# 300260 - SENSORS - Sensors and Interfaces

**Coordinating unit:** 300 - EETAC - Castelldefels School of Telecommunications and Aerospace Engineering  
**Teaching unit:** 710 - EEL - Department of Electronic Engineering  
**Academic year:** 2019  
**Degree:** MASTER'S DEGREE IN APPLIED TELECOMMUNICATIONS AND ENGINEERING MANAGEMENT (MASTEAM) (Syllabus 2015). (Teaching unit Compulsory)  
MASTER'S DEGREE IN ADVANCED TELECOMMUNICATION TECHNOLOGIES (Syllabus 2019). (Teaching unit Optional)  
**ECTS credits:** 3  
**Teaching languages:** English

## Teaching staff

**Coordinator:** RAMON PALLAS ARENY  
**Others:** Primer quadrimestre: RAMON PALLAS ARENY - M1A11

## 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

**Basic:**

CB7. (ENG) CB7 - Que los estudiantes sepan aplicar los conocimientos adquiridos y su capacidad de resolución de problemas en entornos nuevos o poco conocidos dentro de contextos más amplios (o multidisciplinares) relacionados con su área de estudio.

**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.

## Teaching methodology

Lectures in the classroom and autonomous work outside the classroom.

## 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>Total learning time: 75h</th>
<th>Hours large group: 27h</th>
<th>36.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours medium group:</td>
<td>0h</td>
<td>0.00%</td>
</tr>
<tr>
<td>Hours small group:</td>
<td>0h</td>
<td>0.00%</td>
</tr>
<tr>
<td>Guided activities:</td>
<td>0h</td>
<td>0.00%</td>
</tr>
<tr>
<td>Self study:</td>
<td>48h</td>
<td>64.00%</td>
</tr>
</tbody>
</table>
# 300260 - SENSORS - Sensors and Interfaces

## Content

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Learning time</th>
<th>Theory classes</th>
<th>Self study</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Design of the measurement chain</td>
<td>Functions in sensor-based measurement systems. Feedback-based measurement systems: advantages and shortcomings. Transfer characteristic of digitizing systems: resolution. Impedance adaptation and signal coupling. Dynamic range: power supply rails and noise. Calibration: uncertainty, accuracy.</td>
<td>27h</td>
<td>11h</td>
<td>16h</td>
</tr>
</tbody>
</table>
Qualification system

Midterm written exam (50 %) and a final written exam (50 %).

Bibliography

Basic:


Complementary:
