

29714 - Industrial Drawing

Syllabus Information

Academic year: 2023/24

Subject: 29714 - Industrial Drawing

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

Degree: 434 - Bachelor's Degree in Mechanical Engineering

ECTS: 6.0

Year: 2

Semester: Second semester

Subject type: Compulsory

Module:

1. General information

1.1. Objectives of the subject

The general objective of the degree is to provide the student with the competences that will allow them to deal with the management of knowledge and design skills necessary for the planning and development of the entire manufacturing process and the life of a product.

In this sense, the subject is part of the group that aims to put into practice and develop these skills as they are acquired by the student, through experimentation.

Therefore, the objective of the subject is to ensure that the student acquires the necessary knowledge to interpret and develop a mechanical assembly in all aspects related to graphic expression (standardization, representation, scaling, cuts, sections, etc.), structuring it in phases and applying a methodology. In addition, they must be able to use standard parts lists and tables to correctly define the most common standard parts: bearings, keys, lugs, bolts, nuts, etc. and integrate them into the assembly drawing and bill of materials.

The necessary knowledge must also be acquired to establish and correctly represent the surface finishes and dimensional tolerances of the parts and to properly select the materials for each part.

1.2. Context and meaning of the subject in the degree program

The subject aims to deepen the training of students for the design and graphic representation of geometric figures, industrial parts and various objects, through a universal language that allows its understanding by third parties and its subsequent manufacturing process.

The main aspects of Industrial Drawing related to the process of designing and manufacturing of mechanical assemblies:

- Designation of materials
- Use of commercial and standardized elements
- Use of gears to transmit motion
- Dimensional tolerances
- Surface qualities

Special emphasis will be placed on the representation of simple mechanical assemblies using individual, assembly, subassembly and element lists and 2D/3D CAD drawings. The knowledge acquired can be easily extrapolated to more complex mechanical assemblies.

1.3. Recommendations for taking the subject

This subject has no prerequisites. However, it should be taken once the first year course of Graphic Expression and Computer Aided Design has been passed.

2. Learning results

2. Competencies and learning results

2.1. Competencies

Specific competencies:

C31: Ability to apply engineering graphics techniques, including CAD/CAM/CAE software.

Generic competencies:

C9: Ability to manage information, handling and application of technical specifications and legislation required for the practice of engineering.

C10: Ability to learn continuously and develop autonomous learning strategies.

2.2. Learning Results

1. Know and understand the basics of industrial drawing to apply them to the realization and interpretation of drawings, and to elaborate reasoned solutions to geometrical problems in the plane and in space.

2. Value standardization as the ideal conventionalism to simplify not only production but also communication, giving it a universal character.

3. Be able to integrate and select standard and commercial elements in the design of mechanical assemblies, interpreting catalogs and catalogs.

4. Know and understand different concepts such as tolerances and surface qualities and is able to apply them to specific problems in the field of Industrial Drawing.

2.3. Importance of learning results

The subject is part of the backbone of the degree, is mandatory and is part of the basic training of students, has 6 credits, so it is considered that training in this subject is important for future engineers in industrial design and product development. In general, everyone acquires knowledge of the representation techniques linked to Industrial Drawing and technical drawing, which allows the universal interpretation of any industrial drawing and lists of elements that compose it, including all aspects related to the design and subsequent manufacture of a mechanical assembly or an individual element.

In addition, it provides knowledge for other cross-cutting and elective subjects that may be related and that are project-based.

3. Syllabus

1. Standardization in Industrial Drawing.
2. Assembly drawings and exploded views.
3. Standardized threaded elements.
4. Elements of union and security.
5. Bearings and their accessories.
6. Gears.
7. Surface roughness and quality.
8. Tolerances and adjustments.
9. Designation of materials.
10. Geometric tolerances.
11. Representation of the weld

4. Academic activities

4.1. Planning of learning activities and key dates calendar

Week	Theory	Practice
1, 2 y 3	Presentation of the subject Standardization in Industrial Drawing Assemblies and exploded views	Exercise I: preview and generation of templates
4 y 5	Threaded elements Connecting and safety elements	Exercise II: bill of materials
6 y 7	Bearings and bearings	Exercise III: overall plan
8 y 9	Gears and toothed elements	Exercise IV: individual plans
10 y 11	Surface roughness and finish	Exercise V: individual plans
12 y 13	Measurement and adjustment tolerances	Exercise VI: roughness and surface finish.
14 y 15	Designation of materials	Exercise VII: dimensional tolerances

5. Assessment system

Type of tests and their value on the final grade and assessment criteria for each test

The assessment system proposed for the subject is continuous. It will consist of a practical work/project that includes its presentation and defense (carried out individually or in a team, it will represent 50% of the grade).

The practical work will consist of the realization of a mechanical assembly, of which it will be necessary to deliver:

- Freehand sketches of the assembly, non-standardized parts and list of elements.
- Assembly and exploded drawings made with a computer aided design program.

The following aspects of the work will be evaluated:

1. Freehand sketch drawing
2. Preparation of a list of items

- 3. Preparation of assembly and exploded drawings
- 4. Application of surface qualities
- 5. Application of tolerances
- 6. Correct use of standardized and commercial element tables and tables of standardized and commercial elements

The final grade for the subject will be the result of:

- Theoretical-practical exam (50% of the final grade). It will consist of a practical part (70% of the grade) and a theoretical part (30% of the exam grade)

- Practical Work (50% of the final grade): The practical work will be proposed at the beginning of the semester and will be supervised weekly, during the practical classes and with the attendance to the supervised practices established throughout the semester.

The date of delivery of the work will coincide with the date and time of the exam of each session, as established in the academic calendar.

During the term there will be two revisions of the different parts that make up the work, on the dates to be established, which may be assessed for the final grade.

The student can opt for a global evaluation test, in which case another mechanical assembly will be proposed for which the student will have to do the list of elements and the exploded view sketch, as well as the corresponding drawings with a computer-aided design program, in an additional test to the theoretical-practical exam.

In order to pass the subject, it is necessary to have obtained a grade higher or equal to 5.0 in both the practical work and the exam.

In the case of failing any of the two parts, the grade of failure will appear in the minutes of the corresponding exam session, but the grade of the part passed will be kept for the following exam session, within the academic year.