Course guide
320004 - EGE - Graphic Expression in Engineering

Last modified: 08/06/2023

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 CHEMICAL ENGINEERING (Syllabus 2009). (Compulsory subject).
BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Compulsory subject).
BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Compulsory subject).
BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Compulsory subject).
BACHELOR'S DEGREE IN TEXTILE TECHNOLOGY AND DESIGN ENGINEERING (Syllabus 2009). (Compulsory subject).
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: JORDI VOLTAS i AGUILAR

Others: Mireia Puig-Poch
Javier del Toro Sánchez
Elisabet Quintana Vilajuana
Enric Brasó Vives
Adrián Mora Pedregosa
Fernando Mera Pelaez
Marc Rodríguez Novas
Alberto Villar Ribera
Rafael Ruiz Coral
Júlia Garcia i Cornet
Jordi Voltas i Aguilar

PRIOR SKILLS

The new student is supposed to have some manual dexterity in drawing sketches and sketches, as well as the appropriate use of the basic tools of traditional drawing: compass, square, bevel, angle conveyor, scale, ...
It is also desirable that you have previously practiced with a basic computer drawing software, at least 2-dimensional tracing.
On the other hand, other skills are required and previous qualities more generic and applicable to any other activity within the university academic field, such as the spirit of sacrifice, neatness, the ability to synthesize, teamwork, respect for others of classmates, and the teacher, the constancy ..."

REQUIREMENTS

This is a face-to-face subject. A set of deliverables emerges from the weekly sessions. In order to make the delivery, it is a requirement to have completed the corresponding face-to-face session.

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).
CE05-INDUS. Spatial vision and knowledge of graphic representation techniques, both by traditional methods of metric geometry and descriptive geometry, and through computer-aided design applications. (Basic training module)

Transversal:
CT03 N1. Efficient oral and written communication - Level 1. Planning oral communication, answering questions properly and writing straightforward texts that are spelt correctly and are grammatically coherent.

Basic:
CB1. That students have demonstrated possession and understanding of knowledge in a field of study that is based on general secondary education, and is typically found at a level that, while supported by advanced textbooks, also includes some aspects that involve knowledge from the forefront of their field of study.

TEACHING METHODOLOGY

Learning based on practical realization.

Face-to-face sessions with an exposition of concepts, techniques, and procedures, combined with the resolution of exercises and practical work with computer in the CAD laboratory (activities CTP1-13 and SPP1-1). The theoretical bases of the subject, concepts, methods, and results will be introduced illustrating with convenient examples to facilitate their understanding.
There will be 3 types of practical sessions:
- Sessions in which the practices will consist of statements and guided processes to achieve a result.
- Sessions in which the practices will consist only of statements without specifying the process of obtaining the solution.
- Control practices.

Individual autonomous work of study, preparation, and realization of exercises (activities AINP1-6). Students independently will have to study to assimilate the concepts and solve the proposed exercises either manually or with the help of the computer.

Project-based cooperative learning, is oriented to the realization of problems and projects evaluable in the team (activities AGNP1-3). The transversal work of the course will be focused on scheduled non-contact group activities. Its resolution will be made outside the practice classroom and in groups of up to 3 people. This cross-cutting work will always include a public defense of the end result.

Students independently will have to study to assimilate the concepts and solve the proposed exercises either manually or with the help of the computer.
All its content will be conveyed through the ATENEA platform.
All deliveries other than manuals will be made through the ATENEA platform.
Depending on the needs of the center, some students may be required to attend the classroom with their own laptops in order to develop the session.

LEARNING OBJECTIVES OF THE SUBJECT

The objectives of this subject are:
- Facilitate and enhance the student's capacity for abstraction and their vision of space
- Introduce the concepts, techniques, and methodologies of the area of Graphic Expression in Industrial Engineering
- Get acquainted and use the graphic technical language of the industrial environment

STUDY LOAD

Type	Hours	Percentage
Self study	90,0	60.00
Hours medium group	60,0	40.00

Total learning time: 150 h

CONTENTS

TOPIC 1: PLANE GEOMETRY

Description:
Geometric layouts with conditions of perpendicularity and parallels.
Geometric layouts with tangent conditions.
Concept of the axis of symmetry.
Creating restricted paths with CAD software.

