Course guide
300260 - SENSORS - Sensors and Interfaces

Date: 06/07/2023

Last modified: 09/06/2023

Unit in charge: Castelldefels School of Telecommunications and Aerospace Engineering
Teaching unit: 710 - EEL - Department of Electronic Engineering.

Degree: MASTER’S DEGREE IN APPLIED TELECOMMUNICATIONS AND ENGINEERING MANAGEMENT (MASTEAM) (Syllabus 2015). (Compulsory subject).
MASTER’S DEGREE IN ADVANCED TELECOMMUNICATION TECHNOLOGIES (Syllabus 2019). (Optional subject).

Academic year: 2023 ECTS Credits: 3.0 Languages: English

LECTURER

Coordinating lecturer: Reverter Cubarsi, Ferran
Others: Reverter Cubarsi, Ferran

PRIOR SKILLS

DC and AC circuit analysis, linear system theory, analysis and design of basic analog, digital and mixed-signal electronic circuits using passive and active electronic components.

REQUIREMENTS

No further requirements.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
07 MTM. (ENG) Concebir, diseñar e implementar nuevas soluciones para desarrollar aplicaciones basadas en la incorporación de sensores en sistemas electrónicos, para mejorar cualquier proceso en cualquier ámbito social.
08 MTM. (ENG) Diseñar e implementar redes de sensores inalámbricas para cualquier aplicación de cualquier ámbito social.

Generical:
03 DIS. (ENG) Diseñar aplicaciones de alto valor añadido basadas en las Tecnologías de la Información y las Comunicaciones (TIC), aplicadas a cualquier ámbito de la sociedad.

Transversal:
03 TLG. THIRD LANGUAGE. Learning a third language, preferably English, to a degree of oral and written fluency that fits in with the future needs of the graduates of each course.

Basic:
CB7. Students will be able to apply the acquired knowledge and their ability to solve problems in new or little explored environments in broader (or multidisciplinary) contexts related to their study area.

TEACHING METHODOLOGY

Lectures in the classroom, laboratory sessions, and autonomous work.
LEARNING OBJECTIVES OF THE SUBJECT

At the end of the course, the student should be able to:
1. Understand the structure of measurement systems based on electronic sensors and intended for measurement and control applications and for human-machine interfaces.
2. Describe the function and relevant specifications of each component of measurement systems.
3. Conceptually design a system intended to solve a particular measurement problem.
4. Propose alternative solutions to implement each function and their advantages and shortcomings.
5. Identify possible problems in the physical connection between sensors and their electronic interfaces, and to propose criteria and methods to solve those problems as well as performance parameters and methods to evaluate those solutions.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours large group</td>
<td>27,0</td>
<td>36.00</td>
</tr>
<tr>
<td>Self study</td>
<td>48,0</td>
<td>64.00</td>
</tr>
</tbody>
</table>

Total learning time: 75 h

CONTENTS

1. Measurement chain

Description:

Related activities:
Lectures and homework.

Full-or-part-time: 14h
Theory classes: 5h
Self study: 9h

2. Electronic sensors

Description:

Related activities:
Lectures, laboratory sessions and homework

Full-or-part-time: 28h
Theory classes: 4h
Practical classes: 6h
Self study: 18h
3. Signal conditioners

Description:

Related activities:
Lectures, laboratory sessions and homework

Full-or-part-time: 22h
Theory classes: 4h
Practical classes: 4h
Self study: 14h

4. Data converters

Description:

Related activities:
Lectures and homework

Full-or-part-time: 11h
Theory classes: 4h
Self study: 7h

GRADING SYSTEM

Final written exam (50%), guided laboratory sessions (30%), and experimental project (20%).

BIBLIOGRAPHY

Basic:

Complementary: