

28803 - Graphic expression

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	1
Period	First semester
Subject Type	Basic Education
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

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work on the subject during the semester (15 weeks tuition). 60 hours will be held in the classroom and LAB and the rest will be autonomous work.

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

- **Theory Classes** : theoretical activities conducted by the teacher, so that the theoretical support of the subject is given, highlighting the major issues, structuring them on chapters and / or sections and connecting them to each other.
- **Classroom practice work/seminars/workshops** : Theoretical discussion activities or practice work preferably performed in the classroom and requiring high student participation and a performance directed by the teacher.
- **Lab Practice work**: The total group of master classes will be divided into several groups according to the number of students enrolled, but never more than 20 students, so that smaller groups are formed. CAD-CAE Practical Activities with the relevant software will be made in the Technical Office classroom.
- **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 (Considering the experimental level is high, which means a 2h a week for Theory, 2h for practice work and 6 for other activities), no redundancy intended with the above mentioned, the following activities will be developed

- Face-to-face Generic Activities:

- **Theoretical classes**: the concepts and procedures of the subject will be developed and practical examples as support will be developed
- **Practical classes**: problems and case studies will be done to complement the theoretical concepts studied
- **Lab practice work**: Students will be divided into several groups not bigger than 20 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.
- Preparation of written continuous assessment tests, final exams and final project (as applicable).

- **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.

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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

As discussed above, the subject to be developed along the course is divided in **2 well-differentiated parts**:

1. THEORETICAL CONTENTS Part 1

- **Technical Drawing and Representation Systems**

Theoretical and practical part to be held in the classroom assigned for this purpose and during the 1st semester (2 hours per week). In turn, this 1st part consists of 2 sections:

- **Section P1_1:** *Geometric Plotting. Basic standardization .*
- **Section P1_2:** *Industrial Technical Drawing*

SECTION P1_1: Geometric Plotting. Basic Standards	
Unit 1	Metrics and Geometric Plotting 1.1 Introduction to Industrial Technical Drawing 1.2 Standardization in Technical Drawing 1.3 Geometric Plotting Techniques Curves 1.4 Symbols used in S.D.
Unit 2	Sketching 2.1 Introduction 2.2 General issues about Sketching 2.3 Sketching prismatic, cylindrical and mixed pieces. 2.4 Exercices

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Unit 3	DIMENSION DRAWING 3.1 General Principles 3.2 Classification of Plan Views 3.3 Dimensioning Systems 3.4 Dimensioning parts 3.5 Exercises
Unit 4	Views and Sections 2.1 Introduction 2.2 General issues about Sketching 2.3 Sketching prismatic, cylindrical and mixed pieces. 2.4 Exercises
Unit 5	Thread Representation 5.1 Introduction 5.2 Representation of threads according to Standards 5.3 Dimensioning of threads. Screw ends 5.4 Threaded Blind holes 5.5 Exercises
Unit 6	Cone-shaping, Convergence, Tilt or Pending 6.1 Introduction

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	<p>6.2 Cone-shaping, Convergence, Tilt or Pending</p> <p>6.3 Dimensioning</p> <p>6.4 Exercises</p>
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SECTION P1_2: Industrial Technical Drawing. Advanced Standards	
Unit 7	<p>Detachable and Fixed Joint Components</p> <p>7.1 Introduction</p> <p>7.2 Setting Standard Components</p> <p>7.3 Screws, Nuts, Washers and Pins. Countersink</p> <p>7.4 Cotter pins and pull tabs.</p> <p>7.5 Nerved Axes</p> <p>7.6 Rivets and Welding. General Issues</p>
Unit 8	<p>Sets and Detail Drawing. Materials</p> <p>8.1 Set Drawing. Company Criteria and Standards</p> <p>8.2 Plans in assembly drawings</p> <p>8.3 Detail Drawing.</p> <p>8.4 Detail Drawing Plans.</p> <p>8.5 Ferrous and Non-Ferrous Materials</p> <p>8.6 Material Standards used in Industry</p>

