VNIVERSITAT DE VALÈNCIA

Course Guide
34871 Mathematics II

COURSE DATA

Data Subject	
Code	34871
Name	Mathematics II
Cycle	Grade
ECTS Credits	6.0
Academic year	2020 - 2021

Study (s)

Degree	Center	Acad. year	Period
1403 - Degree in Telematics Engineering	School of Engineering	1	Second term

Subject-matter

Degree	Subject-matter	Character
1403 - Degree in Telematics Engineering	1 - Mathematics	Basic Training

Coordination

Name	Department
GARCIA RODRIGUEZ, DOMINGO	15 - Mathematical Analysis

SUMMARY

This course develops the classic content of Mathematical Analysis: Differential and integral calculus in several variables, ordinary differential equations, complex functions and Fourier series and Fourier and Laplace transforms. Addressed to engineering students, with content based on relevant applications, maintaining a consistent order in the presentation and development of different 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

The contents of the course Mathematics I, which is taught in the first semester.

OUTCOMES

1403 - Degree in Telematics 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.
- G4 - Ability to solve problems with initiative, decision-making and creativity, and to communicate and transmit knowledge, abilities and skills, understanding the ethical and professional responsibility of the activity of a telecommunications technical engineer.
- 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.

LEARNING OUTCOMES

This course allows for the following learning outcomes: **(G3, G4, B1)**

- The knowledge of basic concepts in mathematics.
- Solve engineering problems by applying concepts in advanced math.
- Being able to understand the mathematical formalisms that may arise in engineering.
- Modeling physical phenomena using mathematical tools.
- Interpret the mathematical results applied to the physical world.
- To complement the above results, this subject also permits to acquire the following skills and social skills:
- Understand the concept of partial derivative. Using the chain rule for the derivation of composite and implicit functions.
- Understand the concept of double and triple integral and its relation to the calculation of areas and volumes.
- Manage the elementary methods of solving ordinary differential equations and systems.
- Understand the concept of series and deal with some convergence criteria. Representation of some complex functions in power series and understand the concept of convergence region.
- Represent functions in the frequency domain using Fourier series and transforms.
- Being able to properly expose scientific contents.
- Logical reasoning and critical ability.
- Discover connections with other disciplines of self-interest of each student.

DESCRIPTION OF CONTENTS

1. Differential calculus of functions of several variables.

Partial derivatives, directional derivatives. Derivation of composite functions (chain rule). Implicit differentiation. Curves and surfaces.

Schedule: 5 h theory, 3 h problems, laboratory 2 h.

2. Multiple integration

Integral functions of two and three variables. Integration by change of variables. Fundamental theorems of integral calculus.

Schedule: 4 h theory, 3 h problems, laboratory 2 h

3. Ordinary differential equations

Equations of separable variables, homogeneous, linear equations of first order, linear differential equations of higher order with constant coefficients. Systems of differential equations. Laplace Transformation. Application of the Laplace transform to solve differential equations and systems.

Schedule: 4 h theory, 3 h problems, laboratory 2 h

4. Sequences and series. Complex variable functions.

Sequences and series of complex numbers. Series convergence criteria. Complex variable functions. Power series.

Schedule: 5 h theory, 4 h problems, laboratory 2 h

5. Series and Fourier transform

Fourier series. Trigonometric form and complex form. Fourier series representation of periodic functions. Fourier transform, properties and inversion formula.

Schedule: 5 h theory, 6 h problems, laboratory 2 h

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	27,00	0
Preparing lectures	15,00	0
Preparation of practical classes and problem	30,00	0
TOTAL	**147,00**	

TEACHING METHODOLOGY

It is based on the following strategies:

a) Lectures
b) Interactive activities: problem-based independent learning.

Theoretical activities (G3, G4, B1)

Lectures (single group)

Practical activities
Solving problems (2 subgroups)

Laboratories: (G3, G4, B1)

Working in the classroom computer (5 subgroups)

EVALUATION

The evaluation consists of :

- Final exam with a weight of 70% of the final grade.

- Continuous Assessment: will assess the ongoing work of the student through active participation in class, or giving some problems / assignments given by the teacher, or by conducting regular checks. The weight of this part is 20%. The atendance to the Labs is mandatory and has a weight of 10%.

If for some reason, continuous assessment of a student failed to make full, its weight will decrease proportionally, increasing the weight of the test to a maximum of 75% complete 100% of the mark.

In any case, the evaluation will be regulated by the Reglamento de Evaluación y Calificación de la Universitat de València para Grados y Masters:

https://webges.uv.es/uvTaeWeb/MuestraInformacionEdictoPublicoFrontAction.do?idEdictoSeleccionado=5639

REFERENCES

Basic

- (1) G. James . Matemáticas avanzadas para la ingeniería. Segunda Edición. Pearson Education. (2002) ISBN: 970-26-0209-2
- (2) E. Kreyszig. Matemáticas avanzadas para la ingeniería. Limusa Wiley (2003) ISBN: 968-18-5310-5
- (4) M. Molero, A. Salvador, T. Menárguez, L. Garmendia. Análisis matemático para ingeniería. Pearson Education. (2007) ISBN: 978-84-8322-346-8.

Additional

- (3) J.E. Marsden, A.J. Tromba. Cálculo vectorial. Cuarta Edición. Pearson Educación (1998) ISBN: 968-444-276-9
- (5) 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.