29814 - Signals and systems

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	2
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

At the EINA (ZARAGOZA)

The course will be based on combining theoretical explanations with practical exercises, written assignments and laboratory work.

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1. Lectures will provide theoretical background on Signal and Systems fundamentals
2. Case studies and problem solving will be worked out at the classroom
3. The students will do laboratory work in small groups
4. Written assignments will be proposed

Student participation is considered very important in order to acquire the learning outcomes and skills needed.

At the EUPT (TERUEL)

The learning process is based on:

1. Theoretical lectures given to the whole group of students enrolled in the course. Lectures will explain the basic principles of the subject. A selection of problems will be solved at the end of each chapter.
2. Laboratory sessions every 2 weeks.
3. Supervised assignments (approximately every 2 weeks).
4. Individual study.

5.2.Learning activities

The guidelines designed in order to help students to reach the expected learning results include the following activities ...

At the EINA (ZARAGOZA)

Classroom activities 6 ECTS (60 hours)

1) Lectures (T1) (30 hours): Fundamentals of systems modelling and analysis, mixing theoretical concepts and practical applications.

2) Case studies (T2) (15 hours): Examples and practical case studies with active participation of students.

3) Lab sessions (T3) (15 hours): Five laboratory sessions related to system identification and simulation and signal analysis. Students have to prepare sessions in advance. This previous work will be evaluated in the laboratory.

Personal work: 3.6 ECTS (90 hours)

4) Assignments (T6) (10 hours): Assignments for groups of two students related to modelling and simulation of a continuous system will be proposed

5) Personal study (T7) (76 hours): Continuous study will be promoted among students. They can also attend tutorials to solve the specific problems they can face in the course

6) Evaluation activities (T8) (4 hours): Assessment will be based on coursework (laboratory work and assignments) and

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final examination

At the EUPT (TERUEL)

1. Theoretical lectures (30 hours, in classroom)

2. Solving selected exercises and problems (15 hours, in classroom)

3. Lab sessions (14 hours, in laboratory)

4. Individual work, study (58 non-presential hours)

5. Lecturer-student sessions (in lecturer's office)

6. Evaluation / assessment (5 hours, in classroom)

7. Supervised assignments (28 hours; 14 in classroom + 14 non-presential)

5.3.Program

1. Continuous-time systems modeling.

1.1 Representation of continuous-time signals.

1.2 Modeling tools.

1.3 Physical systems modeling.

2. Time-domain analysis of continuous-time systems.

2.1. Time-domain response of linear systems.

2.2. Stability

2.3. Transient response analysis.

3. Frequency-domain analysis of continuous-time signals and systems.

3.1. Fourier Transform.

3.2. Frequency-domain transfer function.

3.3. Bode and polar plots.

4. Discrete-event systems modeling and simulation.

4.1. Discrete-event systems. State diagrams.

4.2. Petri networks.

4.3. Qualitative and quantitative properties. Analysis based on examples.

4.4. Discrete-event and hybrid systems simulation.

5.4.Planning and scheduling

Classroom and laboratory sessions take place according to the general schedule set by faculty board. Timetables 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. All the other activities will be planned and announced well in advance. It will be available at https://moodle2.unizar.es/add/

5.5.Bibliography and recomended resources

At the EINA (ZARAGOZA)

1. Slides, proposed exercices and lab sessions documentation , available at https://moodle2.unizar.es/add/ .

2. Basic references:

- P. H. Lewis, C. Yang: *Sistemas de control en ingeniería* (Prentice-Hall)
- C. G. Cassandras, S. Lafortune: Introduction to Discrete Event Systems, (Springer)

3. Other references:

- B. Kuo: *Sistemas de control automático* (Prentice-Hall). 1996.
- *Alan V. Oppenheim / Alan S. Willsky / S. Hamid Nawab: Señales y Sistemas* (Prentice-Hall)
- Silva, M.. *Las Redes de Petri en la Automatica y la Informatica. AC, Madrid, 1985*

At the EUPT (TERUEL)

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Basic references:

- Bolton, W., Ir ngeniería de control 2ª Edición, Ed. Alfaomega.
- Lewis, P. H., Yang C., Sistemas de Control en Ingeniería, Ed. Prentice-Hall.
- Kuo, B.C., Sistemas de Control Automático, Ed. Prentice-Hall.
- Ogata, K., Ingeniería de Control Moderna, Ed. Prentice-Hall.
- Ogata, K., Discrete-time control system, Ed. Prentice-Hall.
- Oppenheim, A.V., Willsky, A.S., Nawab, S.H., Señales y Sistemas, Ed.Prentice-Hall.

Other references:

- Ogata, K., Problemas de Ingeniería de Control utilizando MATLAB, Ed. Prentice Hall.