Universida deVigo

IDENTIFYING DATA

Graphic expression: Fundamentals of engineering graphics

Subject	Graphic expression: Fundamentals of engineering graphics				
Code	V12G360V01101				
Study programme	Degree in Industrial Technologies Engineering				
Descriptors	ECTS Credits		Choose	Year	Quadmester
	9		Basic education	1st	1st
Teaching language					
Department					
Coordinator	López Figueroa, Concepto Esteban				
Lecturers	Adán Gómez, Manuel Alegre Fidalgo, Paulino Corralo Domonte, Francisco Javier Fernández Álvarez, Antonio López Figueroa, Concepto Esteban Patiño Barbeito, Faustino Roa Corral, Ernesto Troncoso Saracho, José Carlos				
E-mail	esteban@uvigo.es				
Web	http://faitic.uvigo.es				
General description	The aim that pursues with this subject is to form to the student in the thematic relative to the Graphic Expression, so as to prepare for the handle and interpretation of the systems of representation more employed in the industrial reality and his basic technicians, enter him to the knowledge of the forms, generation and properties of the geometrical entities more frequent in the technician, including the acquisition of vision and space understanding, initiate him in the study of the appearances of technological character that influence in the Graphic Expression of the Engineering and enter him rationally in the knowledge and application of the Normalisation, so much in his basic appearances as in the specific. The subject will develop so that prepare to the student for the indifferent employment of traditional technicians and of new technologies of the information and communications.				

Competencies

Code	
B3	CG3 Knowledge in basic and technological subjects that will enable them to learn new methods and theories, and equip them with versatility to adapt to new situations.
B4	CG4 Ability to solve problems with initiative, decision making, creativity, critical thinking and to communicate and transmit knowledge, skills and abilities in the field of Industrial Engineering.
B6	CG6 Capacity for handling specifications, regulations and mandatory standards.
C5	CE5 Capacity for spatial vision and knowledge of the techniques of graphic representation, using traditional methods of metric geometry and descriptive geometry, and through the application of computer-aided design.
D2	CT2 Problems resolution.
D5	CT5 Information Management.
D6	CT6 Application of computer science in the field of study.
D9	CT9 Apply knowledge.
D13	CT13 Adaptability to new situations.
D16	CT16 Critical thinking.

Learning outcomes

Expected results from this subject	Training and Learning Results

- Know, understand, and apply a body of knowledge about the basics of drawing and standardization of industrial engineering, in its broadest sense , while promoting the development of space capacity.	B3 B4	C5	D6
Purchase the capacity for the abstract reasoning and the establishment of strategies and efficient procedures in the resolution of the graphic problems inside the context of the works and own projects of the engineering.	B3 B4		D2 D16
Use the graphic communication between technicians, by means of the realisation and interpretation of planes in accordance with the Norms of Technical Drawing, involving the use of the new technologies.	B6	C5	D6 D9 D13 D16
Assume a favourable attitude to the permanent learning in the profession, showing proactive, participatory and with spirit of improvement.	B4		D5 D9 D13 D16

Contents

Topic

Block 0. Computer-aided drawing 2D. Sketching, and application of Norms.	Introduction to the Computer-aided Drawing. Surroundings of work. Systems of Coordinates. You order of Drawing. Graphic entities. Helps to the drawing. References to entities. You order of Modification. You order of Visualisation. You order of Query. Impression and scales.

0.2. Sketching, and application of Norms |
| Block I 2D. Flat geometry. | I review of previous knowledges.

Conical: definitions, focal and main circumferences, tangent line and normal in a point, tangent lines from an external point, own and improper.

Tangencies between straight and circumferences and between circumferences (26 cases). Tools of resolution: geometrical places, operations of dilatation and investment and power.

Technical curves: Trochoids: definition, traced and tangent line in a point. Other technical curves. |
| Block II 3D. Systems of representation. | Introduction: Types of projections. Invariants *proyectivos.

System *Diédrico: Foundations. Belonging and Incidence. Parallelism and *Perpendicularidad. Distances, Angles. Operations: Twists, Changes flatly and *Abatimientos. Surfaces: Polyhedral, Irradiated and of Revolution, Surfaces: Flat Sections, Development. Intersection of Surfaces. Foundations.

