

**COURSE DATA****DATA SUBJECT**

**Code:** 34814  
**Name:** Analogue electronics II  
**Cycle:** Undergraduate Studies  
**ECTS Credits:** 6  
**Academic year:** 2025-26

**STUDY (S)**

Degree	Center	Acad. year	Period
1402 - Degree in Telecommunications Electronic Engineering	Escola Tècnica Superior d'Enginyeria	3	First quarter

**SUBJECT-MATTER**

Degree	Subject-matter	Character
1402 - Degree in Telecommunications Electronic Engineering	Electronics	COMPULSORY

**COORDINATION**

DEL CANTO SERRANO IRENE

**SUMMARY**

The Analog Electronics II course is a course of four months duration, to be conducted in the 5 th quarter of the career, which corresponds chronologically with the first semester of third year. The course is 6 ECTS credits and is included within the electronics field.

The course explores the knowledge and skills of analog electronics that students must acquire to perform their work as an engineer in the company and society. The course extends concepts and skills in analog electronics, such as audio amplifiers.

**PREVIOUS KNOWLEDGE****RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE**

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



## OTHER REQUIREMENTS

For the successful use of this subject should have prior knowledge acquired in the subjects of Electronic Circuits and Electronic and Photonic Devices and Analogue Electronics I course.

## COMPETENCES / LEARNING OUTCOMES

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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.

G6 - Ability in the handling of specifications, regulations and norms of compulsory compliance.

G9 - Ability to work in a multidisciplinary environment and in a multilingual group and to communicate, in writing and orally, knowledge, procedures, results and ideas related to telecommunications and electronics.

TE5 - Ability to design circuits for analog and digital electronics, analog-digital and digital-analog conversion, radio frequency, power and power conversion for telecommunications and computing applications.

## DESCRIPTION OF CONTENTS

### 1. Filters

Definition and classification. Transfer function of a filter. Butterworth, Chebyshev and Bessel approaches. Frequency transformations. Passive filters. Active filters: Sallen-Key cells, Rauch and other configurations. Sensitivity of the parameters with respect to the components used. Practical filter design.

### 2. Nonlinear applications of A.O

Comparators and threshold detectors. Precision rectifiers. Voltage limiters. Signal generators.



### 3. Oscillators

Concept and criteria of oscillation. RC oscillators. Other types of function and waveform generators: multivibrator. LC and crystal oscillators. Timing circuits.

### 4. Audio power amplifiers

Extending audio power amplifiers. Different types of amplifiers. Settings in class A, B, AB and D. Thermal considerations.

## WORKLOAD

### PRESENCIAL ACTIVITIES

Activity	Hours
Theory	30,00
Laboratory	20,00
Classroom practices	10,00
<b>Total hours</b>	<b>60,00</b>

### NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	20,00
Independent study and work	15,00
Preparation of lessons	35,00
Preparation for assessment activities	20,00
Resolution of case studies	0,00
<b>Total hours</b>	<b>90,00</b>

## TEACHING METHODOLOGY

The teaching methodology is organized in three types of activities. In all cases, the student will have access in advance to the teaching material related to the contents of the subject through the Virtual Classroom (the University of Valencia's e-learning platform), in order to facilitate the preparation of the classes. The content will be based on notes, slides and multimedia material, both internal and external, in order to reinforce concepts. The students will have an approximate timing of the development of the subject during the whole term. Attendance to all face-to-face classes will be noted.



- Theory classes. In the theory classes the topics will be developed providing a global and integrating vision, analyzing with more detail the key and more complex aspects. To encourage student participation, the master classes will alternate with examples to be solved jointly by the teacher and the students. The teacher will also be able to evaluate the student's previous preparation by means of questions at the beginning of the class. Emphasis will also be placed on practical aspects of design and engineering. During the classes and at the end of each topic there will be exercises and questionnaires that can be handed in, both on paper and in digital format. The classes will be repeated so that all the shifts have the possibility of attending in person.

- Classes of problems. In the practical classes there will be sessions of discussion and resolution of the most significant problems of each section of the subject. Problem bulletins will be presented and developed in groups, with some sessions in class, and later presented by the students for discussion. We will tend to the inverse class methodology in this section. A practical project will be proposed, to be carried out and presented by groups in class. The presentations of the projects will be recorded to put them in the Virtual Classroom (G9, G4, TE5)

- Lab classes. In each laboratory class, both the previous preparation of the practice to be carried out, by checking the design and simulation of the circuits, and the results will be evaluated. An attendance control will be carried out. (G9, G4, TE5)

## EVALUATION

The evaluation of learning will be carried out prioritizing continuous evaluation and the participation of students throughout the course, and through a final theory and laboratory exam. The evaluation will measure the scope of the objectives in two blocks: Block A, which will collect knowledge of theory and problems and Block B, which will collect practical and laboratory knowledge. It will be necessary to obtain a minimum grade of 4 in both blocks to pass the minimum required knowledge. The final grade will be the weighted average of both blocks as specified below.

There will be two exam calls coinciding with the official calls.

