60820 - Control engineering

Información del Plan Docente

Academic Year	2016/17
Academic center	110 - Escuela de Ingeniería y Arquitectura
Degree	532 - Master's in Industrial Engineering
ECTS	6.0
Course	1
Period	First semester
Subject Type	Optional
Module	---

1.Basic info

1.1.Recommendations to take this course

1.2.Activities and key dates for the course

2.Initiation

2.1.Learning outcomes that define the subject

2.2.Introduction

3.Context and competences

3.1.Goals

3.2.Context and meaning of the subject in the degree

3.3.Competences

3.4.Importance of learning outcomes

4.Evaluation

5.Activities and resources

5.1.General methodological presentation

The learning process designed for this course is based on the following:
The teaching process will involve three main levels: theory classes, problems and laboratory.
-In theory classes foundations and theoretical basis of the course will be presented also illustrated with practical examples.
-In problem-based classes different problems will be developed with the participation of the students.
-Practical work will be developed in the laboratory, individually or in groups of two students, where students put into practice the concepts of interest, implementing the designed control schemes in simulation and real system.

5.2.Learning activities

The program to achieve the expected results includes the following activities:
Classes (type T1) (30 hours).
Keynote sessions of theoretical and practical content. The concepts and fundamentals of computer control are presented illustrating them with examples. Student participation through questions and brief discussions are encouraged.
Problems classes (type T2) (15 hours).
Problems and case studies with student participation, coordinated with the theoretical contents are developed. Students are encouraged to work the problems previously.
Laboratory Practice (type T3) (15 hours).
The student performs the simulation, implementation real control and analysis of automation systems. Q tutorial of the practice will available, consisting of sections of previous study and practical work in the laboratory. The preliminary study should be done prior to practice.
Individual work (type T7) (86 hours).
It consists of individual study of theoretical concepts and implementation problems. The ongoing work of the student is encouraged by the homogeneous distribution throughout the semester of the various learning activities.
Assessment tests (T8) (4 hours).
In addition to the evaluating function, the tests are also a learning tool with which the student checks the degree of understanding and assimilation reached.

5.3.Program

The contents developed are:
Topic 1: Introduction.
Item 2: Sampling and reconstruction of signals.
Item 3: Z-Transform.
Item 4: Analysis of discrete-time systems
Item 5: Design of digital controllers. Industrial PID.
Item 6: System identification.
Item 7: Modeling discrete event systems.
Item 8: Implementation of industrial automation controllers.
The topics to be developed in the laboratory are:
-Analysis of discrete systems and design of a digital controller.
-System identification.
-Modeling and analysis of a discrete event system.
-Design and implementation of control and supervision.
-Simulation of hybrid systems.

5.4.Planning and scheduling

Schedule sessions and presentation of works:
Lectures and problem classes, and practice sessions are held in the laboratory according to the schedule set by the center (schedules available on EINA website).
Each teacher will report its hours of tutoring.
The other activities are planned depending on the number of students and disclosed in good time. Available at http://add.unizar.es

5.5.Bibliography and recomended resources