COMILLAS
UNIVERSIDAD PONTIFICIA
ICAI ICADE CIHS

Syllabus
2025 - 2026

GENERAL INFORMATION

Data of the subject	
Subject name	Communication Electronics
Subject code	DEAC-MIT-511
Mainprogram	Official Master´s Degree in Telecommunications Engineering
Involved programs	Grado en Análisis de Negocios/Business Analytics y Máster Universitario en Ingeniería de Telecom. [Fifth year] Máster Universitario en Ingeniería de Telecomunicación y Mást. Univ. en Administración de Empresas [First year] Máster Universitario en Ingeniería de Telecomunicación + Máster Universitario en Big Data [First year] Máster Universitario en Ingeniería de Telecomunicación [First year] Máster Universitario en Ingeniería de Telecomunicación y Máster en Ciberseguridad [First year] Máster Univ. en Ing. de Telecomunicación + Máster en Tecnologías Financieras: Pagos y Banca Digital [First year] Máster Universitario en Ingeniería de Telecomunicación + Máster in Smart Grids [First year]
Level	Postgrado Oficial Master
Quarter	Semestral
Credits	7,5 ECTS
Type	Obligatoria
Department	Department of Electronics, Control and Communications
Coordinator	Francisco Javier Herraiz Martínez
Office hours	Contact by email

Teacher Information	
Teacher	
Name	Francisco Javier Herraiz Martínez
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Teacher	
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DESCRIPTION OF THE SUBJECT

Contextualization of the subject

Prerequisites

- Fundamentals of analysis and design of low frequency electronic circuits.
- Signals and systems in continuous time.
- Basic knowledge of electromagnetism, radiation and propagation.
- Reading technical documents in English.

Course contents

Contents

Course Contents

Electronic communication systems: transmitters and receivers

UNIT 1. Electronic communication systems

- Basic scheme and classification
- Distortion and noise
- Communication subsystems: filters, amplifiers, oscillators, mixers, PLLs, frequency synthesizer, detectors and antennas

UNIT 2. Transmitters and receivers

- Transmitter and receiver schemes
- Tramsmitter paramters
- Receiver parameters and frecuency planning
- Modulators and demodulators

Analysis and design of communication subsystems

Analysis and design of passive subsystems

- Review of high frequency technologies
- Resonators and communication filters
- Power dividers, combiners and other high frequency passive devices for communication systems
- Circulators

Analysis and design of active subsystems

- Review of low and medium frequency electronics
- High frequency amplifiers
- Oscillators
- Mixers and other frequency converters
- Switches and router components

Laboratory

Laboratory sessions

Amplifiers, oscillators

Final project
Design, manufacturing and testing of a communication receiver

EVALUATION AND CRITERIA

The use of AI to produce full assignments or substantial parts thereof, without proper citation of the source or tool used, or without explicit permission in the assignment instructions, will be considered plagiarism and therefore subject to the University's General Regulations.

Evaluation activities	Evaluation criteria	Weight
Individual tests during the term and final exam	Correctness of the solutions found, approach to the problem, understanding of the theoretical basis.	60
Laboratory	1. Laboratory sessions: The quality of the designs results and reports. 2. Presentation of a final project: The development of the project and the final report are made in groups. The presentation and evaluation is individual.	40

Grading

Tests and final exam (60 %)

- Individual tests during the term (20% in the ordinary period, 15% in the extraordinary or re-sit period)
- Final exam (40% in the ordinary period, 45% in the extraordinary or re-sit period)

Laboratory (40 %)

1. Laboratory sessions: The quality of the designs results and reports.

2. Presentation of a final project: The development of the project and the final report are made in groups. The presentation and evaluation is individual.

In the case the laboratory part has not been passed in the normal period, a practical (laboratory) exam will be required. The grade obtained will replace the laboratory part in the continuos evaluation grade.

Both parts (tests and laboratory) must be passed independently.

Attendance Rules

Class attendance is mandatory, according to the Academic Regulations of the Higher Technical School of Engineering (ICAI). The requirements of attendance will be applied independently for theory and laboratory sessions:

In the case of theory sessions, failure to comply with this rule may prevent them from taking the exam in the ordinary period.

In the case of laboratory sessions, failure to comply with this rule may prevent you from taking the exam both in the normal and re-sit period.

In any case, unjustified absences from laboratory sessions will be penalized in the evaluation.

AI Usage Policy

The use of AI is permitted for documentation, study, and presentation of the topics chosen by the students, as well as for laboratory work, to the extent allowed under Level 2 of the guide available at https://aiassessmentscale.com/. AI may be used for pre-task activities such as brainstorming, outlining and initial research. This level focuses on the effective use of AI for planning, synthesis, and ideation, but assessments should emphasise the ability to develop and refine these ideas independently.

The use of AI is strictly prohibited in all examinations and performance assessment tests.

BIBLIOGRAPHY AND RESOURCES

Basic References

Notes provided by the instructor in the course web page (Moodlerooms)