Course guide
330505 - EG1 - Graphic Expression 1

Last modified: 04/05/2023

Unit in charge: Manresa School of Engineering
Teaching unit: 750 - EMIT - Department of Mining, Industrial and ICT Engineering.

Degree: BACHELOR'S DEGREE IN AUTOMOTIVE ENGINEERING (Syllabus 2017). (Compulsory subject).

Academic year: 2023 **ECTS Credits:** 4.5 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: Lopez Martinez, Joan Antoni

Others:

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CE5. Spatial vision capacity and knowledge of graphic representation techniques, both by traditional methods of metric geometry and descriptive geometry, and by computer aided design applications.

Generical:
CG3. Knowledge of basic and technological subjects that will enable students to learn new methods and theories and that will endow them with the versatility needed to adapt to new situations.

Transversal:
1. 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.
2. SELF-DIRECTED LEARNING - Level 1. Completing set tasks within established deadlines. Working with recommended information sources according to the guidelines set by lecturers.

Basic:
CB1. Students will be able to demonstrate their knowledge of a field of study that builds on secondary education and is usually found at a level that, while supported by advanced textbooks, also includes aspects that involve knowledge of the latest developments in the field of study.
CB2. Students will be able to apply their knowledge to their work or vocation in a professional manner and demonstrate that they possess the competencies that are typically demonstrated by elaborating and defending arguments and solving problems in the field of study.

TEACHING METHODOLOGY

MD1 Master class or lecture (EXP)
MD2 Problem solving and case study (RP)
MD4 Directed theoretical and practical work (TD)
MD5 Small-scale project, activity or assignment (PR)
MD7 Assessment activities (EV)

LEARNING OBJECTIVES OF THE SUBJECT

OAG1. Facilitate and improve the capacity for abstraction.
OAG2. Develop and exercise spatial imagination.
OAG3. Introduce concepts, techniques and methodologies in the area of graphic expression in industrial engineering.
OAG4. Use and understand the graphics language typical of industry.

STUDY LOAD

Type	Hours	Percentage
Self study	67,5	60.00
Hours small group	45,0	40.00

Total learning time: 112.5 h

CONTENTS

Industrial standardisation

Description:
Introduction. Industry standards.
Freehand technical drawing.
Obtaining standardised views.
Treatments: cutaways and sections.
Guidelines for industrial dimensioning.
Screw threads and other standardised items.
Graphic representation of industrial assemblies.

Specific objectives:
OAG1, OAG3, OAG4

Related activities:
CRO1, CRO2, PRA

Full-or-part-time: 18h
Practical classes: 6h
Self study : 12h

Geometry and wireframe

Description:
Geometric locus.
Projections and representation systems: basic operational techniques.
Points, lines and planes. Relative positions.
Conditions of perpendicularity, parallelism and #convergence#.
Distances.
Angles

Specific objectives:
OAG1, OAG2

Related activities:
PRA

Full-or-part-time: 9h
Practical classes: 3h
Self study : 6h

Surfaces

Description:
Generatrices and directive planes
Surface types and samples
Standard sheet metal elements
Developed views

Specific objectives:
OAG2, OAG4

Related activities:
PRA,PRO

Full-or-part-time: 7h 30m
Practical classes: 2h 30m
Self study : 5h

ACTIVITIES

Classroom sketching (CRO1)

Description:
Understanding axonometric views .
First angle projection representation.
Using drawing and representation tools.
Result evaluation.

Specific objectives:
OAG1, OAG2, OAG3 y OAG4

Material:
Basic drawing/sketching tools

Delivery:
Paper.

Full-or-part-time: 3h 30m
Theory classes: 3h 30m

Sketching and independent study (CRO2)

Description:
Understanding axonometric views.
First angle projection representation.
Using drawing and representation tools.
Result evaluation.

Specific objectives:
OAG1, OAG2, OAG3 i OAG4

Material:
Basic drawing/sketching tools.

