29823 - Control Engineering

Información del Plan Docente

Academic Year	2016/17
Academic center	110 - Escuela de Ingeniería y Arquitectura 326 - Escuela Universitaria Politécnica de Teruel
Degree	440 - Bachelor's Degree in Electronic and Automatic Engineering 444 - Bachelor's Degree in Electronic and Automatic Engineering
ECTS	6.0
Course	3
Period	First semester
Subject Type	Compulsory
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 methodology that will be used in this course is as follows.

The course will include lectures, problem solving sessions, and laboratory activities.

Lectures will provide the theoretical background, and will introduce the connections between the theoretical concepts and

practical applications.

The course will include specific problem solving sessions, where case studies and practical exercises will be considered, discussed and solved. Written assignments will be proposed as well.

During the laboratory sessions, students will work in small groups to solve problems using the available equipment (simulation tools and/or real platforms). These activities will usually include the development of a preliminary study, where students will have to apply the ideas explained during the lectures to the particular problem associated to the laboratory activity.

In addition, in order to better motivate students, special learning activities related to industrial applications may be performed, subject to the available equipment.

5.2.Learning activities

IN CLASS AND LABORATORY ACTIVITIES (60 hours):

1) Lectures (T1) (30 hours)

Fundamentals of the theoretical concepts and practical applications. Computer based automatic control will be explained, emphasizing its importance and the connections with practical applications.

2) Case studies and problem solving (T2) (15 hours)

Students, working in small groups, will solve case studies and practical problems, using the ideas introduced during the lectures.

3) Laboratory work (T3) (15 hours)

Students will analyze, simulate, study, and verify different automatic control policies, applied to several practical examples. Sessions will be organized in small groups, adapted to the laboratory requirements.

The specific laboratory sessions and the time table will be announced in moodle, at the official webpage associated to the course. An example of laboratory topics includes:

- Digital control of a prototype model

- System Identification

- State-space model building and analysis of a system

- Automatic control of a system using state feedback control

- Design of state observers for controlling state-space systems

PERSONAL WORK (90 hours):

4) Personal study (T7) (82 personal hours)

Students are assumed to employ this time studying and understanding the theoretical concepts, solving problems, making practical exercises, and preparing the laboratory sessions in advance. All the teachers/professors involved in the course have associated "tutorial" hours, which will be announced at "moodle". Students can use these tutorial hours to solve questions arising while studying or solving exercises, and to get suggestions on strategies to address the course.

5) Evaluation activities (T8) (8 hours)

In addition to grading purposes, evaluation activities are as well a learning tool which can be used by students to check the knowledge and understanding they have acquired on the topics involved in the course.

5.3.Program

The main topics associated to the course are:

- Introduction to computer based control systems

- Sampling methods. Analysis of discrete-time systems

- Design of computer based controllers

- Model building and system identification

- State-space system design and analysis.

- Controllability and observability in control systems.

- State feedback controllers

- State observer design strategies

- Fuzzy control

5.4.Planning and scheduling

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Timetables for classroom and laboratory sessions will be published prior to the beginning of the course at the web of the EINA https://eina.unizar.es/ and EUPT https://eupt.unizar.es/
Each teacher will publish his tutoring hours.

The other activities will be planned depending on the number of students and will be announced well in advance. It will be available on https://moodle2.unizar.es/add/

5.5.Bibliography and recomended resources