**UNIVERSITAT POLITÈCNICA DE CATALUNYA**
**BARCELONATECH**

# Course guide
# 330514 - DAOCAD - Computer-Aided Design (Cad)

**Last modified:** 04/05/2023

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| **Unit in charge:** | Manresa School of Engineering |
| **Teaching unit:** | 750 - EMIT - Department of Mining, Industrial and ICT Engineering. |
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| **Degree:** | BACHELOR'S DEGREE IN AUTOMOTIVE ENGINEERING (Syllabus 2017). (Compulsory subject). |

**Academic year:** 2023     **ECTS Credits:** 3.0     **Languages:** Catalan, Spanish

## LECTURER

**Coordinating lecturer:**          Puig Tomas, Roger

**Others:**

## DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

**Specific:**
CE5. Spatial vision capacity and knowledge of graphic representation techniques, both by traditional methods of metric geometry and descriptive geometry, and by computer aided design applications.

**Generical:**
CG3. Knowledge of basic and technological subjects that will enable students to learn new methods and theories and that will endow them with the versatility needed to adapt to new situations.

**Transversal:**
1. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 2. Using strategies for preparing and giving oral presentations. Writing texts and documents whose content is coherent, well structured and free of spelling and grammatical errors.
2. SELF-DIRECTED LEARNING - Level 2: Completing set tasks based on the guidelines set by lecturers. Devoting the time needed to complete each task, including personal contributions and expanding on the recommended information sources.

**Basic:**
CB1. Students will be able to demonstrate their knowledge of a field of study that builds on secondary education and is usually found at a level that, while supported by advanced textbooks, also includes aspects that involve knowledge of the latest developments in the field of study.
CB2. Students will be able to apply their knowledge to their work or vocation in a professional manner and demonstrate that they possess the competencies that are typically demonstrated by elaborating and defending arguments and solving problems in the field of study.

## TEACHING METHODOLOGY

MD1 Master class or conference (EXP)
MD2 Problem solving and case study (RP)
MD4 Directed theoretical and practical work (TD)
MD5 Project, activity or reduced work (PR)
MD7 Project or broad work (PA)

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## LEARNING OBJECTIVES OF THE SUBJECT

The student, at the end of the course, must be able to:

OA1: Provide the knowledge to understand the rules and multiview projection present in mechanical design, as well as the spatial ability needed to read the different drawings that graphically document a project.

OA2: Present the standardized and non-standardized elements related to mechanical design in order to conceive and design different mechanisms, through a series of different practices assisted by CAD.

OA3: Interpret and graphically design any project.

## STUDY LOAD

| Type | Hours | Percentage |
|------|-------|------------|
| Hours small group | 30,0 | 40.00 |
| Self study | 45,0 | 60.00 |

**Total learning time:** 75 h

## CONTENTS

### 1- 3D GEOMETRY AND PARAMETERS

**Description:**
Create a range of products by developing:
-Industrial product drawings: assemblies and cut views.
-Standardized elements.
-Graphic representations of industrial equipment and facilities.
-Graphic representations in civil engineering
-Graphic representations in industrial designs

**Specific objectives:**
Acquisition of the graphic language of mechanisms, machines and facilities in the field of industrial engineering. Be familiar with the parameterization of models-

**Related activities:**
Assigned class sessions, A1, PF

**Full-or-part-time:** 15h
Practical classes: 6h
Self study : 9h

## 2- CAD, PLASTIC PARTS FOR ASSEMBLY AND AUTOMOTIVE SURFACES

**Description:**
Be acquainted with the work of surfaces and plastic parts and their associated problems while designing and/or manufacturing them.

**Specific objectives:**
Be acquainted with the work of surfaces and its application to plastic parts.

**Related activities:**
Assigned class sessions, A2, PDF

**Full-or-part-time:** 60h
Practical classes: 24h
Self study : 36h

# ACTIVITIES

## A1-Parametric CAD

**Description:**
Parametric cad oriented to create a range of products.

**Specific objectives:**
- Be acquainted with the parametrization of models.
- Explain which are the parameters that control the shape or behavior of a model.

**Material:**
Material at Atenea and Help from the CAD program itself.

**Delivery:**
The student will develop a model in CAD3D, which may change depending on the parameters created for this purpose. The teacher will score the exercise and make the relevant comments, thus establishing the necessary feedback between student and teacher. Represents 3/15 of the internship grade.

**Full-or-part-time:** 15h
Practical classes: 6h
Self study: 9h

## A2-CAD, plastic parts for assembly and automotive surfaces

**Description:**
Work with surfaces and plastic parts and their associated problems while designing and/or manufacturing them.

**Specific objectives:**
Get acquainted with work with surfaces and their application to plastic parts.

**Material:**
Material at Atenea and Help from the CAD program itself.

**Delivery:**
The student will elaborate several models in CAD3D of plastic pieces manufactured by means of some system of molding. The teacher will score the exercises and make the relevant comments, thus establishing the necessary feedback between student and teacher. Represents 4/15 of the internship grade.

**Full-or-part-time:** 60h
Practical classes: 24h
Self study: 36h

| PF – Final test |
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**Description:**
Individual test of all parts and topics from the course.

**Specific objectives:**
-Machinery design in the mechanical metal industry.
-Work with surfaces and its application to plastic parts.
-Kinematic and dynamic simulations.
-Parametrization of models.

**Material:**
Material at Atenea and Help from the CAD program itself.

**Delivery:**
Test resolution.
40% of subject.

**Full-or-part-time:** 60h
Practical classes: 24h
Self study: 36h

## GRADING SYSTEM

A model of continuous evaluation will be applied with the basic purpose of weighing both the autonomous work and the teamwork of the students. The evaluation of acquisition of knowledge, competences and specific abilities will be done calculating the final grade.

NP: activities marks. NP = 3/15 * A1 + 12/15 * A2
Final grade: NF = 0.4 * PF + 0.6 * NP

## EXAMINATION RULES.

- Face-to-face sessions to present the contents, solve exercises and practical work.
- Autonomous study work, carrying out exercises and searching and analyzing information.
- Preparation and performance of assessable group activities.

## BIBLIOGRAPHY

**Basic:**
- Hernández Abad, Francisco, i altres. Ingeniería gráfica: introducción a la normalización. 2ª ed. Terrassa: ETSEIAT. Departamento de Expresión Gráfica en la Ingeniería, 2006. ISBN 8460946592.

**Complementary:**
- Félez, Jesús; Martínez, María Luisa. Dibujo industrial. 3ª ed. rev. Madrid: Síntesis, 1999. ISBN 8477383316.
- Félez, Jesús; Martínez, María Luisa. Ingeniería gráfica y diseño. Madrid: Síntesis, 2008. ISBN 9788497564991.

## RESOURCES

**Other resources:**
Asociación Española de Normalización y Certificación. (2009). Dibujo técnico (4a ed.)-CD. Madrid: Aenor.