**First call.** The first call will prioritize continuous evaluation and the student's work. The percentage allocation of each part of the evaluation in the first call will be as follows:

Block A: theory-problems



- Attendance and participation: 10%
- Questionnaires and deliverables: 15%
- Final theory exam: 45%

Block B: practical activities

- Laboratory: 15%
- Project presentation: 15%

The final theory exam will be taken individually on the date, time and place officially designated by the center and will evaluate the knowledge and concepts acquired by the student and their ability to solve problems based on the experience, knowledge and skills acquired. It will be necessary to obtain more than a 4 on the exam to pass the minimum required knowledge.

The attendance and participation grade will include a grade proportional to the student's attendance at face-to-face classes, and participation in the tasks proposed therein, with priority given to voluntary activities. The quality and attention of the interventions in the debates on the problems will be assessed.

The grade for the work in class will be obtained by evaluating and averaging the results of the questionnaires, problems and challenges, both in digital format and in physical format, that the teacher poses during the classes.

The laboratory grade will be obtained as a result of evaluating each practice, which will be divided into previous calculations and completion of the practice. They may be evaluated through questions, questionnaires or deliverable reports, depending on the nature of the practice. The continuous evaluation of each practice (preparation 30%, execution 70%) will constitute the total of the final laboratory grade. The teacher may save this laboratory note by carrying out in-person practices and continuous evaluation for the following course.

The grade for the project presentation will be obtained from the teacher's evaluation of the formal quality of the material presented, the technical quality of the solution, the response to questions during the debate after the solution and the inclusion of novel or non-new aspects. seen in class, all in equal parts.

**Second call.** The percentage allocation of each part of the evaluation in the first call will be as follows:

Block A: theory-problems

- Attendance and participation: 5%



- Questionnaires and deliverables: 10%
- Final theory exam: 65%

Block B: practical activities

- Laboratory: 10%
- Project presentation: 10%

The final theory exam will be taken individually on the date, time and place officially designated by the center and will evaluate the knowledge and concepts acquired by the student and their ability to solve problems based on the experience, knowledge and skills acquired. It will be necessary to obtain more than a 4 on the exam to pass the minimum required knowledge.

The attendance and participation grade will include a grade proportional to the student's attendance at face-to-face classes, and participation in the tasks proposed therein, with priority given to voluntary activities. The quality and attention of the interventions in the debates on the problems will be assessed.

The grade for the work in class will be obtained by evaluating and averaging the results of the questionnaires, problems and challenges, both in digital format and in physical format, that the teacher poses during the classes.

The grade for the project presentation will be obtained from the teacher's evaluation of the formal quality of the material presented, the technical quality of the solution, the response to questions during the debate after the solution and the inclusion of novel or non-new aspects. seen in class, all in equal parts. If the student has not presented the problems through continuous evaluation, they must request a list of projects from the teacher and individually present a report on the solution of the chosen project and a digital presentation of them before the day of the second call for the exam.

The laboratory grade will be obtained as a result of evaluating each practice, which will be divided into previous calculations and completion of the practice. They may be evaluated through questions, questionnaires or deliverable reports, depending on the nature of the practice. The continuous evaluation of each practice (preparation 30%, execution 70%) will constitute the total of the final laboratory grade. For students who have not obtained a grade of 4 or higher by attending the laboratories, there will be an exam in this call on the date and time officially designated by the center for the official exam of the subject in the second call, after the final exam. of theory. In this case, the grade for this exam will represent 100% of the laboratory block grade, and it will be essential to obtain at least 4 out of 10. Students who have not attended the laboratory during the course for at least 75% of the sessions, they will not be able to take this exam.

The sections Attendance and participation and Questionnaires and deliverables, are not recoverables in the second call.



The copying or plagiarism of any activity that is part of the evaluation will mean the impossibility of passing the subject, subsequently subjecting yourself to the appropriate disciplinary procedures indicated in the PROTOCOL FOR ACTION AGAINST FRAUDULENT PRACTICES AT THE UNIVERSITAT DE VALÈNCIA (ACGVV 123/2020).

## REFERENCES

- Referencia b1: ApuAllan R. Hambley. Electrónica. Pearson Education, 2001.
- Referencia b2: Horowitz-Hill. The Art of Electronics. Cambridge University Press 1989.
- Referencia b3: Espí, Camps, Muñoz. Fundamentos de Electrónica Analógica. Servicio de Publicaciones de la Universidad de Valencia (SPUV), 2006.
- Referencia b4: Espí, Camps, Muñoz. Electrónica Analógica: Problemas y cuestiones. Prentice Hall. Serie Prentice/Práctica, 2006.
- Referencia b5: Documentación preparada por el profesorado para la asignatura, accesible a los alumnos a través de Aula Virtual.
  
- Referencia c1: J. Millman y A. Grabel. "Microelectrónica" Ed. Hispano Europea. 1991
- Referencia c2: Muhammad H. Rashid "Circuitos Microeletrónicos: Análisis y diseño". Ed. Thomson. 2002
- Referencia c3: Ramakant A. Gayakwad "Op-Amps and Linear Integrated Circuits, 4/e" 2000 ISBN: 0-13-280868-4
- Referencia c4: Benhzad Razavi. Design of Analog CMOS Integrated Circuits. McGraw-Hill.
- Referencia c5: Enlaces web específicos y aplicaciones de electrónica: empresas del sector y hojas de características de componentes