COURSE DATA

DATA SUBJECT

Code: 34876
Name: Electronic circuits
Cycle: Undergraduate Studies
ECTS Credits: 6
Academic year: 2026-27

STUDY (S)

Degree	Center	Acad. year	Period
1403 - Degree in Telematics Engineering	Escola Tècnica Superior d'Enginyeria	1	Second quarter
1935 - Double Degree Program in Mathematics-Telematics Engineering	Facultat de Ciències Matemàtiques	1	Second quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1403 - Degree in Telematics Engineering	Electronic and photonic components and circuits	BASIC
1935 - Double Degree Program in Mathematics-Telematics Engineering	Primer curso	COMPULSORY

COORDINATION

GOMEZ CHOVA LUIS

SUMMARY

The subject "Electronic Circuits" is a four-month course, consisting of 6 ECTS credits and is taught during the 2nd semester of the first academic year of the Degree in Telecommunications Electronic Engineering (GIET) and the Degree in Telematics Engineering (GIT). The course presents basic Circuit Theory and a brief introduction to digital electronics that will be needed in later courses. In any case, there are not specific prerequisites, so students who have not previously studied Circuit Theory should not have troubles following it, assuming they have the math skills needed in this course.

The theoretical concepts of the course are basically learned by performing simple exercises and problems that will gradually increase its complexity to achieve all the concepts to be learned. The basic topics of circuit theory and digital electronics are organized in four thematic units that bring together fundamental concepts that all electronic communications engineer must know and master. In fact, the contents of Electronic Circuits are widely used in many other subjects of the degree and also in the development of the professional career.

The four thematic units refer to the four large blocks in which the course is structured:

1. Basics. Laws. Theorems.

2. Sinusoidal steady-state and frequency response.

3. Laplace and Fourier Transforms.

4. Introduction to Digital Electronics.

The material needed to follow the theoretical class will be provided in advance, therefore, students should review these contents before the first class of each topic. The learning will be based on the resolution of problems and exercises, first by the teacher and then with increasingly active participation of students. Regarding the laboratory sessions, the guidelines to complete the session will be provided before attending and their contents must be prepared before reaching the lab. Laboratory sessions help to reinforce the theory as well as having a first contact with a laboratory of Electronics, both in terms of circuit simulation and assembly.

The tutoring hours for each teacher are available on the website of Department of Electronic Engineering (http://www.uv.es/die). The subject material (notes, problems, lab guidelines, etc.) will be available through the Virtual Classroom of the University of Valencia (http://aulavirtual.uv.es/).

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

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

OTHER REQUIREMENTS

Being a core subject taught in the first year, there are no prerequisites for Electronics and Circuit Theory, although it is desirable to understand basic physical concepts and mathematical tools to be used during the course. In particular students should be aware of:

-Mathematical calculations with complex variables.
-Vector and matrix calculus.
-Basic differential and integral calculus.
-Trigonometry and basic linear algebra.
-Logarithms.

Regarding physics, students must at least meet the follow

COMPETENCES / LEARNING OUTCOMES

1403 - Degree in Telematics Engineering

B4 - Understand and master the basic concepts of linear systems and the related functions and transforms, electric circuit theory, electronic circuits, physical principle of semiconductors and logic families, electronic and photonic devices, materials technology and their application to solve engineering problems.

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.

G5 - Knowledge to carry out measurements, calculations, assessments, evaluations, loss adjustments, studies, reports, task planning, and other analogous work in the specific field of telecommunications.

DESCRIPTION OF CONTENTS

1. Basics. Laws. Theorems.

This first thematic unit sets the basis for the subsequent analysis of circuits. We begin by reviewing some basic knowledge of basic electronic components and signals, Kirchoff's laws, and major networks' theorems.

The laboratory is designed to reinforce concepts discussed by solving exercises and circuit simulation:
Thematic Unit I is characterized by a theoretical study. In the lab session 1, we propose very simple problems but very useful for teaching and consolidating the theoretical concepts.

2. Sinusoidal steady-state and frequency response

This second thematic unit focuses on the analysis of stationary alternating currents and voltages using the concepts and tools studied in the previous thematic unity. It introduces the concept of phasor, which is necessary to define the transfer function of a circuit. We study how to make graphic representations of the transfer functions in frequency domain, the Bode diagram, analyzing the effect of the zeros and poles of the transfer function and thus the system's response to some input excitation.

The laboratory is designed to reinforce concepts discussed by solving exercises and circuit simulation:
Thematic Unit II includes lab sessions 2 and 3, which introduce the concepts of transfer function, frequency response and Bode diagrams.

