



Course guides

320004 - EGE - Graphic Expression in Engineering

Last modified: 29/05/2020

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 ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Compulsory subject).
BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Compulsory subject).
BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Compulsory subject).
BACHELOR'S DEGREE IN CHEMICAL 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: 2020 **ECTS Credits:** 6.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: JORDI VOLTAS i AGUILAR

Others: Jordi Voltas
Joaquim Marqués
Fina Pàmies
Adrianna Mas
Anna Pujol
Rafel Ruiz
Arnau Diaz
Ferran Mera

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

1. IND_BASIC: Capability for spatial vision and an understanding of graphic representation techniques, using the traditional methods of metric and descriptive geometry as well as computer-aided design applications.

Transversal:

2. SELF-DIRECTED LEARNING - Level 1. Completing set tasks within established deadlines. Working with recommended information sources according to the guidelines set by lecturers.
3. 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.
4. TEAMWORK - Level 1. Working in a team and making positive contributions once the aims and group and individual responsibilities have been defined. Reaching joint decisions on the strategy to be followed.

TEACHING METHODOLOGY

- Face-to-face lecture sessions

Lectures are given using digital presentations. The presentations will be made available to students on the virtual campus before classes begin to help them follow them. The assessment will be based on mid-semester examinations (or an optional final examination for students who fail the first one).

- Face-to-face practical work sessions

During practical work sessions, students work individually or in small groups of 2-3 on problems and questions under the lecturer's supervision. A collection of problems will be made available on the virtual campus. Systems for self-assessment (with assessment criteria or rubrics), co-assessment (among students) and delivery of reports, corrected by the teacher and returned, are made available to facilitate independent learning.

Face-to-face laboratory work sessions

Students work in pairs during laboratory sessions. Guidelines for practicals will be made available to students on the virtual campus at the start of the course. Students must hand in a report for each practical. Marks will be based on the work carried out in the laboratory and the reports handed in.

LEARNING OBJECTIVES OF THE SUBJECT

On completion of the course, students should be able to:

- Correctly use and interpret the language and basic concepts of Chemistry.
- Recognise the structure of matter and relate it to the physical and chemical properties of organic and inorganic substances.
- Apply stoichiometric calculations to solve problems.
- Recognise the equipment and apply the basic techniques of the chemistry laboratory.

STUDY LOAD

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

Total learning time: 150 h

CONTENTS

TOPIC 1: PLANE GEOMETRY

Description:

- 1.1. Tangencies and tangential contacts.
- 1.2. Conic sections.
- 1.3. Technical curves.

Specific objectives:

For students to:

- OE1. Formulate the principles and basic techniques of plane geometry.
- OE2. Understand the formulation of geometry exercises on the basis of graphic and textual descriptions.
- OE3. Find solutions to plane geometry problems.

Related activities:

AV0 and AV1 (CTP1), AV2 (SPP1), AV3 (AINP1), AV4 (CTP2), AV5 (SPP2), AV6 (AINP2), AV7 (CTP3), AV8 (SPP3) and AV9 (AGNP1).

Full-or-part-time: 30h

Practical classes: 12h

Self study : 18h



TOPIC 2: SOLID GEOMETRY

Description:

- 2.1. Projections and representation systems: basic operational techniques.
- 2.2. Point, line and plane. Relative positions.
- 2.3. Conditions of perpendicularity, parallelism and belonging.
- 2.4. Distances.
- 2.5. Angles.

Specific objectives:

For students to:

- OE4. Understand the principles that determine solid geometry.
- OE5. Understand the descriptions of problems focusing on spatial situations and relationships.
- OE6. Find graphical solutions to spatial problems.
- OE7. Understand the functioning of the main representation systems used in engineering.
- OE8. Make proper use of these representation systems to find solutions to problems.

Related activities:

AV10 (CTP4), AV11 (SPP4), AV12 (AINP3), AV13 (CTP5), AV14 (SPP5), AV15 (AINP4), AV16 (CTP6), AV17 (SPP6), AV18 (AINP5), AV19 (CTP7) AV20 (SPP7), AV21 (AINP6), AV22 (CTP8), AV23 (SPP8), AV24 (AGNP2) and AV25 (CPP1).

