28832 - Robotics

Información del Plan Docente

Academic Year	2016/17
Academic center	175 - Escuela Universitaria Politécnica de La Almunia
Degree	424 - Bachelor's Degree in Mechatronic Engineering
ECTS	6.0
Course	4
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

There are a strong interaction between teacher and student. This interaction is brought into being through a division of work and responsibilities between the students and the teacher. Nevertheless, it must be taken into account that, to a certain degree, students can set their learning pace based on their own needs and availability, following the guidelines set by the teacher.

The current subject Automatic Foundation is conceived as a stand-alone combination of contents, yet organized into three fundamental and complementary forms, which are: the theoretical concepts of each teaching unit, the solving of problems or resolution of questions and laboratory work, at the same time supported by other activities

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The organization of teaching will be carried out using the following steps:

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

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

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Laboratory Workshop : The lecture group is divided up into various groups, according to the number of registered students, but never with more than 20 students, in order to make up smaller sized groups.

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

En una fuerte interacción profesor/alumno. Esta interacción se materializa por medio de un reparto de trabajo y responsabilidades entre alumnado y profesorado. No obstante, se tendrá que tener en cuenta que en cierta medida el alumnado podrá marca su ritmo de aprendizaje en función de sus necesidades y disponibilidad, siguiendo las directrices marcadas por el profesor.

La presente asignatura de fundamentos de automática se concibe como un conjunto único de contenidos, pero trabajados bajo tres formas fundamentales y complementarias como lo son: los conceptos teóricos de cada unidad didáctica, la resolución de problemas o cuestiones y las prácticas, apoyadas a su vez por otra serie de actividades.

La organización de la docencia se realizará siguiendo las pautas siguientes:

— **Clases teóricas** : Actividades teóricas impartidas de forma fundamentalmente expositiva por parte del profesor, de tal manera que se exponga los soportes teóricos de la asignatura, resaltando lo fundamental, estructurándolos en temas y/o apartados y relacionándolos entre sí.

— **Clases prácticas** : El profesor resuelve problemas o casos prácticos con fines ilustrativos. Este tipo de docencia complementa la teoría expuesta en las clases magistrales con aspectos prácticos.

— **Prácticas** : El grupo total de las clases teóricas o de las clases prácticas se puede o no dividir en grupos más reducidos, según convenga. Se emplearan para analizar casos, resolver supuestos, resolver problemas, etc. A diferencia de lo que sucede con las clases prácticas, el profesor no es protagonista, limitándose a escuchar, atender, orientar, aclarar, valorar, evaluar. Se busca fomentar la participación del alumno, así como tratar de facilitar la evaluación continua del alumnado y conocer el rendimiento del aprendizaje.

— **Tutorías individuales** : Son las realizadas a través de la atención personalizada, de forma individual, del profesor en el departamento. Tienen como objetivo ayudar a resolver las dudas que encuentran los alumnos, especialmente de aquellos que por diversos motivos no pueden asistir a las tutorías grupales o necesitan una atención puntual más personalizada. Dichas tutorías podrán ser presenciales o virtuales, fomentando el uso de las últimas tecnologías disponibles.

5.2.Learning activities

Involves the active participation of the student, in a way that the results achieved in the learning process are developed, not taking away from those already set out, the activities are the following:

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

● **Theory Classes** : The theoretical concepts of the subject are explained and illustrative examples are developed as 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 no more than 20 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.

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 moderate.

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Activity	Hours per week
Lectures	3
Laboratory workshop	1
Other activities	6

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

— 44 hours of lectures, with 50% theoretical demonstration and 50% solving type problems.

— 12 hours of laboratory workshop, in 1 or 2 hour sessions.

— 4 hours of written assessment tests, one hour per test.

— 40 hours of teamwork divided up over the 15 weeks of the semester.

— 50 hours of personal study, divided up over the 15 weeks of the semester.

5.3.Program

The theoretical program

1. Introduction to the robotic
2. The cinematic problem
3. Dynamics in robots
4. Sensing and driving systems
5. Path control
6. Language programming in robotic

The lab program

Almost of the previous topics comes with lab practices. The different lab works will be introduced in Moodle platform.

The main work in the subject will be a robot design in a BPL teamwork.

1. Programming with manipulators.
2. The Design of path controls systems.

3. The Design of a robotic system.

Materials

Material	Soporte
Topic theory notes Topic problems	Paper/repository
Topic theory notes Topic presentations Topic problems Related links	Digital/Moodle E-Mail
Educational software	Web page

5.4.Planning and scheduling

Class hall sessions & work presentations timetable

Activity	Week															Hours
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	P
Tema 1	4	3														7
Tema 2			3	3	3											9
Tema 3						3	3	3								9
Tema 4									2	3						5
Tema											3	3	3			9

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5																
Tema 6														3	3	6
Práctica 1		1	1	1	1											2
Práctica 2						1	1									4
Práctica 3								1		1	1	1	1	1	1	2
Prueba 1									2							2
Prueba 2															2	2
Trabajo en grupo	3	3	3	3	3	3	3	3	0	3	3	3	3	3	1	40
Estudio personal	3	3	3	3	3	3	3	3	6	3	3	3	3	3	5	50
Total	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**150**

The dates of the final exams will be those that are officially published at http://www.eupla.es/secretaria/academica/examenes.html.

The written assessment tests will be related to the following topics:

— **Test 1** : Topic 1, 2, 3.

— **Test 2** : Topic 4, 5 y 6.

At the end of every topic the student can find some reinforce exercises in order to guide him in their personal homework.

5.5.Bibliography and recomended resources

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