28837 - Computer-Assisted Design for Engineering

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	Second semester
Subject Type	Optional
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 learning process that is designed for this subject is based on the following:

A strong interaction teacher/student. This interaction becomes a reality by a division of labor and responsibilities between students and teachers. However, to some extent, the students will be allowed to set up their own pace of learning according to their needs and availability, following the guidelines set by the teacher.

The teaching organization is based on the number of ECTS credits, which represents, in this case 150 hours of student

work on the subject during the semester (15 weeks tuition). 48% of this work (70h) will be held in the classroom and the O.T. LAB and the rest will be autonomous.

The organization of the actual teaching will be based on the following guidelines:

- **Theory/Practice Lectures:** The concepts and procedures of the subject will be explained and developed simultaneously, giving practical examples as support (in class and group tutorials), requiring a high participation of the students and activities driven by the teacher / a.

- The number of students enrolled will be divided into groups not bigger than 24 people, so that smaller groups can be created. Computer software practical activities will be done for the making of digital prototypes using different computer tools and getting as much information as required for its manufacturing and assembly.

*** Group tutorials:** Scheduled tracking learning activities in which the teacher meets with a group of students to guide their autonomous learning work and consultancy of targeted work or tasks that require a very high degree of advice from the teacher. Essentially a number of hours will be required for such group monitoring (to agree with each of the groups, with at least the specified time in the Calendar section of this document).

*** Individual tutorials:** These are made on a one-to-one basis, at the department. They aim to help solving problems that are the students might have, particularly those which for several reasons cannot attend group tutorials or need a more personalized attention. These tutorials may be face-to-face or virtual (Moodle or email).

5.2.Learning activities

The program that the students are offered to help them achieve the expected results involves the following activities...

Active participation of the students, so that, to achieve the learning outcomes, no redundancy intended with the above mentioned, the following activities will be developed:

- Face-to-face Generic Activities:

*** Theoretical-practical classes:** the concepts and procedures of the subject will be developed and practical examples as support will be developed.

*** Lab practice work:** Students will be divided into several groups not bigger than 24 students / being monitored by the teacher.

- Non-class Generic Activities:

* Study and assimilation of the concepts and procedures outlined in the laboratory.

* Understanding and assimilation of the problems and practical cases solved in practical lessons.

* Organization of seminars, suggested problems solving, etc.

* Organization of laboratory practice work, development of scripts and reports.

* Individual and group production of the final Project.

- Monitored autonomous activities: Although they will rather have a mixed nature between face-to-face and non-class tuition they have been considered separately and will be focused mainly to seminars and tutorials under the supervision of the teacher.

- Reinforcement activities: With a remarkable non-class nature, through a virtual learning portal (Moodle, e-mail) several activities that reinforce the basic contents of the subject will be carried out. These activities can be customized or not, and will be monitored through the portal.

The subject consists of 6 ECTS credits, which represents 150 hours of the student work during the semester, i.e. 10 hours per week for 15 tuition weeks.

5.3.Program

Essential Contents of the subject for the achievement of learning outcomes

Theoretical and practical part to be developed in the O.T. Laboratory, and throughout the 2nd semester (4 hours per week).

INTRODUCTION	
Unit 0	**PROGRAM AND PRESENTATION OF THE COURSE** 0.1 Introduction to the Subject and general presentation of the theoretical and practical contents 0.2 Scheduling of classroom lessons, blended learning and autonomous classes 0.3 Group and individual tutorials timetable 0.4 Assessment Criteria and Ratings. CEVA table 0.5 Introduction and purpose of the Software and Hardware to use 0.6 Delivery of cards for the call for papers. Work group Distribution
Unit 1	**DIGITAL PROTOTYPES**

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	1.1 Prototype Workflow 1.2 Prototype Components 1.3 Prototype making 1.4 CDC Parts
Unit 2	**MODELING, ASSEMBLIES AND DOCUMENTATION (reminder)** 2.1 User Interface 2.2 Modeling with Defined Operations 2.3 Parametric Solid Process and Techniques 2.4 Working with Sketches 2.5 Introduction to Operations 2.6 Assemblies (Groups or UF) 2.7 Documentation
Unit 3	**PRESENTATIONS AND DOCUMENTATION (reminder)** 3.1 Creating Views 3.2 Moving and Creating Trajectories 3.3 Controlling camera views 3.4 Presentations Animation 3.5 Creating IPN and AVI files

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	3.6 Creation of Standards. Boxes. Texts 3.7 Resources and Plan Views 3.8 Modifying Views and Sections 3.9 Plan Views Annotation 3.10 Creating drawing plans. Sheet treatment 3.11 Creating assembly drawings. Lists 3.12 Printing Plans

ELEMENTS AND SETS	
Unit 4	**PLASTIC PARTS AND OPERATIONS** 4.1 Solid Division 4.2 Grill Creating and joints 4.3 Creating Supports and Lips 4.4 Adding Joints and Holes 4.5 Creating Revolution and Displacement Bodies
Unit 5	**SIMULATION-STUDIO** 5.1 Rendering 5.2 Animations 5.3 Positional Representations

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Unit 6	**SPECIAL MECHANICAL ELEMENTS** 6.1 Bolt Connections 6.2 Axes 6.3 Straight Gear Connection 6.4 Bearings
Unit 7	**WELDED SETS** 7.1 Steps to Welding Generation 7.2 Welded Set Operations 7.3 Types of Welding 7.4 Cords and 3D Welding 7.5 Documentation
Unit 8	**METAL SHEET AND METAL SHEET GENERATOR** 8.1 Metal Sheet Parts 8.2 Metal Sheet Styles 8.3Structure Generator

CABLES AND PIPES	
Unit 9	**CABLES AND HARNESSES** 9.1 Cables and Harness

	9.2 Inserting Electrical Components 9.3 Assembling Harnesses 9.4 Creating Wires and Cables 9.5 Creating Segments 9.6 Routing Wire and Cables 9.7 Creating Junctions 9.8 Flat Cables 9.9 Harness Assemblies and Document Cable. Cape Table
Unit 10	**PIPES AND PIPELINES** 10.1 Pipes and Pipelines 10.2 Pipe and Pipeline Styles 10.3 self-draining lines

ANALYSIS	
Unit 11	**DYNAMIC SIMULATION** 11.1 Dynamic Simulation 11.2 Assembly Loads and Movements 11.3 CEF with moving Loads
Unit 12	**STRESS ANALYSIS**

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	10.1 Voltage and Modal Analysis of Parts 10.2 Assembly Voltage Analysis 10.3 Contacts and Mesh Refining 10.4 Assembly Modal Analysis 10.5 Optimizing Assemblies 10.6 Stress Analysis Contacts
Unit 13	**STRUCTURE ANALYSIS** 13.1 Structure Analysis. Results 13.2 Structure Analysis Connections 13.3 Structure Modal Analysis

5.4.Planning and scheduling

Classroom session schedule and presentation of works

For the presentation of papers the students will be informed either during the development of the classroom activities or through the Moodle platform: http://moodle.unizar.es.

In the following table, the schedule which includes the development of the activities and work is shown and may vary depending on the teaching progress:

5.5.Bibliography and recomended resources

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