

## Syllabus

### Course description

<b>Course title</b>	Basics of Electronics
<b>Course code</b>	42406
<b>Scientific sector</b>	ING-INF/01
<b>Degree</b>	Bachelor in electronic and cyber-physical systems engineering
<b>Semester</b>	2 <sup>nd</sup>
<b>Year</b>	I
<b>Academic year</b>	2022/223
<b>Credits</b>	6 CFU
<b>Modular</b>	No

<b>Total lecturing hours</b>	36
<b>Total exercise hours</b>	24 (12 Exercise + 12 Laboratory)
<b>Attendance</b>	
<b>Prerequisites</b>	Mathematical Analysis I, Linear Algebra, Physics I
<b>Course page</b>	

<b>Specific educational objectives</b>	<p>The course aims at providing students with the fundamental notions of electrical circuits and the fundamental concepts of electronic information processing. In the first part of the course, the topics that are covered are the analysis of elementary circuits in steady-state, sinusoidal, and transient conditions; in the second part, the basics of semiconductor devices, as well as of digital and analog electronics are illustrated.</p> <p>Topics covered in the subject include:</p> <ul style="list-style-type: none"> <li>• Basics of electrical engineering: the concept of bipole; electrical quantities; measurement units. Kirchhoff's laws.</li> <li>• Adynamic bipoles and circuits: pure resistive bipoles; Thevenin and Norton models; real generators; energy phenomena in bipoles; nodal analysis of circuits, the superposition principle.</li> <li>• Dynamic bipoles and circuits: dynamic bipoles; elemental circuit; circuits in sinusoidal regime.</li> <li>• Introduction to semiconductor devices: diodes; MOS transistors.</li> <li>• Digital and analog electronics: logic gates, single MOSFET amplifier stages, operational amplifiers.</li> </ul>
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<b>Learning outcomes</b>	<p><b>Knowledge and understanding</b> The student knows the concept of a circuit model and its fundamental components; the fundamental laws and theorems (including their limits of validity) necessary to analyze a circuit; the functioning of the main electronic devices.</p> <p><b>Applying knowledge and understanding</b> The student is able to use the knowledge acquired to create circuit models and analyze electrical and electronic circuits.</p>
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	<p><b>Making judgments</b> The student is able to select from the various tools provided by the course those most suitable for achieving the objectives in terms of modeling and analysis of electrical and analogic and digital electronic circuits.</p> <p><b>Communication skills</b> The student is able to present the competencies acquired with vocabulary appropriate to the topic.</p> <p><b>Learning skills</b> The student is able to use the tools and reasoning techniques acquired to extend his/her knowledge.</p>
<b>Assessment</b>	Written exam.
<b>Assessment language</b>	Italian
<b>Evaluation criteria and criteria for awarding marks</b>	The valuation criteria will be: accuracy of the answers given to the written exam, with particular attention to the resolution procedure adopted.
<b>Required readings</b>	Materials provided by the teacher.
<b>Supplementary readings</b>	Supplementary readings will be provided by the lecturers prior to lectures.