

## 30103 - Graphic expression and computer-assisted design

### Información del Plan Docente

Academic Year	2018/19
Subject	30103 - Graphic expression and computer-assisted design
Faculty / School	175 - Escuela Universitaria Politécnica de La Almunia 179 - Centro Universitario de la Defensa - Zaragoza
Degree	457 - Bachelor's Degree in Industrial Organisational Engineering 563 - Bachelor's Degree in Industrial Organisational Engineering 425 - Bachelor's Degree in Industrial Organisational Engineering
ECTS	6.0
Year	1
Semester	First semester
Subject Type	Basic Education
Module	

### 1.General information

#### 1.1.Aims of the course

#### 1.2.Context and importance of this course in the degree

#### 1.3.Recommendations to take this course

### 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

### SPECIALIZATION IN BUSINESS

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

- **Lectures:** 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

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performed in the classroom and requiring high student participation

- **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.
- **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

### DEFENCE

The learning process for this course was designed based on the encouragement of the student's continual work, applying the theoretical contents in practical exercises and projects, which are completed individually or in groups, during the practical lessons.

During the master classes, the most important concepts of engineering drawing are presented using real examples, so that students can identify similar factors in the exercises performed during the course.

### 4.2.Learning tasks

#### SPECIALIZATION IN BUSINESS

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

... which involve the 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

- **Theoretical-Practical classes (Classroom 30h):** The concepts and procedures of the subject will be developed and practical examples as support will be developed. Also, problems and case studies will be done to complement the theoretical concepts studied
- **Lab practice work (30h):** Students will be divided into several groups not bigger than 20 students / being monitored by the teacher and they will develop the concepts and procedures in CAD-CAE
- **Tutorials:** 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.
- **Personal Study:** Assimilation of the concepts and procedures for a proper learning process
- **Assessment test:** Individual test where the student show his level of understanding and competence on the subject.

### DEFENCE

This is a 6 ECTS course organized as follows:

1. Master classes (20h): Classroom sessions where the theoretical concepts are exposed and explained to the students.

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2. Practical classes (20 h): Classroom sessions where the contents learnt during the master classes are applied.
3. Computer lab sessions (20 h): In-class sessions with required attendance. During these sessions, with the help of a computer, the student learns to use the Solidworks software, a parametric software to model in 3D.
4. Group or independent work (85 h): The part of the course where the student should assimilate the knowledge explained and worked during the sessions with required attendance through their autonomous study.

During the semester, they are faced with:

- Voluntary tasks related to each of the topics explained. The tasks are later corrected.
  - Compulsory and mandatory handing in of manually executed graphical exercises \*
  - Compulsory and mandatory modelling of a CAD ensemble \* (parts, assembly and planes)
5. Assessment criteria (5 h): Evaluation of the entire course curriculum (attendance required).
    - Theoretical and practical exam\* (3 h) of the whole subject
    - CAD Exam \* (2 h). Management of the software and application to the course

\* The final grade of the course is composed of 50% of the theory and practice exam and the remaining 50% of a sum of evaluable mandatory exercises, the CAD Exam and exercise, according to the completion requirements in terms of time and knowledge.

(For more information, see the "Assessment" section)

Theory hours					
Required attendance hours				Non-required attendance hours	Total
Master classes	Practical classes	Computer lab sessions	Evaluation	Group or independent work	

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20	20	20	5	85	150
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### 4.3.Syllabus

#### SPECIALIZATION IN BUSINESS

**Essential Contents of the subject for the achievement of learning outcomes**

#### 1 Technical Drawing and Representation Systems

##### **1-1.- Geometric Plotting. Basic standardization.**

- Sketching
- Dimension Drawing
- Views and Sections
- Thread Representation
- Cone-shaping, Convergence, Tilt or Pending

##### **1-2.- Industrial Technical Drawing. Advanced Standards**

- Detachable and Fixed Joint
- Tolerances. Fundamental concepts
- Gearwheels
- Bearings

#### 2 Knowledge and application of CAD / CAE Tools

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

- Introduction to the Modeling Process
- Working with Sketches
- Introduction to Operations
- Assemblies (Sets, Groups or Functional Units)
- Documentation
- Presentation -Exploding-

##### **2.2 Knowledge and Application in the Development of CAD-CAE (II)**

- Scheme Development Software

#### DEFENCE

TEMA 0.- Basic concepts of metric geometry

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0.1. Fundamental graphic drawings

0.2. Fundamental constructions

0.3. Figures and geometric shapes

TEMA 1.- Engineering drawing Standards I

1.1. Scales

1.2. Formats

1.3. Types of lines

1.4. Lettering

TEMA 2.- Descriptive geometry

2.1. Orthographic projection

2.1.1. Basis of the orthographic projection

2.1.2. Views

2.2. Axonometric projection

2.2.1. Isometric projection

2.2.2. Oblique projection

2.3. Topographic system

2.3.1. Topography. Topographic profiles

2.3.2. Site Work

TEMA 3.- Engineering drawing Standards II

3.1. Dimensioning

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### 3.2. 3.2 Cuts & sections

### TEMA 4.- Engineering drawing Standards III

#### 4.1. Assemble planes

#### 4.2. Exploded planes.

#### 4.3. Standard features

#### Computer Aided-Design (CAD)

1. Basis model of parts. Sketch and basis operations
2. Planes
3. Assembly of parts
4. Advanced options of representation

### 4.4.Course planning and calendar

#### **SPECIALIZATION IN BUSINESS**

The Theory and Problem-Solving Lectures and the practical sessions in the laboratory are given according to the schedule set up by the School and it is published, prior to the start date of the course, on the EUPLA website, as well as the tutorial schedule.

The most significant dates **-Planning of the Subject-** (initial test, work proposals, and presentations and evaluation test) will be explained in the classroom, at the beginning of the course and in the Moodle Virtual Classroom.

The weekly schedule of the subject will be published at <http://www.eupla.unizar.es/asuntos-academicos/calendario-y-horarios>

The dates of the global evaluation test (**official calls**) will be published at <http://www.eupla.unizar.es/asuntos-academicos/examenes>

#### **DEFENCE**

Week	Theory	Exercises	Type 1	Type 2	Type 3	Type 7	Type 8	Value
1	Presentation  Scales, formats,		2	2				2,7%

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	lettering and lines							
2	Descriptive geometry		2	2		3		4,7%
3	Descriptive geometry		2	2		4		5,3%
4	Descriptive geometry		2	2		4		5,3%
5	Descriptive geometry		2	2		4		5,3%
6	Engineering drawing Standards: Dimensioning	Exercise 1			4	6		6,7%
7	CAD	Delivery of Exercise 2			4	6		6,7%
8	CAD		2		2	4		5,3%
9	Engineering drawing Standards: Cuts & Sections		2	2		8		8%
10	CAD and engineering drawing Standards: Cuts & Sections	Deadlines Exercise 2			4	8		8%
11	CAD		2	2		8		8%
12	Engineering				4	8		8%

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	drawing Standards: Assemble planes and CAD							
13	CAD			2	2	8		8%
14	CAD	Delivery of Exercise 3	2	2		8		8%
15	Refresher class		2	2		6		6,7%
	Theory and practice exam						5	3,3%
Total			20	20	20	85	5	150

### 4.5. Bibliography and recommended resources

#### SPECIALIZATION IN BUSINESS

##### RESOURCES:

- Access to the subject documentation using the Moodle platform
- Freehand drawing tools and pendrive

#### DEFENCE

##### RESOURCES

- Classroom materials, lecture notes and learning materials are available via Moodle