
Academic Year of Degree: 2025/26

23966 - Transmission Media and Circuits

Teaching Guide Information

Academic Course: 2025/26

Academic Center: 337 - Engineering School

Study: 3379 - Bachelor's degree in Telecommunications Network Engineering

Subject: 23966 - Transmission Media and Circuits

Credits: 5.0

Course: 2

Teaching languages:

Theory: Group 1: English

Group 2: Catalan

Seminar: Group 101: English

Group 102: English

Group 201: Catalan

Group 202: Catalan

Teachers: Rafael Pous Andres

Teaching Period: First term

Presentation

Transmission Media and Electronic Circuits is an introductory course, both theoretical and practical, covering the basics of electronic circuits.

It covers the following blocks:

- Analysis of basic circuits
- Analysis and design of logic gates
- Nonlinear circuits and amplifiers
- Sinusoidal steady state and filters
- Operational Amplifiers

Associated skills | General learning outcomes

Basic competences:

CB1. That the students have proved to possess and understand knowledge in a study area which comes from the basis of general secondary education, and are usually in a level which, although it is supported on advances text books, it also includes some aspects which imply knowledge coming from their study field's innovation;

CB2. That the students can apply their knowledge to their work or vocation of a professional

form and possess the competences which are usually proved by means of the elaboration and defense of arguments and solving of problems within their study area;

CB3. That the students have the ability of collecting and interpreting relevant data (normally within their study area) to issue judgements which include a reflection about relevant topics of social, scientific or ethical nature;

CB4. That the students can transmit information, ideas, problems and solutions to a public both specialized and non specialized;

CB5. That the students have developed those learning abilities necessary to undertake later studies with a high degree of autonomy.

Transversal competences:

CT1. Working in a group in international and interdisciplinary contexts.

CT2. Applying leadership and coordination and proving initiative.

CT3. Applying with flexibility and creativity the acquired knowledge and adapting it to new contexts and situations.

CT4. Communicating in academic and professional contexts orally and writing in English.

CT5. Generating new ideas and incorporating them in daily work. ce of the electronic systems developed throughout the course.

Learning outcomes | Specific learning outcomes

CE1. Solving the mathematical problems which can be set out in engineering and apply the knowledge on: linear algebra; differential and integral calculus; numerical methods, numerical algorithms, statistics and optimization.

RA.CE1.1 Applying linear algebra knowledge to solve problems which can be set out in the engineering

RA.CE1.2 Proving knowledge of differential and integral calculus to solve problems which can be set out in engineering.

RA.CE1.3 Using knowledge of numerical methods to solve problems which can be set out in engineering.

CE2. Mastering the basic concepts of fields and waves and electromagnetism, theory of electric circuits, electronic circuits, physical principle of the semiconductors and logic families, electronic and photonic devices, and their application for solving typical problems of the engineering.

RA.CE2.2 Managing basic concepts of linear systems and the functions and transformations related to solving typical problems in engineering.

RA.CE2.3 Mastering knowledge of electronic circuits, physical principle of the semiconductors and logic families, electronic and photonic devices to solve problems which can be set out in engineering.

CE7. Designing, building and assessing electronic systems and circuits.

RA.CE7.2 Solving typical problems of the engineering applying advanced concepts of linear systems and the related functions and transformed.

RA.CE7.3 Assessing communications systems specifying its fundamental parameters, from the point of view of the signal space, the disturbances and the noise.

CE11. Developing and using analysis, simulation and experimentation methods in the design, assessment and optimization of telecommunication networks and systems.

RA.CE11.1 Analyzing and designing networks applying methodology of modelling and simulation.

Contents

In the Transmission Media and Electronic Circuits course the following contents are covered:

1. - Basic circuit analysis
 - Introduction and lumped elements
 - Basic Circuit Analysis Method (KVL and KCL)
 - Superposition, Thevenin and Norton
- 2 - Analysis and design of logic gates
 - Digital abstraction and inside the logic gate
 - Capacitive transients of first order and speed of digital circuits
3. - Nonlinear circuits and amplifiers
 - Nonlinear Analysis
 - Incremental analysis
 - Dependent sources and amplifiers
 - Large signal analysis of MOSFET amplifiers
 - Small signal model of amplifiers
- 4 - Sinusoidal steady state and filters
 - Sinusoidal steady state and the impedance model
 - Transfer function and filters
5. - Operational amplifiers

Sustainable Development Goals

- 4 - Quality Education
- 8 - Decent Work and Economic Growth
- 11 - Sustainable Cities and Communities

Evaluation and grading system

For the evaluation of the course there is only one itinerary, in which the note is calculated based on:

- Laboratory (80%): Laboratory attendance is an essential requirement to pass the course. Only in exceptional and justified cases there will be an option to make up the lab session, always before the Final Exam. The laboratory evaluation will be based in the written reports of each lab (70%) and a quiz to verify the knowledge acquired in each lab (10%). To pass the course a minimum grade of 4 in each report and each quiz is required, and a minimum average grade of 5 in the laboratory part.
- Final Exam (20%): Will include all the course contents. The minimum Final Exam grade to pass the course is 5. The main objective of the final exam is to verify that the student has contributed significantly to the lab reports, and that he or she has assimilated the contents.
- Up to 2 additional points out of 10 can be obtained by dedicating time to helping other classmates who ask for help, either through digital media (e.g. Piazza) or in face-to-face tutoring sessions. These additional points will be decided by the coordinator. As a guideline, to obtain the 2 points a student must spend a minimum of 10 hours helping other students. The points will be added to the grade obtained from the Laboratory and the Final Exam. In the event that the result of the sum is greater than 10, the final grade will be 10.

A Laboratory grade below 5 or failure to attend a lab session makes it impossible to pass the course, because there is no lab make up exam. The Final Exam can be made up in July with an exam that will have a weight of 20% and a minimum grade to pass of also 5.