

320004 - EGE - Graphic Expression in Engineering

Coordinating unit:	205 - ESEIAAT - Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit:	717 - EGE - Department of Engineering Presentation
Academic year:	2019
Degree:	BACHELOR'S DEGREE IN INDUSTRIAL DESIGN AND PRODUCT DEVELOPMENT ENGINEERING (Syllabus 2010). (Teaching unit Compulsory) BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Teaching unit Compulsory) BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Teaching unit Compulsory) BACHELOR'S DEGREE IN TEXTILE TECHNOLOGY AND DESIGN ENGINEERING (Syllabus 2009). (Teaching unit Compulsory) BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Teaching unit Compulsory) BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Teaching unit Compulsory)
ECTS credits:	6
Teaching languages:	Catalan, Spanish

Teaching staff

Coordinator:	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.

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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

Total learning time: 150h	Hours large group:	0h	0.00%
	Hours medium group:	60h	40.00%
	Guided activities:	0h	0.00%
	Self study:	90h	60.00%

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Content

<p>TOPIC 1: PLANE GEOMETRY</p>	<p>Learning time: 30h Practical classes: 12h Self study : 18h</p>
<p>Description: 1.1. Tangencies and tangential contacts. 1.2. Conic sections. 1.3. Technical curves.</p> <p>Related activities: AV0 and AV1 (CTP1), AV2 (SPP1), AV3 (AINP1), AV4 (CTP2), AV5 (SPP2), AV6 (AINP2), AV7 (CTP3), AV8 (SPP3) and AV9 (AGNP1).</p> <p>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.</p>	
<p>TOPIC 2: SOLID GEOMETRY</p>	<p>Learning time: 60h Practical classes: 24h Self study : 36h</p>
<p>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.</p> <p>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).</p> <p>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.</p>	

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TOPIC 3: INDUSTRIAL STANDARDISATION	Learning time: 60h Practical classes: 24h Self study : 36h
<p>Description:</p> <ul style="list-style-type: none">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. <p>Related activities:</p> <p>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).</p> <p>Specific objectives:</p> <p>For students to:</p> <ul style="list-style-type: none">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.	

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Planning of activities

AV1: (CTP1) PLANE GEOMETRY	Hours: 0h 35m Practical classes: 0h 35m
AV0: PRESENTATION OF THE SUBJECT	Hours: 0h 10m Practical classes: 0h 10m
AV2: (SPP1) TANGENCIES AND TANGENTIAL CONTACTS.	Hours: 3h 15m Practical classes: 3h 15m
AV3: (AINP1)	Hours: 6h Self study: 6h
AV4: (CTP2) PLANE GEOMETRY (II)	Hours: 0h 45m Practical classes: 0h 45m
AV5: (SPP2)	Hours: 3h 15m Practical classes: 3h 15m
AV6: (AINP2)	Hours: 6h Self study: 6h
AV7: (CTP3) PLANE GEOMETRY (III)	Hours: 0h 45m Practical classes: 0h 45m
AV8: (SPP3)	Hours: 3h 15m Practical classes: 3h 15m
AV9: (AGNP1)	Hours: 6h Self study: 6h

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AV10: (CTP4) SOLID GEOMETRY	Hours: 0h 45m Practical classes: 0h 45m
AV11: (SPP4)	Hours: 3h 15m Practical classes: 3h 15m
AV12: (AINP3)	Hours: 6h Self study: 6h
AV13: (CTP5). SOLID GEOMETRY (II)	Hours: 0h 45m Practical classes: 0h 45m
AV14: (SPP5)	Hours: 3h 15m Practical classes: 3h 15m
AV15: (AINP4)	Hours: 6h Self study: 6h
AV16: (CTP5). SOLID GEOMETRY (III)	Hours: 0h 45m Practical classes: 0h 45m
AV17: (SPP6)	Hours: 3h 15m Practical classes: 3h 15m
AV18: (AINP5)	Hours: 6h Self study: 6h
AV19: (CTP7). SOLID GEOMETRY (IV)	Hours: 0h 45m Practical classes: 0h 45m

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AV20: (SPP7)	Hours: 3h 15m Practical classes: 3h 15m
AV21: (AINP6)	Hours: 6h Self study: 6h
AV22: (CTP8) SOLID GEOMETRY (V)	Hours: 0h 45m Practical classes: 0h 45m
AV23: (SPP8)	Hours: 3h 15m Practical classes: 3h 15m
AV24: (AGNP2)	Hours: 12h Self study: 12h
AV25: (CPP1)	Hours: 3h 15m Laboratory classes: 3h 15m
AV26: (CTP9) INDUSTRIAL STANDARDISATION (I)	Hours: 0h 45m Practical classes: 0h 45m
AV27: (SPP9)	Hours: 3h 15m Practical classes: 3h 15m
AV28: (AINP7)	Hours: 6h Self study: 6h
AV29: (CTP10) INDUSTRIAL STANDARDISATION (II)	Hours: 0h 45m Practical classes: 0h 45m

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AV30: (SPP10)	Hours: 3h 15m Practical classes: 3h 15m
AV31: (AGNP3)	Hours: 30h Self study: 30h
AV32: (CTP11) INDUSTRIAL STANDARDISATION (III)	Hours: 0h 45m Practical classes: 0h 45m
AV33: (SPP11)	Hours: 3h 15m Practical classes: 3h 15m
AV34: (CTP12) INDUSTRIAL STANDARDISATION (IV)	Hours: 0h 45m Practical classes: 0h 45m
AV35: (SPP12)	Hours: 3h 15m Practical classes: 3h 15m
AV36: (CTP13) INDUSTRIAL STANDARDISATION (V)	Hours: 0h 45m Practical classes: 0h 45m
AV37: (PTG)	Hours: 3h 15m Practical classes: 3h 15m
AV38: (CPP2) EXAMINATION	Hours: 4h Laboratory classes: 4h



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Qualification 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.

Regulations for carrying out activities

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

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Bibliography

Basic:

- Corbella Barrios, David. Técnicas de representación geométrica: con fundamentos de concepción espacial. Madrid: L'autor, 1993. ISBN 846047495X.
- Gonzalo Gonzalo, J. Dibujo geométrico: arquitectura, ingeniería. San Sebastián: Donostiarra, 2001. ISBN 8470632876.
- 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 8470632876.
- Puig Adam, Pedro. Curso de geometría métrica, vol. 1. Madrid: Euler, 1986. ISBN 8485731050.
- 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.
- 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.
- Félez, J.; Martínez, M^a L. Dibujo industrial. Madrid: Síntesis, 1995. ISBN 8477383316.
- Ramos, Basilio; García, Esteban. Dibujo técnico. 2a ed. Madrid: AENOR, 2000. ISBN 9788481434743.

Complementary:

- Prieto, M.; Sondesa, M^a D. Problemas básicos de la geometría del diseño. Madrid: Aula Documental de Investigación, 1995. ISBN 8492038101.

Others resources:

Hyperlink

General

- http://www.isftic.mepsyd.es/jovenes/dibujo_tecnico/
<http://ocw.unican.es/enseñanzas-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>