

## SUBJECT TEACHING GUIDE

### G697 - Numerical Methods

#### Degree in Industrial Technologies Engineering

Academic year 2023-2024

1. IDENTIFYING DATA					
Degree	Degree in Industrial Technologies Engineering			Type and Year	Compulsory. Year 4
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Subject Area: Further Mathematics Module: Further Basic Training				
Course unit title and code	G697 - Numerical Methods				
Number of ECTS credits allocated	6	Term	Semester based (1)		
Web	<a href="https://personales.unican.es/casase/MN/">https://personales.unican.es/casase/MN/</a>				
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	DIEGO RUIZ ANTOLIN				

### 3.1 LEARNING OUTCOMES

- Knowledge of the numerical methods for the approximate solution of mathematical problems arising in scientific applications

### 4. OBJECTIVES

To deepen in the student's education in the Scientific Computing, addressing the resolution of problems by means of numerical methods.

Show to the students the most efficient numerical methods and their correct programming to compute the solution of a problem with a given accuracy.

## 6. COURSE ORGANIZATION

CONTENTS	
1	Approximate solution of systems of nonlinear equations
2	Optimization
3	Computation of eigenvalues and eigenvectors

## 7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Theoretical-practical exam on the solution of systems of nonlinear equations	Laboratory evaluation	No	Yes	30,00
Theoretical-practical exam on optimization	Laboratory evaluation	No	Yes	40,00
Theoretical-practical exam on the computation of eigenvalues and eigenvectors	Laboratory evaluation	No	Yes	30,00
TOTAL				100,00
Observations				
These tests are optional and are designed to facilitate the continuous assessment of the student. There will be a final test for those who do not show up or have failed all or any of the partial tests. All tests will be done in the computer lab using Matlab as a software tool.				
Observations for part-time students				
Part-time students, like the rest of the students, may participate in the partial exams or limit themselves to the final exam.				

## 8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC
J. E. Dennis y R.B. Schnabel: "Numerical Methods for Unconstrained Optimization and Nonlinear Equations". Prentice Hall, Englewood Cliffs. New Jersey 1983
J. Nocedal y S. J. Wright: "Numerical Optimization". Springer-Verlag. New York 1999.
Biswa Nath Datta: "Numerical Linear Algebra and Applications". Society for Industrial and Applied Mathematics (SIAM), Philadelphia, PA, 2010.
David S. Watkins: "Fundamentals of Matrix Computations". John Wiley & Sons. New York 2002.