

28833 - Mechatronic Systems: Design and Maintenance

Syllabus Information

Academic Year: 2019/20

Subject: 28833 - Mechatronic Systems: Design and Maintenance

Faculty / School: 175 - Escuela Universitaria Politécnica de La Almunia

Degree: 424 - Bachelor's Degree in Mechatronic Engineering

ECTS: 6.0

Year: 4

Semester: First semester

Subject Type: Compulsory

Module: ---

1.General information

1.1.Aims of the course

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

- Show the fundamentals and main components of mechatronic systems, as well as their context within the current technological development.
- To make known the methodology of the development of mechatronic systems, together with the phases to be applied in the mechatronic design from the initial conception, through the development of prototypes, until the final concretion of said system.
- Design mechatronic systems of general application integrating the knowledge of electronic design, mechanics, programming, electrical machines and control.
- Study the types of maintenance applicable to mechatronic systems, as well as the development of a maintenance plan according to each type or particular characteristics of the mechatronic system in question.
- Indicate the phases that must be taken in a number when carrying out a safety study in mechatronic systems.
- Analysis of how security in a mechatronic system affects maintenance and how both, in turn, affect the design process.
- Introduce the existing regulations on design, maintenance and safety of mechatronic systems.

1.2.Context and importance of this course in the degree

The subject of Design and Maintenance of Mechatronic Systems is part of the Degree in Mechatronic Engineering taught by EUPLA, framed within the group of subjects that make up the module called Mechanics and within this to the subject of Design and Calculation. It is a subject of the fourth course located in the seventh semester and compulsory, with a teaching load of 6 ECTS credits.

This subject implies a very important impact in the acquisition of the skills of the degree, in addition to providing a useful and specific training in the performance of the functions of the Mechatronic Engineer.

1.3.Recommendations to take this course

The development of the subject of Design and Maintenance of Mechatronic Systems brings into play knowledge and strategies coming from subjects related to the areas of ELECTRONICS, MECHANICS, CONTROL and COMPUTERS.

In relation to the above, in the first, second and third year of the degree and in advance subjects related to these subjects are studied, providing the basic knowledge to be able to follow without any type of restriction the evolution of the subject in question.

This subject does not possess any normative prerequisite nor does it require specific complementary knowledge. Therefore, the above is understood from a formal point of view, although it is necessary to be clear that an adequate training base is needed in the disciplines previously indicated.

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 learning process designed for this subject is based on the following:

In a strong teacher/student interaction. This interaction is materialized through the distribution of work and responsibilities between students and teachers. However, it will have to be taken into account that to a certain extent students can mark their learning pace according to their needs and availability, following the guidelines set by the teacher. The present subject of Electrical Engineering is conceived as a unique set of contents but worked under three fundamental and complementary forms as they are: the theoretical concepts of each didactic unit, the resolution of problems or questions and the laboratory practices, supported in turn For another series of activities. The organization of the teaching will be carried out following the following guidelines:

? **Lectures:** Theoretical activities carried out mainly through exposition by the teacher, where the theoretical supports of the subject are displayed, highlighting the fundamentals, structuring them in topics and or sections, interrelating them.

? **Practice Sessions:** The teacher resolves practical problems or cases for demonstrative purposes. This type of teaching complements the theory shown in the lectures with practical aspects.

? **Laboratory Workshop:** The lecture group is divided up into various groups, according to the number of registered students, in order to make up smaller sized groups.

? **Group Tutorials:** Programmed activities of learning follow-up in which the teacher meets with a group of students to guide their work of autonomous learning and supervision of works directed or requiring a very high degree of advice by the teacher.

? **Individual Tutorials:** Those carried out giving individual, personalized attention with a teacher from the department. Said tutorials may be in person or online.

4.2.Learning tasks

The course includes the following learning tasks:

? **Face-to-face generic activities:**

? Lectures: The theoretical concepts of the subject are explained and illustrative examples are developed as a support to the theory when necessary.

? Practical Classes: Problems and practical cases are carried out, complementary to the theoretical concepts studied.

? Laboratory Workshop: This work is tutored by a teacher, in groups of students.

? **Generic non-class activities:**

? Study and understanding of the theory taught in the lectures.

? Understanding and assimilation of the problems and practical cases solved in the practical classes.

? Preparation of seminars, solutions to proposed problems, etc.

? Preparation of laboratory workshops, preparation of summaries and reports.

? Preparation of the written tests for continuous assessment and final exams.

- **Tutored autonomous activities.**

Although they will have more of a face character that has been taken into account in part for their idiosyncrasies, they will be primarily focused on seminars and tutorials under the supervision of the teacher.

- **Reinforcement activities.**

Non-contact marking character, through a virtual learning portal (Moodle) various activities that reinforce the basic contents of the subject be addressed. These activities can be customized or not, controlling their realization through it.

4.3.Syllabus

The course will address the following topics:

THEORETICAL CONTENTS.

The theoretical contents are articulated based on a series of didactic units, attached relationship, indivisible blocks of treatment, given the configuration of the subject that is programmed. These topics cover the contents necessary for the acquisition of predetermined learning outcomes.

- TOPIC 1: Design of mechatronic systems.

- TOPIC 2: Maintenance of mechatronic systems.

- TOPIC 3: Security of mechatronic systems.

PRACTICAL CONTENTS.

Its aim is none other than to be covered learning outcomes of the course through a program of laboratory practices, encompassing aspects related to the following issues:

- Work With the tools, techniques and methods necessary involved in the design process of mechatronic systems from initial design to manufacturing planning.
- Apply The most common when planning a typology of maintenance methodologies, based on situations and analysis of results.
- Basic Notions of implementing security features in mechatronic systems.

The laboratory workshop practices to be developed by the student will be conducted in sessions of two hours.

4.4.Course planning and calendar

The subject has 6 ECTS credits, which represents 150 hours of student work in the subject during the trimester, in other words, 10 hours per week for 15 weeks of class.

A summary of a weekly timetable guide can be seen in the following table. These figures are obtained from the subject file in the Accreditation Report of the degree, taking into account the level of experimentation considered for the said subject is high.

Activity	Weekly school hours
Lectures	2
Laboratory	2
Others activities	6

Nevertheless, the previous table can be shown in greater detail, taking into account the following overall distribution:

? 28 hours of lectures, with 50% theoretical demonstration and 50% solving type problems.

? 28 hours of laboratory workshop, in 1 or 2-hour sessions.

? 4 hours of written assessment tests, one or two hours per test.

? 90 hours of personal study, divided up over the 15 weeks of the semester.

Written continuous assessment tests are related to the following topics:

? **Written assessment test 1:** Topics 2.

? **Written assessment test 2:** Topics 3.

The most significant dates of the continuous evaluation system will be published in Moodle during the development of the course.

The dates of the global evaluation test will be those published officially on the School website.

The weekly schedule of the subject will be published officially on the School website.

4.5.Bibliography and recommended resources

Resources and materials used in the development of the subject are reflected in the following table:

Material	Format
Topic theory notes Topic problems	Paper/repository
Topic theory notes Topic presentationso Topic problems Related links	Digital/Moodle E-Mail
Software	Pc's laboratorio
Technical manuals	Paper/repository Digital/Moodle
Labware	

http://biblos.unizar.es/br/br_citas.php?codigo=28833&year=2019