Course guide
340075 - DIRT-D4O17 - Design and Technical Drawing

Last modified: 31/03/2025

Unit in charge: Vilanova i la Geltrú School of Engineering
Teaching unit: 717 - DEGD - Department of Engineering Graphics and Design.

Degree: BACHELOR'S DEGREE IN INDUSTRIAL DESIGN AND PRODUCT DEVELOPMENT ENGINEERING (Syllabus 2009). (Compulsory subject).

Academic year: 2025 **ECTS Credits:** 6.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: DANIEL RODRÍGUEZ RODRÍGUEZ

Others:
- DANIEL RODRÍGUEZ RODRÍGUEZ
- DANIEL ESPÍN AGÜERO
- ALBERT LACASA PUIGMAL

PRIOR SKILLS

Knowing the rules of Industrial Design in the following contents:
- Views and Sections.
- Dimensioning.
- Interpretation and representation of assemblies.
- Notions of Tolerancies and Surface Finishes.

Reading and interpretation of product/component technical specification sheets.
Software CAD 3D (SolidWorks)

REQUIREMENTS

It is mandatory to have completed and passed EXGR.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Transversal:
1. 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.
2. 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.
5. EFFECTIVE USE OF INFORMATI0N RESOURCES - Level 1. Identifying information needs. Using collections, premises and services that are available for designing and executing simple searches that are suited to the topic.

TEACHING METHODOLOGY

Autonomous Learning:
Introduction of each area of â□□â□□knowledge, including justification and examples of practical application. It is carried out through the notes published on the digital campus (Atenea) according to the planning published at the beginning of the course.

Theoretical class sessions (in person):
Resolution of doubts and clarifications in the classroom, derived from the previous study.
Guided exercises and autonomous exercises to consolidate content and assimilate concepts carried out in the classroom.

Laboratory class sessions (in person):
Explanation and contextualization of the practical exercise.
Presentation of concepts, techniques and procedures for solving exercises with a computer and CAD software (SolidWorks). It does not include 2D in detail, the student must apply the theoretical concepts learned in 2D drawing.

Autonomous work:
Continued laboratory exercises until completion.
Autonomous exercises published on campus to enhance drawing skills and consolidate content.

LEARNING OBJECTIVES OF THE SUBJECT

- Know the Regulations and Terminology of Graphic Engineering.
- Assess the importance of Normalization as a universal means of graphic language.
- Give the student the ability to interpret and project as well as solve design problems based on products, assemblies and the components that make them up.
- Identification of the different parts that define a product, disassembly and representation as well as its function.
- Graphically represent the components and their joining systems, detailing each product.
- Ability to manage and handle technical documentation related to the product, as well as the application of the regulations in the representation of assembly plans with the corresponding indications.
- Knowledge of a methods and tools to product design and development.

STUDY LOAD

Type	Hours	Percentage
Hours large group	30,0	20.00
Self study	90,0	60.00
Hours small group	30,0	20.00

Total learning time: 150 h

CONTENTS

1. Dimensional Tolerances

Description:
- Identify the geometries that require dimensional tolerance.
- Selection and spedification in f=(application, cost, funcionality).

Specific objectives:
Identify and assign the most appropriate dimensional tolerances.

Related activities:
Exercises in theory/laboratory class and practical work.

Full-or-part-time: 10h
Theory classes: 4h
Self study : 6h

2. Surface Finishes

Description:
- Identify the surfaces that require specific surface finished.
- Selection and spedification in f=(application, cost, funcionality).

Specific objectives:
Identify and assign the most appropriate surface finishes.

Related activities:
Exercises in theory/laboratory class and practical work.

Full-or-part-time: 10h
Theory classes: 4h
Self study : 6h

3. Geometric Tolerances

Description:
- Identify the geometries that require geometric tolerance.
- Selection and spedification in f=(application, cost, funcionality).

Specific objectives:
Identify and assign the most appropriate geometric tolerances.

Related activities:
Exercises in theory/laboratory class and practical work.

Full-or-part-time: 10h
Theory classes: 4h
Self study : 6h

4. Sealing. Technical solutions.

Description:
Know sealing solutions such as O-rings and seals.

Specific objectives:
- Study of existing alternatives and their requirements for an optimal application.
- Choice and specification in f=(application, cost, functionality).

Related activities:
Practical exercises applying optimal sealing solutions.

Full-or-part-time: 10h
Theory classes: 4h
Self study : 6h

5. Mechanical components

Description:
Become familiar with assemblies with mechanical components such as bearings, cotter pins and springs.

Specific objectives:
- Identify the operation of mechanical components.
- Identify the assembly requirements for its proper functioning and apply them to the designed parts.
- Selection and spedification in f=(application, cost, funcionality).

Related activities:
Exercises in theory/laboratory class and practical work.

