Last update: 12-01-2018

340606 - SENS-R2O10 - Sensors and Mems

Coordinating unit: 340 - EPSEVG - Vilanova i la Geltrú School of Engineering

Teaching unit: 710 - EEL - Department of Electronic Engineering

Academic year: 2017

Degree: MASTER'S DEGREE IN AUTOMATIC SYSTEMS AND INDUSTRIAL ELECTRONICS (Syllabus 2012). (Teaching unit Compulsory)

ECTS credits: 5 Teaching languages: Catalan, Spanish, English

Teaching staff

Coordinator: Jordi Prat Tasias

Prior skills

Basic knowledge of circuit theory, basic electronics, basics of programming and digital electronics.

Degree competences to which the subject contributes

Specific:

1. CEV08 - Ability to select sensors and preparation for the design of measurement systems.
2. CEV09 -Ability to design and test instrumentation systems, and make their integration and programming using devices of measurement and data acquisition
3. CG03 - Ability to combine various electronic functional blocks for a complex system.

Teaching methodology

This subject uses a teaching methodology based on lectures, individual assignments, exercises and laboratory experimentation.

Learning objectives of the subject

Know and use different types of sensors used in industrial and research applications.

Study load

Total learning time: 125h	Hours large group:	22h 30m	18.00%
	Hours medium group:	0h	0.00%
	Hours small group:	22h 30m	18.00%
	Guided activities:	0h	0.00%
	Self study:	80h	64.00%

Last update: 12-01-2018

340606 - SENS-R2O10 - Sensors and Mems

Content

Introduction

Learning time: 6h

Theory classes: 2h
Self study : 4h

Description:
Brief description of the historical evolution of the devices used to perform measurements of different types, and how electronics and microelectronics revolutionizes the ability to perform measurements. Introduction to the industry 4.0

Sensors and measuring converters

Learning time: 66h

Theory classes: 14h 30m
Laboratory classes: 22h 30m
Self study : 29h

Description:
Description of several sensors for measuring deformation, temperature and displacement

Introduction to MEMS

Learning time: 18h

Theory classes: 6h
Self study : 12h

Description:
3. Introducción a MEMS
3.1 Introducción y concepto
3.2 Descripción y evolución
3.3 Tecnologías de fabricación
3.4 Ejemplos de aplicación: DMD y acelerómetros
3.5 MEMS en IoT y en IIoT. Ejemplo de aplicación: IoT in Smart Cities.

Last update: 12-01-2018

340606 - SENS-R2O10 - Sensors and Mems

Planning of activities

Projects about sensor integration in data acquisicion systems	Hours: 14h 30m Laboratory classes: 4h 30m Self study: 10h
Description: During the course students will build different measurement and calibration projects with commercial sensors and acquisition systems to implement real measurement systems.	

Laboratory experimentation. Study of an LVDT sensor. Implementation the conditioning circuit of the sensor.	Hours: 43h Laboratory classes: 18h Self study: 25h

Qualification system

The student will be evaluated independently on the theoretical part (55%), with two written tests and a theoretical work. The practical part (45%) is evaluated including labs and a mini-project. The two written tests will have the option to be re evaluated according to current regulations.

Regulations for carrying out activities

The student has to attend all theoretical and practical lectures and delivering all the exercises.

Bibliography

Basic:

Gardner, Julian W; Varadan, Vijay K; Awadelkarim, Osama O. Microsensors, MEMS, and smart devices. Chichester [etc.]: John Wiley & Sons, 2001. ISBN 047186109X.

Norton, H.N.. Handbook of transducers. 1989. Prentice Hall,

Webster, J.G.. The Measurement, Instrumentation and Sensors Handbook. 1999. CRCnet BASE,