Course guide
820253 - DSCPEIA - Process Control Systems Design

Last modified: 27/05/2024

Unit in charge: Barcelona East School of Engineering
Teaching unit: 707 - ESAII - Department of Automatic Control.

Degree: BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Optional subject).

Academic year: 2024 **ECTS Credits:** 6.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: EDMUNDO GUERRA PARADAS

Others: Primer quadrimestre:
EDMUNDO GUERRA PARADAS - M11
ALEJANDRO ROLAN BLANCO - M11

PRIOR SKILLS

1. Basic background on analog and digital electronics.
2. Basic background on automatic control.
3. Basic background on C programming.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
1. Design automatic control systems.
2. Design analogue, digital and power systems.
3. Understand the fundamentals and applications of analogue electronics.

Transversal:
4. TEAMWORK - Level 3. Managing and making work groups effective. Resolving possible conflicts, valuing working with others, assessing the effectiveness of a team and presenting the final results.

TEACHING METHODOLOGY

Lectures: 25%; Computer programming: 75%

LEARNING OBJECTIVES OF THE SUBJECT

1. Introduce basic concepts about electronic design and programming of automatic control systems.
2. Acquire skills for the design and programming of electronic control systems.

STUDY LOAD

Type	Hours	Percentage
Hours large group	45,0	30.00
Self study	90,0	60.00
Hours small group	15,0	10.00

Total learning time: 150 h

CONTENTS

T1. Introduction

Description:
Basic concepts: embedded systems, real-time systems, automatic control systems, microcontrollers.

Full-or-part-time: 4h
Theory classes: 4h

T2. The microcontroller and its programming.

Description:
8051 architecture.
C programming.
I2Kit development board.

Full-or-part-time: 8h
Theory classes: 6h
Laboratory classes: 2h

T3. Displays.

Description:
Types of displays.
Control (programming) of LCD displays.

Full-or-part-time: 14h
Theory classes: 10h
Laboratory classes: 4h

T4. Communications.

Description:
Communication standards: I2C, USB, Zigbee, Bluetooth, WiFi.
The I2C bus.
Programming.

Full-or-part-time: 14h
Theory classes: 4h
Laboratory classes: 10h

T5. Automatic control.

Description:
Basics of automatic control.
Basic controllers.
PID controllers.
Programming.

Full-or-part-time: 14h
Theory classes: 11h
Laboratory classes: 3h

Exam.

Description:
Exam (computer programming).

Full-or-part-time: 2h
Laboratory classes: 2h

Teamwork presentation.

Description:
Teamwork presentation.

Full-or-part-time: 4h
Theory classes: 4h

GRADING SYSTEM

Laboratory: 50%
Exam: 30%
Teamwork: 20%
Completing laboratory work is required to get a passing grade in this course.

EXAMINATION RULES.

This course has NO REEVALUATION