The third thematic unit explores the Fourier and Laplace transforms, useful for circuit analysis. Fourier series allow you to extend the analysis of circuits to non-sinusoidal periodic signals. The Fourier transform establishes the relationship between time and frequency domains. The study of the Laplace transform allows to obtain a global solution for the analyzed circuits, transient and stationary states. Also enables a more rapid and efficient solution than that obtained by phasors. It also allows us to deduce the concepts of

3. Transforms

free and forced response and stability of a network.

The laboratory is designed to reinforce concepts discussed by solving exercises and circuit simulation: Thematic Unit III is developed in lab sessions 4 and 5, where there are problems to be solved by Fourier series and Laplace transforms. These practices show experimentally the decay of sinusoids (harmonics) in periodic waves, transient and stationary responses of circuits, and transfer functions are defined in the transformed domain and then their response is obtained in the frequency and time domains.

4. Introduction to Digital Electronics

The last thematic unit introduces the basic concepts of digital electronics. You start seeing the Boolean algebra and from this simplifying logic functions and multifunctions and then study the numbering systems and codes.

The laboratory is designed to reinforce concepts discussed by solving exercises and circuit simulation: Thematic Unit IV is developed in the last sessions 6. It introduces the basic logic gates from which any logic function can be implemented and the simplification of logic functions.

WORKLOAD

PRESENCIAL ACTIVITIES

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

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	40,00
Independent study and work	0,00
Preparation of lessons	30,00
Preparation for assessment activities	20,00
Resolution of case studies	0,00
Total hours	**90,00**

TEACHING METHODOLOGY

The development of the course is structured around four pillars: the theory and problem solving sessions, tutoring, testing and continuous assessment, and the presentation of reports of the lab sessions.

Presential learning

(G3, G4, G5, B4)

Before each lesson, the teacher will provide the student the necessary study material for preparin the lesson. In the lectures, the teacher will discuss with students the questions that may have arisen. In the problem sessions, the teacher will explain a number of illustrative problems, thanks to which the student will learn to identify the essential elements to solve problems. It will also use the participatory approach to the problem sessions, in which communication is to prevail among students and student/teacher.

Tutorships

(G3, G4, G5, B4)

The students have a schedule for tutorships aimed at solving the problems, doubts, work orientation, etc. The schedule of these tutorships will be indicated at the beginning of the academic year. They will also have the opportunity to clarify some questions via email or discussion forums via the use of virtual classroom tool that provides the University of Valencia.

Homework

(G3, G4, G5, B4)

The student will have problems with solutions to work on concepts that will be studied along the course. There will be at least four questionaries, one for each unit.The labs have a previous part of individual work for the preparation of the lab session.

Teaching materials available

The student has in the virtual classroom from the beginning of the academic year, the following

documents:

- Teaching Guide (this document) provides sufficient data elements to determine what is expected from the student, how it will be learnt it and under what conditions, and how it will be evaluated.

- Slides of each of the topics of the course.

- Problems of each lesson.

- Lab sessions with the following structure:

- Objectives.
- Material.
- Preparation.
- Tasks.

EVALUATION

Learning assessment will be carried out by evaluating student participation throughout the course and through a final theory and laboratory exam. The percentage allocation of each part of the assessment will be as follows:

Continuous Assessment
Theory: 50%
Participation: 10%
Laboratory: 30%
Continuous Assessment: 10%

Alternative Assessment
Theory: 70%
Participation: 0%
Laboratory: 30%
Continuous Assessment: 0%

Theory.
There will be two exam sessions coinciding with the official calls. The theory exam will be taken individually on the date, time, and place officially designated by the center. It will assess the knowledge and concepts acquired by the student, as well as their ability to solve problems based on experience, knowledge, and acquired skills. The exam grade will account for 50% of the final subject grade in the first session and 70% in the second session. A minimum score of 4 out of 10 is required in order to average it with the rest of the evaluation components.

Laboratory.
The laboratory grade will be obtained by continuously assessing each practical session and through a final individual practical test of the same nature as the previous practices, which will take place in the laboratory during the last session. The continuous assessment of each practice (30% preparation and 70% execution) will make up 30% of the final laboratory grade, while the remaining 70% will be obtained from the individual test.
The laboratory grade, as described above, will represent 30% of the overall subject grade. It is mandatory to achieve at least 4 out of 10 in this component to average it with the rest of the evaluation.

For students who do not achieve a grade of 4 or higher by attending laboratory sessions, there will be two exam calls on the dates and times officially designated by the center for the official subject exam, following the theory exam. The grade from this exam will represent 100% of the laboratory component and 30% of the overall subject grade. A minimum of 4 out of 10 is required.

Regulations.
In any case, the assessment system will be governed by the provisions established in the *Regulation on Assessment and Grading* of the University of Valencia for Undergraduate and Master¿s Degrees: https://webges.uv.es/uvTaeWeb/MuestraInformacionEdictoPublicoFrontAction.do?idEdictoSeleccionado=5639

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