

## Materia 4\_31: Telecommunications Engineering Technologies

<b>Materia:</b>	Telecommunications Engineering Technologies	<b>ECTS:</b>	20
<b>Descriptor</b>	<ul style="list-style-type: none"> <li>Linear Circuits, Passive Components, Direct Current (DC), Alternating Current (AC), Continuous Regime, Sinusoidal Regime, Transient Regime, Steady State Regime, Laboratory Instrumentation</li> <li>Passive Devices (Resistors, Capacitors, Inductors), Active Devices (Diodes, Transistors), Discrete Components, Integrated Circuits, Operational Amplifiers, CAD, Instrumentation.</li> <li>Continuous Periodic and Non-Periodic Signals, Signal Energy and Power, System Classification, Linear and Invariant Systems (LTI), Fourier Transform, Frequency Response, Elemental and Periodic Discrete Signals, Sampling, Z-Transform, Filters, Random Signals.</li> <li>Communication Theory, Analogue Modulations, Digital Modulations, signal to noise ratio, bit error probability, signal detection, inter-symbol interference, white noise, AWGN (Additive White Gaussian Noise) channel.</li> </ul>		
<b>Objetivos generales</b>	<p>This subject has the objective of introducing the fundamental laws governing electrical circuits, and the basic fundamentals of different electronic devices will be studied. The basic theory of signals and systems necessary for the modelling of the basic elements that appear in a telecommunication system will also be studied. Finally, the basic concepts of communication theory, the basis of both analogue and digital communication systems, will be presented.</p>		
<b>Competencia específica</b>	<p>CE 4-31a: Understanding and mastering the basic concepts of linear systems and related functions and transforms, electrical circuit theory, electronic circuits, physical principle of semiconductors and logic families, electronic and photonic devices, and their application to engineering problem solving.</p> <p>CE 4-31b: Ability to evaluate the advantages and disadvantages of different technological alternatives for the deployment or implementation of communications systems, from the point of view of signal space, disturbances and noise, and analogic and digital modulation systems.</p>		
<b>Resultados de aprendizaje</b>	<ul style="list-style-type: none"> <li>Analyse linear circuits in the continuous, sinusoidal, transient and permanent regimes using basic circuit modelling techniques.</li> <li>Handle basic laboratory instruments to analyse electronic circuits.</li> <li>Apply basic techniques to analyse the behaviour of electronic circuits including passive and active devices.</li> <li>Implement basic circuits for linear and non-linear applications of the operational amplifier.</li> <li>Design simple electronic systems using basic circuits and simulate with frequency using CAD programs.</li> <li>Classify communications signals according to their typology and identify LTI systems.</li> <li>Analyse the behaviour of continuous and discrete systems in both the time and frequency domains.</li> <li>Transform signals from the time domain to the frequency domain and vice versa.</li> <li>Calculate the output of an LTI system given the input.</li> <li>Sample continuous signals and design filters by simulation.</li> <li>Identify the elements that appear in a modulation (information signal, carrier, bandwidth, modulated signal).</li> <li>Obtain the modulated signal corresponding to an information signal and compare the performance of different modulations.</li> <li>Calculate the signal-to-noise ratio in an AWGN channel and estimate the average error probability of a communications system.</li> <li>Investigate the modulations used in current digital communication systems.</li> </ul>		
<b>Métodos de evaluación</b>	<ul style="list-style-type: none"> <li>Evaluation: Written open-ended test and Problems</li> <li>Assessment instruments: Checklists and Rating Scales</li> </ul>		