28839 - Advanced Instrumentation

Syllabus Information

Academic Year: 2019/20
Subject: 28839 - Advanced Instrumentation
Faculty / School: 175 - Escuela Universitaria Politécnica de La Almunia
Degree: 424 - Bachelor's Degree in Mechatronic Engineering
ECTS: 6.0
Year: 4
Semester: Second semester
Subject Type: Optional
Module: ---

1.General information

1.1.Aims of the course

The objective of the subject is to train the student in the theoretical and practical concepts of the data acquisition systems, digital processing and virtual instrumentation.

The subject and its expected results respond to the following approaches and goals:

- Establish knowledge about network instrumentation, card-based instrumentation, programming and Interconnection of Instruments.
- Distinguish the technological, structural and functional characteristics to be able to choose the sensor type, circuits of signal conditioning, acquisition system and the most suitable signal processing, to obtain a certain solution.
- Introduce the student in the management of advanced instruments.
- Establish the foundations on the problem of interference, and its treatment.
- Know how to develop the essential blocks that make up an intelligent instrumentation system.
- Encourage students to develop real application projects.

1.2.Context and importance of this course in the degree

The subject of Advanced Instrumentation is part of the group of subjects that are part of the module called electricity and electronic. This optional subject complements the 3rd year subject Electronic Instrumentation, extending the contents in data acquisition, digital processing of the signal, communications between digital instruments and intelligent instrumentation.

1.3.Recommendations to take this course

There is no prerequisite to take this subject. Nevertheless, the contents to be taken will require the contest of the abilities and skills acquired, mainly, in the subjects of: Electronic Instrumentation, Electrical Engineering, Programmable Electronic Instruments, Electronic Technology I and Electronic Technology II.

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as:

1 Lectures: The theoretical concepts of the subject are explained and illustrative examples are developed as a support to the theory when necessary, focus on calculation, design, and development of a mechatronic system

2. Laboratory Workshop. These classes are highly recommended for a better understanding of the concepts because those items whose calculation is done in theory classes are shown in working mode.

3. Tutorials related to any concept of the subject. This activity is developed in a presencial mode with a defined schedule or through the messaging and forum of the virtual classroom Moodle.

4.2.Learning tasks

The course includes the following learning tasks:

Lectures. It will take 2 hours per week till the 30 hours, necessary to accomplish the objectives of the subject study, will be reached

Laboratory Workshop. It will take 15 sessions of 2 hours duration. The group is divided up into various groups, according to the laboratory capacity.

Study and personal work. This off-site part is valued in about 90 hours, necessary for the study of theory, problem-solving and revision of documents

Individual tutorials. Each teacher will publish a schedule of attention to the students throughout the four-month period

4.3.Syllabus

The course will address the following topics:

	Advanced instrumentation.
Topic 1	Data acquisition systems.
Topic 2	Digital signal processing.
Topic 3	Instrumentation software.
Topic 4	Communication protocols instrumentation.
Topic 5	Smart instrumentation.

4.4.Course planning and calendar

Schedule of Face-to-face generic activities and presentation of papers

The dates of the final exams will be those that are officially published at https://eupla.unizar.es/asuntos-academicos/examenes

In continuous evaluation methodology, the students delivering several partial works and a final work whose schedule will be defined during the course.

* The final dates will be published in the digital platform (moodle)

The overall test for not continuous evaluation system will be set at the end of the semester and will consist of a written test based on theoretical arguments and problems of all topics covered in class.

4.5.Bibliography and recommended resources

http://biblos.unizar.es/br/br_citas.php?codigo=28839&year=2019

Material	Format
Topic theory notes Topic presentations	Paper/repository
Topic theory notes Topic presentations Topic problems Related links	Digital/Moodle E-Mail

technical manuals	Papel/repositorio Digital/Moodle
Acquisition system NI USB-6008laboratory	laboratory
Software LabView 2012	laboratory work station
Software Matlab Simulink	laboratory work station