Full-or-part-time: 12h 15m
Practical classes: 5h
Self study : 7h 15m

TOPIC 2: REPRESENTATION SYSTEMS

Description:
Cylindrical-orthogonal systems
- Dihedral
- Axonometric
- Isometric

Oblique and conical systems
Scale concept
Third sight determination exercises and isometric constructions

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

TOPIC 3: INDUSTRIAL STANDARDISATION

Description:
Preliminaries. Industrial standards.
Freehand technical drawing.
Obtaining standard views.
Treatments: cuts, sections and breaks.
Dimensioning: industrial dimensioning guidelines.
Threads and other standard elements.
Graphic representation of industrial assemblies.

Full-or-part-time: 72h 30m
Practical classes: 29h
Self study : 43h 30m

ITEM 4. SPACE GEOMETRY

Description:
Determination of angles between straight lines and planes
Determination of angles between faces
Determination of minimum distances between lines that intersect but do not intersect
Prisms, pyramids, and pyramid trunks. Complete and truncated bodies.

Full-or-part-time: 55h 15m
Practical classes: 33h 15m
Self study : 22h

GRADING SYSTEM

A model of continuous assessment will be applied for the basic purpose of weighing both the self-employment and teamwork of students.
The assessment of the acquisition of knowledge, skills, and abilities will be carried out from:
5% Weekly internship deliveries
30% Partial primer
30% Partial second
15% Report and oral presentation of a group work
10% Sketch I
10% Sketch II
Unsatisfactory results of the "First Part" exam may be corrected by the hand-outlined test called "Sketch II" (to be taken during class time).
Those students who, having presented themselves, have obtained a grade lower than 5. The maximum grade that can be obtained through the renewal will be 5, and it will not be possible to result in a grade lower than the one initially obtained.
As this subject is offered in two semesters, no re-assessment is offered.

EXAMINATION RULES.

"The student is responsible for his / her own material for the sketch tests.
The student will adjust to the start and end times of the test. "

BIBLIOGRAPHY

Basic:
- Puig Adam, Pedro. Curso de geometría métrica, vol. 2. Madrid: Euler, 1986. ISBN 8485731069.
- Cobos Gutiérrez, C.; Del Rio, Mª Gloria. Ejercicios de dibujo técnico I: resueltos y comentados. Albacete: Tébar Flores, 1996. ISBN 8473601602.
- Félez, J.; Martínez, Mª L. Dibujo industrial. Madrid: Síntesis, 1995. ISBN 8477383316.
- Auria Apilluelo, Jose M.; Ibáñez Carabantes, Pedro; Ubieto Artur, Pedro. Dibujo industrial: conjuntos y despieces. Madrid: Paraninfo, 2000. ISBN 8428327297.
- French, Michael. Conceptual design for engineers [on line]. 3rd ed. London: The Design Council, 1999 [Consultation: 03/05/2022]. Available on: https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?docID=3073885. ISBN 1852330279.
- Giesecke, Frederick E. Technical drawing. 13th ed. Upper Saddle River, NJ: Prenctice Hall, cop. 2009. ISBN 9780135135273.
- Ramos Barbero, B.; García Maté, E. Dibujo técnico [on line]. 3a ed. Madrid: AENOR, 2016 [Consultation: 08/03/2023]. Available on: https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?pq-origsite=primo&docID=6774114. ISBN 9788481439182.
- Gonzalo Gonzalo, J. Dibujo geométrico: arquitectura, ingeniería. San Sebastián: Donostiarra, 2001. ISBN 8470632876.
- Corbella Barrios, David. Técnicas de representación geométrica: con fundamentos de concepción espacial. Madrid: L'autor, 1993. ISBN 846047495X.
- Rodríguez de Abajo, Fco. J.; Álvarez Bengoa, V. Curso de dibujo geométrico y de croquización: primer curso de escuelas de ingeniería. 12a ed. San Sebastián: Donostiarra, 1992. ISBN 847063173X.
- Puig Adam, Pedro. Curso de geometría métrica, vol. 1. Madrid: Euler, 1986. ISBN 8485731050.

Complementary:
- Prieto, M.; Sondesa, Mª D. Problemas básicos de la geométría del diseño. Madrid: Aula Documental de Investigación, 1995. ISBN 8492038101.

RESOURCES

Hyperlink:
- Geometria Espacial. http://www.tododibujo.com/index.php?main_page=site_map&cPath=298

Other resources:
Through the ATENEA website, it will be possible to access a whole extensive set of resources, both own and external.