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	8.7 Practical Exercise (Final Exercise).
Unit 9	Surface Signs and Tolerances 9.1 Introduction 9.2 Types of Surfaces 9.3. Roughness. Basic concepts 9.4 Machining Signs. Knurling. Standards. Display in Drawings 9.5 Tolerances. Fundamental concepts 9.6 Tolerances systems. Using Tables 9.7 Tolerances Consignment in Drawings. Standards 9.8 Exercises
Unit 10	Gearwheels 10.1 Introduction 10.2 Gear concept 10.3 Drawings of gearwheels and gears. Standards 10.4 cylindrical and conical Wheels 10.5 Worm screw Gears. Dimensioning 10.6 Exercise
Unit 11	Bearings 11.1 Introduction

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	11.2 Classification of bearings. Ball, Roller and Needle Bearings 11.3 Recommended Settings 11.4 Safety and Security Concerns in Bearings 11.5 Oilers
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2. THEORETICAL CONTENTS Part 2

Knowledge and application of CAD / CAE Tools

Theoretical and practical part to be held in the O.T. classroom, and throughout the 1st semester (2 hours per week).

In turn, this 2nd part consists of 2 sections:

* **Section Q2_1:** Knowledge and Applications in the development of CAD / CAE (I).

* **Section P2_2:** Knowledge and Applications in the development of CAD / CAE (II).

SECTION Q2_1: Knowledge and Development Application in CAD-CAE (I)	
Unit 1	Introduction to the Modeling Process 1.1 User Interface 1.2 Predefined Operations Modeling 1.3 Parametric Solid Process and Techniques 1.4 Operation Modification
Unit 2	Working with Sketches 2.1 Creating Sketchers. Standards

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	2.2 Sketch Operations. Restrictions 2.3 Dimensioning and Editing Sketches
Unit 3	Introduction to Operations 3.1 Working with Sketch Drawings 3.2 Creating Operations 3.3 Using Job Operations: Plans, Axes and Working Points 3.4 Adding Predefined Operations to the Components. Hole, Junction, Chamfer and Emptying Operations 3.5 Pattern Operations
Unit 4	Assemblies (Sets, Groups or Functional Units) 4.1 Assembly Modeling Basics 4.2 Adaptive Components / Parts 4.3 Situation, Creation and Restrictions of Components in Assemblies 4.4 Navigator 4.5 Moving and Changing Properties 4.6 Section Views
Unit 5	Documentation
	5.1 Creating Drawing Standards. Boxes. Texts... 5.2 Resources and Views on the Plans

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	5.3 Modifications of Views and Sections. Annotations 5.4 Creating Plans. Sheet Treatment 5.5 Single Part Plans and Assemblies 5.6 Making Plant Views 5.7 Printing Plans
Unit 6	Presentation -Exploding- 6.1 Creating Views 6.2 Moving and Creating Trajectories 6.3 Controlling camera views 6.4 Exploding Animations 6.5 Creating IPN and AVI files

SECTION P2_2: Knowledge and Application in the Development of CAD-CAE (II)	
Unit 7	Schemes Development Software 7.1 User Interface and Database 7.2 Symbols: Generation and Application 7.3 Scheme and Lists Generation 7.4 Printing.

3. PRACTICAL CONTENTS. Part 1 and Part 2

Each unit presented in the previous sections (**Part 1 and Part 2**) , have associated practices, both/either through practical

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cases, interpretation and commentary on readings associated with the subject and/or work leading to the achievement of results and their analysis and interpretation.

As topics are developed such practices will be dealt with, either in the classroom, lab (OT room) or through the Moodle platform, as indicated in the Assessment of activities section (and corresponding table), and Planning section (and its calendar)

5.4.Planning and scheduling

Session Schedule and Presentation of Projects

In the following table, a tentative schedule which includes the development of activities presented above is shown, with possible modifications depending on the development of the teaching activity.

5.5.Bibliography and recommended resources

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- Leighton Wellman, B.. Geometría descriptiva : compendio de geometría descriptiva para técnicos / B. Leighton Wellman Barcelona : Reverté, 1987
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