

1. OVERVIEW

Subject area	Graphic Expression
Degree	Bachelor's Degree in Industrial Organisation Engineering
School/Faculty	Faculty of Science Engineering and Design
Year	Second
ECTS	6 ECTS
Type	Core
Language(s)	Spanish
Delivery Mode	On campus
Semester	Semester 1
Academic Year	2022-2023

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2. INTRODUCTION

Graphic Expression (worth 6 credits) within the area of Graphic Expression in Engineering, is the first within this field which students will take on the Degree

in Industrial Organisation Engineering.

The main aim is for students to have the correct language to explain certain ideas, objects, parts or machines in their professional careers. These ideas must be expressed in three dimensions using two-dimensional tools such as paper or computer screens. These representations must be done clearly, with no errors or ambiguity.

The language must be easily understood by professionals and presented in accordance with national and international standards.

All experts in this field know the importance of correctly establishing and sizing the elements which will be later used in manufacturing or assembly so that there are no mistakes in understanding them or subsequent problems which are difficult to solve.

The definitions of parts and mechanisms must be clear so that their configuration and dimensions can be correctly interpreted by any person involved in subsequent production processes. The Graphic Expression and Assisted Design course will teach students how to do this.

3. SKILLS AND LEARNING OUTCOMES

Basic skills (CB, by the acronym in Spanish):

- CB1: Students have shown their knowledge and understanding of a study area originating from general secondary school education, and are usually at the level where, with the support of more advanced textbooks, they may also demonstrate awareness of the latest developments in their field of study.
- CB3: Students have the ability to gather and interpret relevant data (usually within their study area) to form opinions which include reflecting on relevant social, scientific or ethical matters.

Cross-curricular skills (CT, by the acronym in Spanish):

- CT02: Independent learning: know how to choose strategies to search, analyse, evaluate and manage information from different sources, as well as to independently learn and put into practice what has been taught.
- CT05: Analysis and problem solving: be able to critically assess information, break down complex situations, identify patterns and consider different alternatives, approaches and perspectives in order to find the best solutions and effective negotiations.
- CT06: Adapting to change: be able to accept, consider and integrate different perspectives, adapting your own approach as required by the situation at hand, and to work effectively in ambiguous situations.

Specific skills (CE, by the acronym in Spanish):

- CE05: Ability to use graphic representation techniques and tools, be they using traditional metric and descriptive geometry methods or computer aided design tools in the field of engineering.

Learning outcomes (RA, by the acronym in Spanish):

- RA1: Effectively make plans required for engineering projects, correctly abiding by regulations and representation criteria.
- RA2: Use digital design programs.
- RA3: Create plans of sets and components, establishing relationships and possible interactions.

The following table shows how the skills developed in the subject area match up with the intended learning outcomes:

Skills	Learning outcomes (RA, by the acronym in Spanish)
CB01, CB03, CT02	RA1: Effectively make plans required for engineering projects, correctly abiding by regulations and representation criteria.
CT05, CE05	RA2: Use digital design programs.
CT06, CE05	RA3: Create plans of sets and components, establishing relationships and possible interactions.

4. CONTENTS

1. Spatial conception and modelling.
2. Graphic representation techniques and systems.
3. Computer-aided design.
4. Geometry of shapes in engineering.
5. Regulations.

5. TEACHING/LEARNING METHODS

The types of teaching/learning methods are as follows:

- MD 1: Master lectures
- MD 2: Collaborative learning

- MD 3: Problem-based learning
- MD 4: Learning based on laboratory work (laboratory, workshop and simulation environments)
- MD 5: Gamification

6. LEARNING ACTIVITIES

The types of learning activities, plus the amount of time spent on each activity, are as follows:

On campus:

Learning activity	Number of hours
Master lectures	20
Problem-solving	17
Case studies and field studies	7
Debates and discussions	8
Laboratory work	23
Learning contract (definition of interests, needs and objectives)	2
Autonomous learning	62
Tutorials	9
Knowledge tests	2
TOTAL	150h

7. ASSESSMENT

The assessment systems, plus their weighting in the final grade for the subject area, are as follows:

On campus:

Assessment system	Weighting
On-site tests to evaluate objectives of theory/practical learning (exam-type objective tests, written compositions, oral presentations, case studies/problem solving, debates, simulation tests)	40%
Off-site tests to assess theory/practical learning (case studies/problem-solving)	40%
Attitude assessment tests (attitude assessment rubrics, class participation)	10%
Self- and co-assessment (learning contract, learning objectives)	10%

On the Virtual Campus, when you open the subject area, you can see all the details of your assessment activities and the deadlines and assessment procedures for each activity.

8. BIBLIOGRAPHY

The recommended bibliography is indicated below:

Reference bibliography:

- DIBUJO A MANO ALZADA PARA ARQUITECTOS Redondo Domínguez, Ernest Parramont, 2004 isbn 9788434225497
- DIBUJO Y PROYECTO Ching, Francis C.K. Gustavo Gili, México, 1999 isbn 978-84-252-2081-4
- MANUAL DE DIBUJO ARQUITECTÓNICO, 3ra edición Francis D.K. Ching Ed. Gustavo Gili ISBN 9788425220210
- EL DIBUJO DE ARQUITECTURA Jorge Sainz Avia Edl. Reverté ISBN 8429121064

Additional bibliography:

Printed book

- INICIACIÓN AL CROQUIS ARQUITECTÓNICO Santiago Llorens Corraliza Universidad Politécnica de Madrid ISBN 8460072755
- DICCIONARIO VISUAL DE ARQUITECTURA Ching, Francis C.K. Gustavo Gili, España. 2007 isbn 978-84-252-2020-3
- DISEÑO: TÉCNICAS GRÁFICAS PARA ARQUITECTOS, DISEÑADORES Y ARTISTAS Porter, T; Goodmans, S Gustavo Gili, Barcelona, 1995 isbn 978-84-252-1149-2
- ANALISIS DE FORMAS ARQUITECTÓNICAS Departamento de Expresión Gráfica Arquitectónica General de Ediciones de Arquitectura, Valencia 2008 isbn 978-84-936203
- REVISTA EGA Editora: García Condoñer, Ángela Departamento coordinador: Departamento de Expresión Gráfica Arquitectónica de la U.P.V.
- LAS DIMENSIONES HUMANAS EN LOS ESPACIOS INTERIORES Julius Panero, Martin Zelnik Editorial Gustavo Gili ISBN 9788425221743

Online

- Imágenes de referencia desde Pintrest: <http://pinterest.com/egauib/>
- Congresos y referencias biográficas: Web del 13 congreso EGA 2010, Web del congreso APEGA 2010, Biografías de arquitectos

Video channels

- Canal Youtube de la Expresión Gráfica en Edificación de la Universitat de les Illes Balears
- How to architect
- Draw by Miandza

Social media

- Redes sociales y la arquitectura/edificación
Listado tomado desde bitácoravirtual.cl (enlace al artículo en cuestión)
- <http://redfadu.ning.com/>
- <http://www.colectivosarquitectura.com/>
- <http://proxima.arquia.es/>
- http://www.architizer.com/en_us/
- <http://blogsarquitectura.com/>
- <http://www.arqytxt.blogspot.com/>
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- <http://www.redarquitectura.cl/>