Full-or-part-time: 60h

Practical classes: 24h

Self study : 36h

TOPIC 3: INDUSTRIAL STANDARDISATION

Description:

- 3.1. Introduction. Industry standards.
- 3.2. Freehand technical drawing.
- 3.3. Obtaining standardised views.
- 3.4. Treatments: cuts, sections and breaks.
- 3.5. Dimensioning: guidelines for industrial dimensioning.
- 3.6. Screw threads and other standardised items.
- 3.7. Graphic representation of industrial assemblies.

Specific objectives:

For students to:

- OE9. Understand and correctly apply the rules for industrial technical drawing.
- OE10. Identify errors in the application of the rules for industrial technical drawing and make the necessary corrections.
- OE11. Develop virtual prototypes in a 3D environment.

Related activities:

AV26 (CTP9), AV27 (SPP9), AV28 (AINP7), AV29 (CTP10), AV30 (SPP10), AV31 (AGNP3), AV32 (CTP11), AV33 (SPP11), AV34 (CTP12), AV35 (SPP12), AV36 (CTP13), AV37 (PTG) and AV38 (CPP2).

Full-or-part-time: 60h

Practical classes: 24h

Self study : 36h

ACTIVITIES

AV1: (CTP1) PLANE GEOMETRY

Full-or-part-time: 0h 35m

Practical classes: 0h 35m



AV0: PRESENTATION OF THE SUBJECT

Full-or-part-time: 0h 10m
Practical classes: 0h 10m

AV2: (SPP1) TANGENCIES AND TANGENTIAL CONTACTS.

Full-or-part-time: 3h 15m
Practical classes: 3h 15m

AV3: (AINP1)

Full-or-part-time: 6h
Self study: 6h

AV4: (CTP2) PLANE GEOMETRY (II)

Full-or-part-time: 0h 45m
Practical classes: 0h 45m

AV5: (SPP2)

Full-or-part-time: 3h 15m
Practical classes: 3h 15m

AV6: (AINP2)

Full-or-part-time: 6h
Self study: 6h

AV7: (CTP3) PLANE GEOMETRY (III)

Full-or-part-time: 0h 45m
Practical classes: 0h 45m

AV8: (SPP3)

Full-or-part-time: 3h 15m
Practical classes: 3h 15m

AV9: (AGNP1)

Full-or-part-time: 6h
Self study: 6h



AV10: (CTP4) SOLID GEOMETRY

Full-or-part-time: 0h 45m
Practical classes: 0h 45m

AV11: (SPP4)

Full-or-part-time: 3h 15m
Practical classes: 3h 15m

AV12: (AINP3)

Full-or-part-time: 6h
Self study: 6h

AV13: (CTP5). SOLID GEOMETRY (II)

Full-or-part-time: 0h 45m
Practical classes: 0h 45m

AV14: (SPP5)

Full-or-part-time: 3h 15m
Practical classes: 3h 15m

AV15: (AINP4)

Full-or-part-time: 6h
Self study: 6h

AV16: (CTP5). SOLID GEOMETRY (III)

Full-or-part-time: 0h 45m
Practical classes: 0h 45m

AV17: (SPP6)

Full-or-part-time: 3h 15m
Practical classes: 3h 15m

AV18: (AINP5)

Full-or-part-time: 6h
Self study: 6h



AV19: (CTP7). SOLID GEOMETRY (IV)

Full-or-part-time: 0h 45m

Practical classes: 0h 45m

AV20: (SPP7)

Full-or-part-time: 3h 15m

Practical classes: 3h 15m

AV21: (AINP6)

Full-or-part-time: 6h

Self study: 6h

AV22:(CTP8) SOLID GEOMETRY (V)

Full-or-part-time: 0h 45m

Practical classes: 0h 45m

AV23: (SPP8)

Full-or-part-time: 3h 15m

Practical classes: 3h 15m

AV24: (AGNP2)

