COMMUNICATION ENGINEERING (LM53)

(Lecce - Università degli Studi - Università degli Studi)

Insegnamento ELECTRON	VICS FOR	Insegnamento ELECTRONICS FOR SIGNAL ACQUISITION	Anno di corso 2
		Insegnamento in inglese ELECTRONICS FOR SIGNAL ACQUISITION	Lingua
		Settore disciplinare ING-INF/01	Percorso PERCORSO COMUNE
GenCod A003114			
Docente titolare Paolo VISCONTI		Corso di studi di riferimento COMMUNICATION ENGINEERING	
		Tipo corso di studi Laurea Magistrale	Sede Lecce - Università degli Studi
		Crediti 6.0	Periodo Secondo Semestre
		Ripartizione oraria Ore Attività frontale 54.0	: Tipo esame Orale
		Per immatricolati nel 2014/2015	Valutazione Voto Finale
		Erogato nel 2015/2016	Orario dell'insegnamento https://easyroom.unisalento.it/Orario
BREVE DESCRIZIONE	Overview		
DEL CORSO	This course er	nbraces themes of sensing and tran	sduction, signal acquisition, design

This course embraces themes of sensing and transduction, signal acquisition, design of analog/digital circuital blocks, analysis of embedded systems and an overview on rapid prototyping solutions for advanced electronic design. These are vital subjects for any system which extracts signals from the real world and processes the information digitally. The course comprises information on signals, sensor and transducer principles, related applications, embedded electronic design for signal acquisition and finally design and testing, by using a specific software, of an electronic acquisition board managed by a microcontroller.

Course Contents

- Introduction: sensors, transducers, processing devices and smart units.
- Block scheme of channel for signal and information acquisition and processing.

• Physical principles of sensors and transducers. Fundamental concepts: sensitivity, resolution, accuracy, linearity, offset, gain, signal-to-noise ratio, standard deviation, measurement error.

• Sensors: strain gauge, piezo-electric sensors, temperature sensors, light and radiation sensors, accelerometers, proximity sensors, magnetic field sensors, sensors of displacement, angle, speed, level, force, pressure, flow rate. Industrial and automotive applications of commecial sensors.

• Electronic sensing circuits, new generation intelligent (smart) sensors.

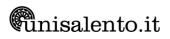
• Digital to analogue converters – internal structure and design. Analogue to digital converters – principal methods.

• Internal scheme, operation and programming of a microcontroller (PIC).

• Proteus software for the design and simulation of smart boards for signals acquisition/processing.

PREREQUISITI

Knowledge in analog and digital electronic, C++ programming.



OBIETTIVI FORMATIVI	 Learning Outcomes After the course the student should be able to: * Understand the principles of operation of commonly used sensors, transducers, and instruments. * Define technical specifications and to select sensors and transducers for a given application. * Understand terminologies associated with instrumentation systems (e.g., range, sensitivity, dynamic response, calibration, hysteresis, error, accuracy, precision, data uncertainty, mean and standard deviation). * Use data acquisition software and hardware to collect and analyze data from a physical system. * Analyze and understand the operation of computerized instrumentation systems for industrial processes using multiple sensors, electronic interfaces, data acquisition boards based on microcontrollers. * Use commercial software for the design and simulation of electronic boards managed by a microcontroller * Gain experience in developing computerized instrumentation systems for industrial processes using multiple sensors, interface electronics, data acquisition smart boards. * Acquire an experience in designing an electronic acquisition system of physical quantities.
METODI DIDATTICI	The course consists of lectures by using the slides provided to the students and laboratory activities related to the design and simulation of electronic solutions by the Proteus software. Also the teacher makes available on the website in addition to the slides of the lessons, further handouts to facilitate the understanding of the topics and the designing of the electronics systems. The final exam consists of an oral question on the theoretical topics of the course and in the presentation of a project realized by the student with the Proteus software.
MODALITA' D'ESAME	Examination: oral and project discussion related to Proteus software. The exam consists of an oral examination related the theoretical and practical contents of the course. In addition, the student has to present a circuital project realized with Proteus software and discuss its contents showing operation modes of designed electronic board managed by a microcontroller and related simulation results (maximum overall duration: two hours).
ALTRE INFORMAZIONI UTILI	Office Hours: By appointment; contact the instructor by email or at the end of class meetings.
PROGRAMMA ESTESO	See the section "Contenuti"
TESTI DI RIFERIMENTO	Teaching materials: teacher handouts.

