UNIVERSITÀ DI PAVIA

Anno Accademico 2018/2019

ELECTRONICS

Enrollment year	2018/2019
Academic year	2018/2019
Regulations	DM270
Academic discipline	ING-INF/01 (ELECTRONICS)
Department	DEPARTMENT OF ELECTRICAL,COMPUTER AND BIOMEDICAL ENGINEERING
Course	INDUSTRIAL AUTOMATION ENGINEERING
Curriculum	Industrial Technologies and Management
Year of study	1°
Period	1st semester (01/10/2018 - 18/01/2019)
ECTS	6
Lesson hours	80 lesson hours
Language	
Activity type	WRITTEN AND ORAL TEST
Teacher	ANNOVAZZI LODI VALERIO (titolare) - 6 ECTS
Prerequisites	Basic theory of passive linear networks. Principles of electrical engineering.
Learning outcomes	This module is focused on the main analog linear and non-linear applications of junction diodes, field effect transistors and operational amplifiers. Moreover, it offers a basic knowledge of MOS logical families and digital circuits. The final goal of the course is to teach the students how to analyze and perform measurements on analog circuits, and the design of simple circuits with op-amps and discrete MOS devices.
Course contents	The course of Electronics for Industrial Engineering includes two modules: 'Elettronica' (Electronics) by prof. Annovazzi Lodi and Static energy conversion by prof. Dallago. The first module, described here, is an introduction to linear and non-linear analog electronics, and to digital electronics.

	Programme of the module of Electronics Operational amplifiers.? Ideal operational amplifier. Adder, subtractor, integrator, differentiator. Network synthesis with op-amps. Bias currents and voltage offset. Multivibrators. ?Junction diodes. Avalanche and Zener diodes. Voltage regulators. Rectifiers. JFET and MOS devices. Biasing. Small signal model. Basic amplifier stages. Current mirrors. The MOSFET as a switch. Digital circuits? Basic digital gates. MOS integrated gates: n-MOS inverters; the CMOS inverter. The latch and the Flip-flop. Memories. D/A and A/D converters. Linear networks. ?Amplifiers and their circuit models; Theorems of Norton, Thevenin, Miller. Time and frequency response of single time constant circuits. Bode diagrams.
Teaching methods	The course includes classroom lessons where the theory of active elements and electronic circuits of the course is developed; classroom exercises where numerical examples are performed on analysis and synthesis of amplifiers and signal processing circuits with discrete elements and operational amplifiers; finally, laboratory activity consisting in measurements on active and passive, linear and nonlinear electronic circuits, selected from those presented during lessons.
Reccomended or required readings	A.Sedra, K.Smith. Microelectronic Circuits, III or newer ed. Oxford University Press.
Assessment methods	The examination for the Module 'Elettronica' consists of a written test with circuits using discrete active elements and operational amplifiers, to evaluate the candidate's ability to apply the analysis methodologies presented during the course; and of an oral test to evaluate the knowledge of the main analog and digital circuits presented in this course.
Further information	The examination for the Module 'Elettronica' consists of a written test with circuits using discrete active elements and operational amplifiers, to evaluate the candidate's ability to apply the analysis methodologies presented during the course; and of an oral test to evaluate the knowledge of the main analog and digital circuits presented in this course.
Sustainable development goals - Agenda 2030	$lbl_legenda_sviluppo_sostenibile