Full-or-part-time: 5h
Theory classes: 2h
Self study : 3h

6. Design of components depending on the manufacturing process

Description:
- Design of machined parts (lathe, mill, CNC, ...).
- Design of aluminum injection parts.
- Design of thermoplastic injection parts.
- Design of metal sheet parts.

Specific objectives:
Apply the knowledge acquired in the subject.

Related activities:
Practical exercises applying all the theoretical knowledge acquired in the subject.

Full-or-part-time: 20h
Theory classes: 8h
Self study : 12h

Laboratory exercices

Description:
An exercise to be solved in several stages during the course applying the knowledge acquired in theory.

Specific objectives:
Apply the knowledge acquired in the subject. Expand knowledge of 3D design (Solidworks).

Related activities:
P1 Exercise: Design of a product applying theoretical concepts acquired in theory.
P2 Exercise: A product redesign in f=(manufacturing process).
* The structure of the exercise may vary.

Full-or-part-time: 78h
Theory classes: 26h
Self study : 52h

ACTIVITIES

Laboratory exercices

Description:
An exercise to be solved in several stages during the course applying the knowledge acquired in theory.

Specific objectives:
Apply the knowledge acquired in the subject. Expand knowledge of CAD 3D and 2D design (Solidworks).

Material:
- Statement of practices.
- Computer with 3D and 2D CAD software installed.
- Annexes and sheets of technical specifications of components.

Delivery:
Partial deliveries are made at the end of each stage of the exercise, according to the indications in the statement.
It is delivered in paper format to the practicum teacher and in digital format (*.pdf) on the virtual campus (ATENEA).

Full-or-part-time: 78h
Laboratory classes: 26h
Self study: 52h

Partial Exam

Description:
Evaluation test of the first half of the course. This is a practical exercise of drawing one (1), two (2) or three (3) pieces based on the diagram of an assembly or a small machine. It must be drawn taking into account the contents seen during the first half of the subject.
It may include some small theoretical questions.

Specific objectives:
Evaluate the learning and the consolidation of the contents of the first half of the subject.

Material:
Exam statement.
Freehand drawing utensils.
Template for carrying out the exercise.

Delivery:
Deliver the exercise at the end of the test.

Full-or-part-time: 2h
Theory classes: 2h

Final Exam

Description:
Evaluation test of the entire course. This is a practical exercise of drawing one (1), two (2) or three (3) pieces based on the diagram of an assembly or a small machine. It must be drawn taking into account the contents seen during the entire subject. It may include some small theoretical questions.

Specific objectives:
Evaluate the learning and the consolidation of the contents of the entire subject.

Material:
Exam statement.
Freehand drawing utensils.
Template for carrying out the exercise.

Delivery:
Deliver the exercise at the end of the test.

Full-or-part-time: 3h
Theory classes: 3h

GRADING SYSTEM

The final qualificaton is obtained according to:
Q_F = 0.4*E_L + MAX (0.2*E_P + 0.4*E_F; 0.6*E_R)
Where:
Q_F = Final Qualification
E_P = Partial Exam
E_F = Final Exam
E_L = Laboratory Exercices
E_R = Reevaluaction Exam*
* To make the reevaluation exam the student needs to acomplish the especific requirements defined by "normativa acadèmica".

EXAMINATION RULES.

All evaluable activities are individual. Copying or allowing copying will imply a zero (0) in the grade of the activity.
The grading details for each activity are included in the same statement. The specific conditions of the exam tests will be published in each case well in advance.
For more details, see the activities and grading system sections.

BIBLIOGRAPHY

Basic:
- Auria Apilluelo, José M.; Ibáñez Carabantes, Pedro; Ubieto Artur, Pedro. Dibujo industrial : conjuntos y despieces. 2a ed. Madrid [etc.]: Paraninfo, 2005. ISBN 8497323904.
- Hernández Abad, Francisco [et al.]. Ingeniería gráfica : introducción a la normalización. 3a ed. Terrassa: ETSEIAT Departamento de Expresión Gráfica en la Ingeniería, 2008. ISBN 8460946592.
- Félez, Jesús; Martinez, Maria Luisa. Ingeniería gráfica y diseño. Madrid: Síntesis, 2008. ISBN 9788497564991.
- Henry, Kevin. Dibujo para diseñadores de producto : de la idea al papel. Barcelona: Prompress, 2012. ISBN 9788492810512.
- Bocetos en diseño de producto = Esboços em design de produto. Madrid: Ilusbooks, 2012. ISBN 9788415227250.
- Pipes, Alan. El Diseño tridimensional : del boceto a la pantalla. Barcelona: Gustavo Gili, 1989. ISBN 8425214165.

Complementary:
- Félez, Jesús; Martínez, Mª Luisa. Dibujo industrial. 3a ed. Madrid: Síntesis, 1999. ISBN 8477383316.

RESOURCES

Computer material:
- SolidWorks. Resource

Other resources:
ATENEA Teaching Intranet.
Other reference notes and web links available in the subject site.