Course guide
320134 - TRG - Graphic Representation Techniques

Last modified: 19/04/2023

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 717 - DEGD - Department of Engineering Graphics and Design.

Degree: BACHELOR'S DEGREE IN INDUSTRIAL DESIGN AND PRODUCT DEVELOPMENT ENGINEERING (Syllabus 2010). (Compulsory subject).

Academic year: 2023 **ECTS Credits:** 6.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: Francisco Bermúdez Rodríguez

Others: Moisès Morón Soler
Jordi Ventura Miret

PRIOR SKILLS

Students will be expected to have passed Chemistry and Experimentation in Chemical Engineering.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CENG5-DIDP. Mastery of techniques for representation, spatial conception, standardization, and computer-aided design; knowledge of the fundamentals of industrial design. (Basic training module).

Basic:
CB2. That students can apply their knowledge to their work or vocation in a professional manner and possess the competencies typically demonstrated through the development and defense of arguments and problem-solving within their field of study.

TEACHING METHODOLOGY

The following methods are used:
- Independent learning and exercises.
- Project-based cooperative learning sessions in which students will work in teams to do problem solving exercises and projects assessed on the basis of team performance.
In the lectures, the lecturer will introduce the theoretical fundamentals of the subject, concepts, methods and results, which will be illustrated with relevant examples to facilitate their understanding.
The practical class sessions will consist of directed work on statements and processes to obtain a result.
Students will be expected to study in their own time so that they are familiar with concepts and are able to solve the exercises set.

LEARNING OBJECTIVES OF THE SUBJECT

Facilitate and strengthen the ability for abstract thinking.
Develop and exercise spatial imagination.
Introduce concepts, techniques and methodologies inherent to the field of engineering presentation.
Interpret and draw plans.
Become familiar with presentation techniques in the design of objects (2D and 3D sketching techniques and parametric CAD software).

STUDY LOAD

Type	Hours	Percentage
Hours small group	45,0	30.00
Hours large group	15,0	10.00
Self study	90,0	60.00

Total learning time: 150 h

CONTENTS

TOPIC 1: ANALYSIS OF PLANE SHAPES

Description:
1.1 Reasoned constructions of polygonal shapes
1.2. Proportion and similarity
1.3. Simple and double ratios
1.4. Geometric transformations

Specific objectives:
OE1: Become familiar with plane shapes and their construction, ratio and composition in a plane.

Related activities:
AV0: Introduction to the subject
AV1: The design of simple and composite shapes

Full-or-part-time: 20h
Theory classes: 2h
Laboratory classes: 6h
Self study : 12h

TOPIC 2: THE CONSTRUCTION OF 3D SURFACES

Description:
2.1 Ruled surfaces
2.1.1 Polyhedral ruled surfaces
2.1.2 Radiated ruled surfaces
2.1.3 Helical ruled surfaces
2.1.4 Director plane ruled surfaces
2.1.5 Ruled surfaces with three directrices
2.2 Non-ruled surfaces
2.2.1 Quadric non-ruled surfaces
2.2.2 Toric non-ruled surfaces
2.2.3 Other curved surfaces
2.3 Developable surfaces
2.3.1 Right sections. Developable from a prismatic or cylindrical surface (right and oblique)
2.3.2 Perpendicular sections. Developable from a regular flat, pyramidal oblique or conical surface
2.3.3 Development of the developable helicoid
2.4 Intersection of surfaces

Specific objectives:
OE2: Use surfaces in the design of objects with simple and complex shapes.
OE3: Design objects using sketch views and their curves in space.

Related activities:
Design polyhedral structures. Design objects using ruled, non-ruled, developable and other surfaces.

Full-or-part-time: 40h
Theory classes: 4h
Laboratory classes: 12h
Self study : 24h

TOPIC 3: DESIGN OF 3D AND 2D OBJECTS

Description:
3.1 Design perspectives
3.2 Sketches of objects
3.3 Design of objects in 3D
3.4 Design of objects based on sketch views
3.5 Design tables
3.6 Plans with all the information required to identify an object

Specific objectives:
OE4: Interpret and read plans.
OE5: Learn to draw sketch views.
OE6: Learn to draw objects in planimetrics.
OE7: Use 3D object design techniques.
OE8: Interpret objects designed in 3D.
OE9: Present part of the technical specifications for the design of objects (plans).

Related activities:
Obtaining the 3D design of an object from any field of industrial design based on its planimetrics.
Redesigning and simulating real-life objects in 3D.
Sketching, measuring and designing an object, and compiling its technical specifications based on a photograph of it.
Sketching objects from 3D drawings, determining their views, cuts and elevations, and compiling the technical specifications required to identify them.
Presenting plans in all technical information.

Full-or-part-time: 40h
Theory classes: 4h
Laboratory classes: 12h
Self study : 24h

TOPIC 4: DESIGN OF OBJECTS. 2D AND 3D ASSEMBLIES

Description:
4.1 Analysis of finished assemblies
4.2 Redesign of assemblies
4.3 Introduction to ascending and descending assemblies
4.4 Sketches of individual and assembled components
4.5 3D design of the components that make up an assembly
4.6 Plans of components and assemblies
4.7 Design presentation

Specific objectives:
OE10: Draw objects with more than two components: 3D CAD, plans and introduction to virtual presentation and animation.

Related activities:
Group work: students will use real-life objects, drawings and photographs of objects with more than one component to design them using any sketches that may be required, simulate them in 3D and draw them according to standard specifications.

Full-or-part-time: 50h
Theory classes: 5h
Laboratory classes: 15h
Self study : 30h

ACTIVITIES

(AV0) PRESENTATION OF THE COURSE

Full-or-part-time: 0h 15m
Theory classes: 0h 15m

(AV1): ANALYSIS OF SIMPLE SHAPES.

Full-or-part-time: 9h 45m
Theory classes: 0h 45m
Laboratory classes: 3h
Self study: 6h

(AV2) : GENERATION OF SURFACES. DESIGN OF REGUALTED SURFACES AND UNREGULATED.

Full-or-part-time: 37h
Theory classes: 4h
Laboratory classes: 9h
Self study: 24h

(AVC1) : INDIVIDUAL TEST

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

(AV3) OBJECT DESIGN (3D AND 2D).

Full-or-part-time: 40h
Theory classes: 4h
Laboratory classes: 12h
Self study: 24h

C2 (AVC2) : INDIVIDUAL TEST

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

GRADING SYSTEM

Model of continuous assessment.
The evaluation of knowledge acquisition, skills and abilities is made from:

Scheduled deliveries.....30%
Partial Exam.....20%
Final Exam.....20%
Report and oral presentation of workgroup.....30%

For those students who meet the requirements and submit to the reevaluation examination, the grade of the reevaluation exam will replace the grades of all the on-site written evaluation acts (tests, midterm and final exams) and the grades obtained during the course for lab practices, works, projects and presentations will be kept.
If the final grade after reevaluation is lower than 5.0, it will replace the initial one only if it is higher. If the final grade after reevaluation is greater or equal to 5.0, the final grade of the subject will be pass 5.0.

EXAMINATION RULES.

The activities must deliver on the dates established

BIBLIOGRAPHY

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