COURSE DATA

DATA SUBJECT

Code: 34808
Name: Telecommunication electronic systems
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	3	Second quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1402 - Degree in Telecommunications Electronic Engineering	Applications of electronic systems	COMPULSORY

COORDINATION

REIG ESCRIVA ABILIO CANDIDO

SUMMARY

The subject Telecommunication Electronic Systems is a compulsory four-month subject that will be taught in the sixth semester of the Degree in Telecommunications Electronic Engineering for a total of 4 classroom credits (theory and problems) and 2 laboratory crèdits The subject develops the required contents so that the student knows the devices involved in a communications system. Examples of communications equipment and subsystems are also presented With their main characteristics and the comparison between them based on their fundamental parameters.
The purpose of this subject is to describe the basic concepts of the telecommunication equipment so that the student can be autonomous to choose the best option regarding technologies, functionality in the design and deployment of the same, and be able to foresee several problems , circumstances and situations that may influence the implementation of a system. It is also proposed to provide the student with basic knowledge about transmission lines and antennas, know communications systems for optical fiber and have a knowledge of current telecommunication services. To reinforce this objective, the student is required to know the functioning of some of the current telecommunication systems and services.

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 recommended to have studied the subjects of:

- Mathematics
- Physics
- Circuits and electronic and photonic components

COMPETENCES / LEARNING OUTCOMES

1402 - Degree in Telecommunications Electronic Engineering

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.

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

G7 - Ability to analyze and assess the social and environmental impact of technical solutions.

TE1 - Ability to construct, operate and manage systems for the acquisition, transport, representation, processing, storage, management and presentation of multimedia information, from the perspective of electronic systems.

TE2 - Ability to select specialized electronic circuits and devices for transmitting, routing and the terminals, both in fixed and mobile environments.

TE4 - Ability to apply electronics as support technology in other fields and activities, not only in the field of Information Technology and Communications.

TE7 - Ability to design interface, data acquisition and storage devices, and terminals for telecommunication services and systems.

DESCRIPTION OF CONTENTS

1. Propagation and antennas

[1] Electromagnetic propagation
- *Foundations of electromagnetic propagation*
- *Propagation with real conditions*

[2] Antennas
- *Introduction*

- *Basic parameters*
- *Dipoles*
- *Printed antennas*
- *Antenna arrays*

2. High frequency networks

1] Transmission lines
- *Transmission line model.*
- *Loaded lines.*

[2] Impedance matching
- *Smith Chart*
- *Impedance matching*

[3] High frequency filters

[4] Waveguides

3. Telecommunications technologies

[1] Software Defined Radio (SDR)

[2] RADAR systems

[3] Satellite communications

4. Laboratory sessions

[1] Numerical Analysis of Wire Antennas

[2] Numerical Analysis of Printed Antennas

[3] Analysis of Reflections in Transmission Lines

[4] Implementation of Microwave Networks

[5] Measurement of S-Parameters

[6] Introduction to Software Defined Radio (SDR)

[7] *Presentation of the Mini-Project*

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	10,00
Individual or group project	15,00
Independent study and work	10,00
Preparation of lessons	32,00
Preparation for assessment activities	20,00
Resolution of case studies	3,00
Total hours	**90,00**

TEACHING METHODOLOGY

The course is structured around four axes: theory and problem-solving sessions, tutorials, presentation of continuous assessment tests, and presentation of technical documentation containing the practical tests.

Group learning with the instructor
The theory and problem-solving sessions will be conducted using a lecture-style model. In the theory sessions, the instructor will explain the fundamental content of the course using the available audiovisual media (presentations, transparencies, whiteboard). In the problem-solving sessions, the instructor will explain a series of typical problems, through which students will learn to identify their essential elements. The instructor will indicate which day will be dedicated to problem-solving and which problems will be solved, so that students can attend these classes with the problem statement, although their resolution will be completed in class.

Tutorials
Students will have a tutorial schedule to solve problems, answer questions, provide guidance on their work, etc. The schedule for these tutorials will be announced at the beginning of the academic year. They will also have the opportunity to clarify any doubts by email or in discussion forums using the "Virtual Classroom" tool, provided by the University of Valencia.

Individual Study
Students may voluntarily submit the results of a series of self-assessment tests. These self-assessment and voluntary tests must be completed exclusively by the student, without assistance from the instructor.

Group Work with Peers
Practice groups will consist of a maximum of two people, who must organize themselves to carry out the design, assembly, and experimental tests. Each practice will have an estimated duration of 3 hours.

Available Teaching Materials
To properly implement the teaching methodology described above, students have access to the following documents in the Virtual Classroom from the beginning of the academic year:
- Teaching Guide, which provides sufficient information to determine what the student is expected to learn, how it will be carried out, under what conditions, and how it will be assessed.
- Transparencies for each course topic.
- Problem report for the topic.
- Continuous assessment tests for the corresponding thematic blocks.
- Lab reports.

EVALUATION

For the evaluation of the subject, two alternatives are proposed:

A) Final exam of the theoretical and practical contents taught in the classroom and exercises that the

teacher proposes to do in the laboratory. To pass the subject, the student must obtain a minimum score of 5 points out of a total of 10 points in the theoretical-practical exam and, additionally, pass the laboratory test proposed by the teacher.

If the applicant fails, a second chance will be given, under the same terms, at the second call.

B) Continuous evaluation of the work carried out during the course. Students who opt for this evaluation procedure must attend the laboratory sessions of the subject.

The evaluation will be as follows:

* Student work, up to 1 point,
    - Participation in class; answers to questions and resolution of exercises in class.
    - Resolution of exercises deliverable in tutorials and other voluntary work.

* Completion of a mini-project, up to 1 point,
    - With the characteristics that will be explained in class.

* Continuous laboratory assessment, up to 2 points. Obtained in the following way:
    - In each lab session, a report will be delivered that will determine obtained grade.
    - The final laboratory grade will be the average of all the grades of the practices.
    - Failure to attend any of the sessions implies a grade of 0 in the practice.

* Exam: up to 6 points - On the official date
    - The minimum grade to average is 4.

If the student fails the theory exam, they can retake it in the second sitting. The remaining grades are retained. If the student fails the laboratory exam through continuous assessment, the student must take a laboratory exam in the second sitting, which will also count for 20%.

It will be considered that the chosen evaluation modality will be given irreversibly by attending two laboratory sessions.

In any case, the evaluation system will be governed by the provisions of the Evaluation and Qualification Regulations of the University of Valencia for Degrees and Masters (https://webges.uv.es/uvTaeWeb/MuestraInformacionEdictoPublicoFrontAction.do?accion=inicio&idEdictoSeleccionado=5639)

The copying or manifest plagiarism of any activity that is part of the evaluation will mean the impossibility of passing the subject, and will then be subject to the appropriate disciplinary procedures indicated in the PROTOCOL OF ACTION AGAINST FRAUDULENT PRACTICES AT THE UNIVERSITY OF VALENCIA (ACGUV 123/2020).

REFERENCES

- Antenna Theory: Analysis and Design. Balanis, C.A. 2nd Ed. Joh Wiley & Sons, Inc. 1997
- Microwave Engineering, David M. Pozar, 4th Edition, Wiley, 2011
- Sistemas de Comunicaciones Electrónicas. W. Tomasi. 4ª edición. Prentice-Hall. 2003
- Antenas, Ángel Cardama, 2ª Edición, Edicions UPC, 2002
- Foundations for Microwave Engineering, Robert E. Collin, 2nd. Ed. IEEE Press 2001