COURSE DATA

DATA SUBJECT

Code: 34836
Name: Mathematics III
Cycle: Undergraduate Studies
ECTS Credits: 6
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
1407 - Degree in Multimedia Engineering	Escola Tècnica Superior d'Enginyeria	2	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1407 - Degree in Multimedia Engineering	Matemáticas	BASIC

COORDINATION

GUERRERO CORTINA FRANCISCO

SUMMARY

The main thematic subjects are: Numerical Methods, Statistics and Optimization.

The general objectives of the course are the following:

- To understand the concept of approximation to the solution of a problem.
- To identify those situations that require a numerical method in order to obtain a solution.
- To acquire the ability to structure a discrete problem in order to be able to solve it using a programming language.
- To learn to question the validity and or the fiability of the results obtained.
- To stablish conections with other subjects of interest in engineering applications.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

OTHER REQUIREMENTS

Matemàtiques I and Matemàtiques II

COMPETENCES / LEARNING OUTCOMES

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B1 - Ability to solve the mathematical problems that may arise in engineering. Ability to apply knowledge of linear algebra, differential and integral calculus, numerical methods, numerical algorithms, statistics and optimisation.

G6 - Know the basic subject areas and technologies that serve as a basis to learn and develop new methods and technologies and those that provide versatility to adapt to new situations.

MM28 - Be able to solve problems with initiative, decision-making and creativity and to communicate and transmit the knowledge, abilities and skills of a multimedia engineer.

DESCRIPTION OF CONTENTS

1. Numerical methods for the solution of nonlinear equations.

Roots of nonlinear equations. Methods of bisection and Newton.

2. Polynomial Interpolation

Construction of the interpolating polynomial for tables. Error bounds for the interpolation error.

3. Numerical methods for the solution of linear systems.

The LU decomposition and its use in the solution of linear systems. Introduction to iterative methods for the solution of large linear systems.

4. Numerical Integration

Integration rules. Error bounds for numerical integration.

5. Numerical Methods for ordinary differential equations

The Euler method. Convergence of a numerical scheme. Order. First order schemes versus higher order schemes.

6. Inference and decision

Statistics vocabulary. Central statistics (mode, means) and dispersion statistics (variance, standard deviation). Introduction to probability distributions. Normal distributions. Random variables and associated density functions. Credible Intervals.

7. Regression

Linear and nonlinear regression. Goodness of fit.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	15,00
Laboratory	30,00
Classroom practices	15,00
Total hours	**60,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	15,00
Independent study and work	10,00
Preparation of lessons	40,00
Preparation for assessment activities	25,00
Resolution of case studies	0,00
Total hours	**90,00**

TEACHING METHODOLOGY

The professor will explain the theoretical concepts to the class, including simple applications. In the practice classes, the student will be asked to solve exercises, alone or in small groups, under the guidance of a professor. In the laboratory, the student shall use the gained knowledge to solve more complex problems, for which the use of a computer is necessary or appropriate.

EVALUATION

The evaluation procedure is as follows:

1.There will be at least one exam to evaluate the knowledge gained in the course. The grades obtained will amount up to 50% of the final grade of the course

2.The evaluation of the participation of the student in the activities linked to the Laboratory will be carried out by one or more exams. In addition, the professor may require the presentation of a lab diary or specific homework. The grades obtained will amount up to 50% of the final grade of the course. The grade of laboratory will be 50% composed of the grade for the homework and the grade for the practical exam.

3.The dayly participation of the student in the development of the course, by attending lectures and other activities proposed by the professor, may amount to up to 10% of the final grade of the course.

The overall grade for the subject will be calculated from the grades obtained in the sections above, according to the percentages established by the teacher, as long as the grades of sections 1 and 2 exceed 40% of the maximum grade corresponding to each of the sections.

The grade of the homework laboratory and the grade of the daily participation in the course will be maintained for the two calls of each academic year and, therefore, they can¿t be recovered.

Copying or plagiarism of any activity that is part of the evaluation will result in the impossibility of passing the course, and the student will then be subject to the appropriate disciplinary procedures indicated in the ACTION PROTOCOL FOR FRAUDULENT PRACTICES AT THE UNIVERSITY OF VALENCIA (ACGUV 123/2020).

In any case, the evaluation of this subject will be done in compliance with the University Regulations in this regard, approved by the GoverningCouncil on 30th May 2017 (ACGUV 108/2017).

REFERENCES

- Métodos Numéricos: Introducción, Aplicaciones y Programación. A. Huerta, J. Sarrate, A. Rodriguez-Ferrer. Edicions UPC
- Análisis Numérico. Burden y Faires. Thomson Learning
- Curs d'Estadística. Colomer Mª Angels. Ed. Universitat de Lleida, 1997
- Problemas resueltos de Métodos Numéricos. A. Cordero, J.L. Hueso, E. Martinez, J.R.Torregrosa, Ed. Thomson.