Full-or-part-time: 12h

Self study: 12h

AV25: (CPP1)

Full-or-part-time: 3h 15m

Laboratory classes: 3h 15m

AV26: (CTP9) INDUSTRIAL STANDARDISATION (I)

Full-or-part-time: 0h 45m

Practical classes: 0h 45m

AV27: (SPP9)

Full-or-part-time: 3h 15m

Practical classes: 3h 15m



AV28: (AINP7)

Full-or-part-time: 6h
Self study: 6h

AV29: (CTP10) INDUSTRIAL STANDARDISATION (II)

Full-or-part-time: 0h 45m
Practical classes: 0h 45m

AV30: (SPP10)

Full-or-part-time: 3h 15m
Practical classes: 3h 15m

AV31: (AGNP3)

Full-or-part-time: 30h
Self study: 30h

AV32: (CTP11) INDUSTRIAL STANDARDISATION (III)

Full-or-part-time: 0h 45m
Practical classes: 0h 45m

AV33: (SPP11)

Full-or-part-time: 3h 15m
Practical classes: 3h 15m

AV34: (CTP12) INDUSTRIAL STANDARDISATION (IV)

Full-or-part-time: 0h 45m
Practical classes: 0h 45m

AV35: (SPP12)

Full-or-part-time: 3h 15m
Practical classes: 3h 15m

AV36: (CTP13) INDUSTRIAL STANDARDISATION (V)

Full-or-part-time: 0h 45m
Practical classes: 0h 45m



AV37: (PTG)

Full-or-part-time: 3h 15m

Practical classes: 3h 15m

AV38: (CPP2) EXAMINATION

Full-or-part-time: 4h

Laboratory classes: 4h

GRADING SYSTEM

30% First examination

30% Second examination

5% Laboratory sessions

15% Application/practicals

10% Sketch I

10% Sketch II

Unsatisfactory results of the "First examination" (not presented are no applicable) may be taken through the hand-drawn test called "Sketch II" (to be done during class time), only for marks under 5. The grade obtained will be recorded as a grade in the "Sketch II" test and, if it is higher than the "First examination" test, it will replace the initial grade, maximum possible is 5.

EXAMINATION RULES.

To pass the subject, students must complete the laboratory practicals and hand in the necessary reports.

BIBLIOGRAPHY

Basic:

- Puig Adam, Pedro. Curso de geometría métrica, vol. 2. Madrid: Euler, 1986. ISBN 8485731069.
- Cobos Gutiérrez, C.; Del Rio, M^a Gloria. Ejercicios de dibujo técnico I: resueltos y comentados. Albacete: Tébar Flores, 1996. ISBN 8473601602.
- Félez, J.; Martínez, M^a 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. 3rd ed. London: The Design Council, 1999. ISBN 1852330279.
- Giesecke, Frederick E. Technical drawing. 10th ed. Upper Saddle River, NJ: Prentice Hall, 1997. ISBN 0134619714.
- Ramos, Basilio; García, Esteban. Dibujo técnico. 2a ed. Madrid: AENOR, 2000. ISBN 9788481434743.
- 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, M^a D. Problemas básicos de la geometría del diseño. Madrid: Aula Documental de Investigación, 1995. ISBN 8492038101.



RESOURCES

Hyperlink:

- General. http://www.isftic.mepsyd.es/jovenes/dibujo_tecnico/
<http://ocw.unican.es/enseanzas-tecnicas/expresion-grafica-y-dao/material-de-clase>
- Geometria Plana. http://www.tododibujo.com/index.php?main_page=site_map&cPath=304
- Geometria Espacial. http://www.tododibujo.com/index.php?main_page=site_map&cPath=298
- Normalització Industrial. http://www.tododibujo.com/index.php?main_page=site_map&cPath=308
<http://ocw.upm.es/expresion-grafica-en-la-ingenieria/dibujo-industrial-ii/material-de-clase/>
- CAD (Tutorials). <http://www.lawebdelprogramador.com/cursos/enlace.php?idp=4604&id=8&texto=AutoCad>