SUBJECT TEACHING GUIDE

G855 - Mathematical Methods for Engineering

Degree in Electrical Engineering

Academic year 2023-2024

1. IDENTIFYING DATA				
Degree	Degree in Electrical Engineering		Type and Year	Core. Year 2
Faculty	School of Industrial Engineering and Telecommunications			
Discipline	Subject Area: Mathematics Basic Training Module			
Course unit title and code	G855 - Mathematical Methods for Engineering			
Number of ECTS credits allocated	6	Term	Semester based (1)	
Web				
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. MATEMATICA APLICADA Y CIENCIAS DE LA COMPUTACION
Name of lecturer	MARIA DOLORES FRIAS DOMINGUEZ
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Other lecturers	CARMEN MARIA SORDO GARCIA SARA PEREZ CARABAZA VERA EGOROVA

3.1 LEARNING OUTCOMES
- Knowledge of basic numerical methods to solve mathematical problems that admit a mathematical formulation.
- Ability to discern the best method among those available for a particular problem, assessing the complexity of the method and the presence and control of numerical errors.
- Knowledge of basic statistical concepts.
- Use mathematical software and gain working knowledge with computers and programming environments to tackle problems that arise in engineering applications

4. OBJECTIVES

Introduce students to mathematical problem solution techniques, making use of numerical and statistical methods applied to model scientific and technical problems
The student must learn how to use mathematics to solve problems that arise in physics and engineering.

6. COURSE ORGANIZATION

	CONTENTS
1	Part I: Statistics
1.1	Descriptive statistics
1.2	Probability
1.3	Common probability distributions
1.4	Statistical Quality Control
2	Part II: Numerical Method and Optimization
2.1	Basic computer arithmetic
2.2	Approximate solution for non-linear equations
2.3	Polynomial approximation of real-values functions. Optimization.
2.4	Numerical integration and differentiation.
2.5	Numerical integration of Ordinary Differential Equations

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Part I: Statistics	Written exam	No	Yes	10,00
Part I: Statistics	Written exam	No	Yes	15,00
Part I: Statistics	Laboratory evaluation	No	No	10,00
Part II: Numerical Methods	Activity evaluation with Virtual Media	No	Yes	25,00
Part II: Numerical Methods	Work	No	Yes	15,00
Part II: Numerical Methods	Laboratory evaluation	Yes	Yes	25,00
TOTAL				100,00

Observations
Students are only allow to repeat the failed exams during the retake period. It will consist of two parts, one for Statistics and one for Numerical Methods, with their corresponding weights. The final mark for the extra call will be the weighted average of the different evaluation methodologies indicated in this guide . The mark in each part of the subject (Statistics and Numerical Methods) must be greater than or equal to 3 over 10.

Observations for part-time students
Part-time students (and only these) will be able to take the written exams simultaneously in the period established for the exams if they so request at the beginning of the year. Practical exams will take place as for the rest of the students to ensure the same evaluation of knowledge and competence. The works proposed throughout the year may be done individually and delivered in electronic format.

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC
Chapra S.C.; Canale R.2005. "Métodos Numéricos para Ingenieros". Ed. McGRaw-Hill.
Mathews J., Kurtis D.1999." Métodos Numéricos con MATLAB". Prentice Hall.
R.L. Burden y J.D. Faires:1988. "Numerical Analysis". PWS-Kent Publishing Company. Boston.
Luceño, A.; González, F.J. 2003. "Métodos Estadísticos para Medir, Describir y Controlar la Variabilidad". Santander: Universidad de Cantabria. ISBN: 978-84-8102-750-1. http://catalogo.unican.es/cgi-bin/abnetopac/?TITN=214714
Cohen, Y.; Cohen, J.Y. 2008. "Statistics and data with R: an applied approach through examples". Chichester:: John Wiley & Sons. ISBN: 978-0-470-75805-2. http://catalogo.unican.es/cgi-bin/abnetopac/?TITN= 292113