VNIVERSITAT DE VALÈNCIA

Course Guide
34787 Mathematics II

COURSE DATA

Data Subject	
Code	34787
Name	Mathematics II
Cycle	Grade
ECTS Credits	6.0
Academic year	2020 - 2021

Study (s)

Degree	Center	Acad. year	Period
1402 - Degree in Telecommunications Electronic Engineering	School of Engineering	1	Second term

Subject-matter

Degree	Subject-matter	Character
1402 - Degree in Telecommunications Electronic Engineering	1 - Mathematics	Basic Training

Coordination

Name	Department
FERRER LLOPIS, JESUS	15 - Mathematical Analysis

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 mainly addressed to engineering students, so that its contains 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.

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 may know the concepts explained in the subject Matemáticas I delivered in the first semester.

OUTCOMES

1402 - Degree in Telecommunications Electronic Engineering

- 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.
- 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.

LEARNING OUTCOMES

This subject allows the acquirement of the following learning skills:
---Comprehension and knowledge of basic Mathematics concepts
---Engineering problem solving by using advanced mathematical tools
---Be able to understand the amthematical problems that may arise in engineering
---Estructure the resolution of engineering problems in a mathematical form
---Modelize physical phenomena by means of mathematical tasks
---Interpretation of the mathematical results when applied to Physics

As a complement of the former results, this subject also allows to acquire the following skills:
---Understand the concpet of partial derivative, as well as the use of the chain rule in order to calculate derivtives of compositions and implícit functions
---Know the concepts of double and triple integral and their appication in calculating plane areas and three-dimensional volumes
---Knowledge of the main methods of resolution of ordinary differential equations
---Know how to deal with numerical series as well as power series which can be used to expand complex functions
---Represent functions in a frequency domain by means of Fourier series and using the Fourier transform
---Corret xposition (both, written and in an oral way) of scientific material
---Logic and critical reasoning

---Facility to ask whatever has not been understood at an expert dissertation
---Discover connections with other disciplines

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.

5. Fourier series and transform

Periodic functions, Fourier series in trigonometric and exponential form, representing periodic funcions by means of Fourier series, Fourier transform and its properties.

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	30,00	100
Classroom practices	20,00	100
Laboratory practices	10,00	100
Study and independent work	15,00	0
Preparation of evaluation activities	30,00	0
Preparing lectures	15,00	0
Preparation of practical classes and problem	30,00	0
TOTAL	**150,00**	

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 eiter some tasks for the student or the realization of periodical tests. The weight of this will be a 20 per cent.

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

REFERENCES

Basic

- 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.

Additional

- 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

ADDENDUM COVID-19

This addendum will only be activated if the health situation requires so and with the prior agreement of the Governing Council

Contents

The contents initially included in the teaching guide are maintained.

Workload and temporary teaching planning

The different activities described in the teaching guide are maintained with the planned dedication.

The material for the follow-up of the classes of theory/practices allows to continue with the professor of temporary planning so much in days as in schedule, so much if the teaching is face-to-face in the classroom or if it is not.

Teaching methodology

In classroom theory and practices, students will tend to have the maximum physical attendance possible, always respecting the sanitary restrictions that limit the capacity of the classrooms as indicated by the competent public health authorities to the estimated percentage of their usual occupation.

Depending on the capacity of the classroom and the number of students enrolled, it may be necessary to distribute the students into two groups. If this situation arises, each group will attend classroom theory and practical sessions with physical presence in the classroom by rotating shifts, thus ensuring compliance with the criteria for occupying spaces.

The rotation system will be established once the actual enrollment data is known, guaranteeing, in any case, that the attendance percentage of all the students enrolled in the subject is the same.

With respect to laboratory practices, attendance at sessions scheduled in the schedule will be totally face-to-face.

Once the actual enrollment data is available and the availability of spaces is known, the Academic Committee of the Degree will approve the Teaching Model of the Degree and its adaptation to each subject, establishing in said model the specific conditions in which it will be developed teaching the subject.

If there is a closure of the facilities for sanitary reasons that totally or partially affects the classes of the subject, these will be replaced by non-contact sessions following the established schedules.

Evaluation

The evaluation system described in the teaching guide of the subject in which the different evaluable activities have been specified as well as their contribution to the final grade of the subject is maintained.

If there is a closure of the facilities for health reasons that affect the development of any face-to-face evaluable activity of the subject, it will be replaced by a test of a similar nature that will be carried out in virtual mode using the computer tools licensed by the Universitat de València.

The contribution of each evaluable activity to the final grade for the course will remain unchanged, as established in this guide.

Bibliography

The bibliography recommended in the teaching guide.