
CONTENTS	
1	Introduction to the numerical computation
2	Approximation of functions: least squares and fast Fourier transform
3	Solution of systems of nonlinear equations
4	Solution of boundary value problems for ordinary differential equations

7. ASSESSMENT METHODS AND CRITERIA				
Description	Type	Final Eval.	Reassessment	%
Final exam	Laboratory evaluation	Yes	Yes	100,00
TOTAL				100,00
Observations				
Observations for part-time students				
Part-time students will be assessed as the rest of the students, in a single final exam.				

8. BIBLIOGRAPHY AND TEACHING MATERIALS
BASIC
A. Aubanell, A. Benseny y A. Delshams: Útiles Básicos de Cálculo Numérico. Editorial Labor, S.A. Barcelona 1993.
G. Hämmerlin y K.H. Hoffmann: Numerical Mathematics. Springer Verlag. Heidelberg-Berlin-New York 1991.
D. Kahaner, C. Moler y S. Nash: Numerical Methods and Software. Prentice Hall, Englewood Cliffs. New Jersey 1989.
J.E. Dennis y R.B. Schnabel: Numerical Methods for Unconstrained Optimization and Nonlinear Equations. Prentice Hall, Englewood Cliffs. 1983.