Delivery:
Paper.

Full-or-part-time: 15h
Self study: 15h

CAD activities (PRA)

Description:
Representing objects, parts, assemblies and subassemblies with CAD tools.
Obtaining drafts with all the necessary indications and symbols for a perfect understanding of parts and assemblies.

Specific objectives:
OAG2, OAG3 i OAG4

Material:
PC, basic drawing and measuring tools.

Delivery:
Atenea.

Full-or-part-time: 38h 30m
Practical classes: 18h
Self study: 20h 30m

CAD design projects (PRO)

Description:
Idea and approach.
Planning.
Sketching and calculation.
Parts and drafting.
Integration and assembly draft.
Oral presentation.

Specific objectives:
OAG2, OAG3 i OAG4

Material:
PC, basic drawing and measuring tools.

Delivery:
Atenea.

Full-or-part-time: 21h
Practical classes: 12h
Self study: 9h

GRADING SYSTEM

The mark is obtained by continuous assessment of the students' work.
- Individual theory activities: 9%
- Self-learning activities: 9%
- Individual CAD activities: 16%
- CAD assembly: 10%
- CAD project: 14%
- Individual standardisation test: 24%
- Individual special geometry and surfaces test: 18%

EXAMINATION RULES.

The practical exercises carried out on the computer will be sent using the platform Atenea in the state in which they are at the end of the class. They must be delivered the following week on paper or in the form indicated by the professor.

Handwritten practical exercises will be done on a sheet with a specific format. Some exercises will require the use of traditional tools, such as set squares, triangles, compasses and protractors.

Other previous generic skills and/or qualities applicable to any academic activity at the university are also required, including a spirit of sacrifice, neatness, capacity for synthesis, teamwork, respect for companions and the professor, and constancy.

BIBLIOGRAPHY

Basic:
- Preciado, Cándido; Moral, Francisco Jesús. Normalización del dibujo técnico. San Sebastián: Donostiarra, 2004. ISBN 8470633090.
- Hernández Abad, Francisco, et al. Ingeniería gráfica: introducción a la normalización. 2ª ed. Terrassa: ETSEIAT. Departamento de Expresión Gráfica en la Ingeniería, 2006. ISBN 8460946592.
- Hernández Abad, Francisco; Hernández Abad, Vicente; Ochoa Vives, Manuel. Lugares geométricos: su aplicación a tangencias. Barcelona: Edicions UPC, 1993. ISBN 8476532814.
- Comasòlivas Font, Ramon. Sistema diédrico [on line]. Barcelona: Edicions UPC, 1997 [Consultation: 19/11/2020]. Available on: http://hdl.handle.net/2099.3/36272. ISBN 8489636141.

Complementary:

- Auria Apilluelo, José M; Ibáñez Carabantes, Pedro; Ubieto Artur, Pedro. Dibujo industrial: conjuntos y despieces. 2ª ed. Madrid: Paraninfo, 2005. ISBN 8497323904.
- Ramos Barbero, Basilio; García Maté, Esteban. Dibujo técnico [on line]. 3ª ed. Madrid: AENOR, 2016 [Consultation: 08/06/2022]. Available on: https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=8888. ISBN 8481439185.
- Giesecke, Frederick E., et al. Technical drawing. 13th ed. Upper Saddle River: Prenctice Hall, 2009. ISBN 9780135135273.
- Corbella Barrios, David. Técnicas de representación geométrica: con fundamentos de concepción espacial. Madrid: l'autor, 1993. ISBN 846047495X.
- French, M. J. 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.
- Félez, Jesús; Martínez, María Luisa. Dibujo industrial. 3ª ed. rev. Madrid: Síntesis, 1999. ISBN 8477383316.
- González García, Victorino; López Poza, Román; Nieto Oñate, Mariano. Sistemas de representación. Vol. 1, Sistema diédrico. Valladolid: Texgraf, 1977. ISBN 8440023316.