Course guides
230319 - SMBC - Low Cost Measurement Systems

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

Degree:
- BACHELOR’S DEGREE IN TELECOMMUNICATIONS SCIENCE AND TECHNOLOGY (Syllabus 2010). (Optional subject).
- BACHELOR’S DEGREE IN AUDIOVISUAL SYSTEMS ENGINEERING (Syllabus 2009). (Optional subject).
- BACHELOR’S DEGREE IN ELECTRONIC SYSTEMS ENGINEERING (Syllabus 2009). (Optional subject).
- BACHELOR’S DEGREE IN TELECOMMUNICATIONS SYSTEMS ENGINEERING (Syllabus 2010). (Optional subject).
- BACHELOR’S DEGREE IN NETWORK ENGINEERING (Syllabus 2010). (Optional subject).
- BACHELOR’S DEGREE IN TELECOMMUNICATIONS TECHNOLOGIES AND SERVICES ENGINEERING (Syllabus 2015). (Optional subject).
- BACHELOR’S DEGREE IN ELECTRONIC ENGINEERING AND TELECOMMUNICATION (Syllabus 2018). (Optional subject).

Academic year: 2019  ECTS Credits: 2.0  Languages: Catalan, Spanish

LEcTuReR

Coordinating lecturer: Vargas Drechsler, Manuel
Others: Torrents Dolz, Josep Maria; Vargas Drechsler, Manuel

PRIOR SKILLS

A little bit of English.

REQUIREMENTS

Curiosity.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

General:
10 ECI. They will have acquired knowledge related to experiments and laboratory instruments and will be competent in a laboratory environment in the ICC field. They will know how to use the instruments and tools of telecommunications and electronic engineering and how to interpret manuals and specifications. They will be able to evaluate the errors and limitations associated with simulation measures and results.

08 CRPE. ABILITY TO IDENTIFY, FORMULATE AND SOLVE ENGINEERING PROBLEMS. To plan and solve engineering problems in the ICT with initiative, making decisions and with creativity. To develop a method of analysis and problem solving in a systematic and creative way.

Transversal:
04 COE. EFFICIENT ORAL AND WRITTEN COMMUNICATION. Communicating verbally and in writing about learning outcomes, thought-building and decision-making. Taking part in debates about issues related to the own field of specialization.

TEACHING METHODOLOGY

The CDIO methodology applied to low cost measurement systems will be used. The CDIO methodology consists of conceiving, designing, implementing and operating systems, in this case based on the sound system of the personal computer.
LEARNING OBJECTIVES OF THE SUBJECT

Introduce students to low cost measurement systems. Introduce students to hardware, software, and free cultural works. Introduce students to LabVIEW programming environment. Introduce students to CDIO methodology. Introduce students to minimize costs. Introduce students to reporting. At the end of the seminar students will be able to program and configure the PC to make a low cost measurement system.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Self study</td>
<td>30</td>
<td>60.00</td>
</tr>
<tr>
<td>Hours small group</td>
<td>20</td>
<td>40.00</td>
</tr>
</tbody>
</table>

Total learning time: 50 h

CONTENTS

An introduction to Low cost measurement systems

Description:
An introduction to low cost measurement systems. Measurement systems offer low cost alternative to traditional systems of measurement. We will study the advantages and disadvantages of low cost measurement systems compared to traditional measurement systems. We will list a few low cost systems. In future lectures, we will turn the PC into a measurement system.

Hardware: PC's sound card

Description:
Hardware: PC's sound card

Software: LabVIEW

Description:
Software: LabVIEW

Related activities:
License

Open source hard&soft

Description:
Open source hard&soft

Examples on soundcard

Description:
Examples on soundcard
**Uncertainty evaluation**

**Description:**
Measurement uncertainty evaluation

**Reporting**

**Description:**
Reporting

**CDIO on low cost system**

**Description:**
CDIO on low cost system

### ACTIVITIES

**Programming and Assembly of circuits. Measurements. Report writing.**

**Full-or-part-time:** 1 h
Laboratory classes: 1h

### GRADING SYSTEM

Evaluation of the ability to measure in an electronic laboratory.

### EXAMINATION RULES.

Continuous evaluation. If additional tests are scheduled, they will be in the lab, alone or in small groups.

### BIBLIOGRAPHY

**Basic:**

**Complementary:**

RESOURCES

Computer material:
- LabVIEW. LabVIEW
- Laboratori CSS101. Laboratory