COURSE DATA

DATA SUBJECT

Code: 34787
Name: Mathematics II
Cycle: Undergraduate Studies
ECTS Credits: 6
Academic year: 2026-27

STUDY (S)

Degree	Center	Acad. year	Period
1402 - Degree in Telecommunications Electronic Engineering	Escola Tècnica Superior d'Enginyeria	1	Second quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1402 - Degree in Telecommunications Electronic Engineering	Mathematics	BASIC

COORDINATION

FALCO BENAVENT FRANCISCO JAVIER

SUMMARY

This subject develops some usual parts of Mathematical Analysis: Differential and integral Calculus of several variables, ordinary differential equations with the Laplace transform, complex funcions and Fourier series as well as the Fourier transform for periòdic funcions.

It is addressed to engineering students, so that the contents have been carefully chosen according to the specific requirements of the corresponding subjects in which they are applied. Always keeping a coherent order in the presentation and development of the concepts to be introduced.

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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 convenient that the student knows the concepts explained in the subject Matemáticas I delivered in the first semester.

COMPETENCES / LEARNING OUTCOMES

1402 - Degree in Telecommunications Electronic Engineering

B1 - Ability to solve any mathematical problems that may arise in engineering. Ability to apply knowledge of: linear algebra, geometry, differential geometry, differential and integral calculus, differential equations and partial derivatives, numerical methods, numerical algorithms, statistics and optimization.

Capacidad de resolver problemas con iniciativa, toma de decisiones, creatividad, razonamiento crítico y de comunicar y transmitir conocimientos, habilidades y destrezas en el campo de la Ingeniería Industrial.

G3 - Acquisition of the knowledge of the basic and technological subjects that allows students to learn new methods and theories and endows them with the versatility to adapt to new situations.

DESCRIPTION OF CONTENTS

1. Differential calculus of functions of several variables.

Partial derivatives, directional derivatives, derivative of a composition, implícit derivatives.

2. Integrals in several variables

Integrals of funcions in two and three variables, Integration by change of variables, Applications to calculus of plane areas and volumes.

3. Ordinary differential equations

Separable variables equations, linear equarions of the first order, linear equations of higher order with constant coeficients, applicatio of the Laplace tansform in the solving of linear equations.

4. Functions of a complex variable.

Functions of a complex variable, elementary complex functions, complex derivatives, power series, power series expansions of complex functions.

Periodic functions, Fourier series in trigonometric and exponential form, representing periodic funcions by

5. Fourier series and transform

means of Fourier series, Fourier transform and its properties.

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	15,00
Preparation of lessons	45,00
Preparation for assessment activities	30,00
Resolution of case studies	0,00
Total hours	**90,00**

TEACHING METHODOLOGY

It is based upon the following learning estrategies:

a) Theory lectures

b) Interactive activities: Mostly personal learning from problema solving

Theory activities: Lecture attendance

Practical activities: Problem solving

Laboratory: Work in computer rooms

EVALUATION

The evaluation of the subject will be carried out according to:

-- A final exam. The weight of this will be a 70 per cent of the final grade.

-- Continuous evaluation. This consists in either some tasks for the student or the realization of periodical tests. The weight of this part will be a 20 per cent.

-- The work developed at the computer lab will have a weight of a 10 per cent.

REFERENCES

- G. James . Matemáticas avanzadas para la ingeniería. Segunda Edición. Pearson Education. (2002) ISBN: 970-26-0209-2
- E. Kreyszig. Matemáticas avanzadas para la ingeniería. Limusa Wiley (2003) ISBN: 968-18-5310-5
- M. Molero, A. Salvador, T. Menárguez, L. Garmendia. Análisis matemático para ingeniería. Pearson Education. (2007) ISBN: 978-84-8322-346-8.
- J.E. Marsden, A.J. Tromba. Cálculo vectorial. Cuarta Edición. Pearson Educación (1998) ISBN: 968-444-276-9
- J. Stewart. Cálculo multivariable. Thomson Learning (2003) ISBN: 970-686-123-8