COURSE DATA

DATA SUBJECT

Code: 34667
Name: Mathematics II
Cycle: Undergraduate Studies
ECTS Credits: 6
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
1400 - Degree in Computer Engineering	Escola Tècnica Superior d'Enginyeria	1	Second quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1400 - Degree in Computer Engineering	Mathematics	BASIC

COORDINATION

MOYA BEDON ANDRES

SUMMARY

This subject is taught in the second semester of the first year of the Degree in Computer Engineering.

This subject develops the classic contents of Mathematical Analysis: Differential and integral calculus in one and several variables, ordinary differential equations, and functions of complex variable. It is aimed at engineering students, with the contents selected as to take into account the applications that are given in the corresponding subjects, maintaining a coherent order in the presentation and development of the different concepts that are introduced.

The first objective of this course is to introduce the basic concepts of differential and integral calculus, both with real functions of a real variable and in the case of several variables. Based on basic notions of differential and integral calculus and linear algebra (the latter acquired in the subjects 'Mathematics I' of the first semester), the student must acquire the fundamental notions about ordinary differential equations and systems of linear, first-order differential equations. In particular, the student must be able to apply the Laplace transformation to the resolution of equations and systems of linear differential equations. The concept of a convergent series of complex numbers and series of functions of complex variable, especially of power series, will also be introduced.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

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

OTHER REQUIREMENTS

It is recommended to have knowledge of the content covered in the Mathematics I course, which is taught in the first semester.

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.

B3 - Ability to understand and master the basics of discrete mathematics, logic, algorithms and computational complexity and their application for solving problems in engineering.

G8 - Knowledge of basic subject areas and technologies that serve as a basis for learning and developing new methods and technologies, and of those which provide versatility to adapt to new situations.

G9 - Ability to solve problems with initiative, decision making, autonomy and creativity. Ability to communicate and transmit the knowledge, skills and abilities of a computer engineer.

DESCRIPTION OF CONTENTS

1. Differential calculus of functions of one variable.

Elementary functions, continuity. Derivatives of elementary functions. The chain rule. Successive derivatives. Taylor's formula. Graphic representation of a function. Functions of complex variables. Power series.

2. Differential calculus of functions of several variables.

Partial derivatives, directional derivatives. Derivation of compound functions (chain rule). Implicit derivation. Curves and surfaces. Basic convex optimization.

3. Integral calculus of functions of one variable and several variables.

Primitives. Integration by parts. Change of variable. Definite integral. Calculation of areas and averages. Integrals of functions of two and three variable. Integration by change of variables. Fundamental theorems of integral calculus.

4. Ordinary differential equations.

Equations of separable variables and homogeneous, linear equations of first order and linear differential equations of higher order with constant coefficients. Systems of differential equations. Laplace transformation. Application of the Laplace transformation.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	30,00
Laboratory	10,00
Classroom practices	20,00
Total hours	**60,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	0,00
Independent study and work	0,00
Preparation of lessons	60,00
Preparation for assessment activities	30,00
Resolution of case studies	0,00
Total hours	**90,00**

TEACHING METHODOLOGY

Based on the following strategies:

a) Lectures

b) Interactive activities: problem-based independent learning.

Theoretical activities: Lectures (single group)

Practical activities: Problem resolution (single group)

Lab: Work in computer rooms (several subgroups)

EVALUATION

The evaluation will be done as follows:

By default, the evaluation will be a continuous evaluation. It consists of two exams, with a weight in the final mark of 10% each, the accomplishments of the laboratory, with a weight on the final mark of 30%, and a final exam with a weight of 50%. Attendance and active participation in class will be regarded positively.

That is, if we note:

NF (final mark)

CT1 (control 1)

CT2 (control 2)

LAB (Laboratory)

EX (final exam mark)

Therefore, the final grade in the first (second) call will be obtained using the final exam grade in the first (second) call, according to the formula:

NF= 10% CT1+ 10% CT2+ 30% LAB + 50% EX

If any of the controls are not done, the weight of the final exam will increase in proportion to covering this missing part. That is, the weight of the final exam will be 60% (1 control not done) or 70% (both controls not done).

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 the subject will be done in accordance with the Regulation of evaluation and qualification of the Universitat de València for the degree and master's degrees approved by the Government Council of May 30, 2017 (ACGUV 108/2017)

REFERENCES

- L. Gascón, A. Pastor, V. del Olmo, D. García-Sala, Análisis Matemático I. Un curso de cálculo para Informática. Ed. Tébar, Madrid, 2000

- J.E. Marsden, A.J. Tromba. Cálculo vectorial. Cuarta Edición. Pearson Educación (1998) ISBN: 968-444-276-9

- G. James . Matemáticas avanzadas para la ingeniería. Segunda Edición. Pearson Education. (2002) ISBN: 970-26-0209-2