System of Bounded Planes: Foundations. Belonging and Incidence. Parallelism and *Perpendicularidad. Distances, Angles. *Abatimientos.

Axonometric system: Foundations. Axonometric scales. Types of *axonometrias: *trimétrica, *dimétrica and isometric.

System of Cavalier Perspective: Foundations.

System of Conical Perspective: Foundation. |

Block III. Normalisation.	Generalities on the drawing:
	- The drawing like language.
	- Types of drawings: technicians and artistic.
	- Technical drawings: architectural, topographical and industrial.
	- Industrial drawing: *Croquis, conjoint diagrams, *despieces and geometrical drawing.

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Normalisation of the drawing:
- Advantages of the normalisation.
- Difference between regulation, specification and norm.

Basic normalisation: formats, writing, types of line, scales, etc.

Representation normalised:
- basic Principles of representation. Methods of projection
- Seen. Seen particular: auxiliaries, interrupted, partial, local, turned, etc.
- Courts, Sections and Breaks: Specifications, types of cut, sections (knocked down, displaced), etc.
- *Rayado of courts: types of line, orientation, etc.
- Conventionalisms: symmetrical pieces, repetitive elements, details, intersections, parts *contíguas, etc.

*Acotación:
- General principles of dimensioning.
- Types of *acotación. Classification of the heights.
- Principles of *acotación.
- Elements of *acotación: Lines, extremes of lines, *inscriciones, etc.
- Forms of *acotación: series, parallel, by coordinates, etc.
- *Acotación of particular elements: radios, diameters, spheres, arches, symmetries, chamfers, etc.
- Threads and threaded unions.
Elements of a thread. Threaded elements.
Classification of the threads.
Representation of the threads.
Threads normalised.
- *Acotación Of threaded elements.
- Designation of the threads.

Drawings of group and *despiece:
- Rules and agreements: reference to elements, material, numbering of planes, examples.
- *Acotación Of groups. List of *despiece.

Systems of tolerances and superficial finishings:
- Types of tolerances: dimensional and geometrical.
- Dimensional tolerances: linear and angular.
- Tolerances ISO: qualities, positions, types of adjust, etc.
- Systems of adjust. Examples.
- Indication of superficial finishings.

Representation of Elements Normalised. Diagrams.

Planning

	Class hours	Hours outside the classroom	Total hours
Master Session	38	116	154
Troubleshooting and / or exercises	34	0	34
Group tutoring	4	0	4
Integrated methodologies	0	27	27
Long answer tests and development	2	0	2
Practical tests, real task execution and / or simulated.	4	0	4

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies

Description

Master Session	Active master Session. Each thematic unit will be presented by the professor, complemented with the comments of the students with base in the bibliography assigned or another pertinent.	
Troubleshooting and / or exercises	They will pose exercises and/or problems that will resolve of individual way or *grupal.	
Group tutoring	Realisation of activities of reinforcement to the learning by means of the resolution *tutelada of way *grupal of practical suppositions linked to the theoretical contents of the subject.	
Integrated methodologies	Realisation of activities that require the active participation and the collaboration between the students.	

Personalized attention

Methodologies	Description
Group tutoring	

Assessment

	Description	Qualification	Training and Learning Results

Long answer tests and development	It will realise a final examination that will cover the whole of the contents of the subject, so many theorists like practical, and that they will be able to include test type test, questions of reasoning, resolution of problems and development of practical cases. It demands reach a minimum qualification of 4,0 points on 10 possible to be able to surpass the subject.	65	B3 C5 D2
			B4 D5
			      D9
			      D13
			      D16

Practical tests, real task execution and / or simulated.	Along the triannual, in determinate sessions of resolution of problems and exercises will pose problems or exercises for his resolution by the students and back delivery to the professor, that will evaluate them in accordance with the criteria that previously will have communicated to the students.	35	B4 C5 D2
			      D5
			      D6
			      D9
			      D13

Other comments on the Evaluation

In second announcement will realise to the student a theoretical proof-practical to evaluate his degree of acquisition of competitions, of analogous characteristics to the final examination, in which to surpass the *asignatura will be necessary to reach a minimum qualification of 5,0 points on 10 possible.

Ethical commitment: It is expected an adequate ethical behaviour of the student. In case of detecting unethical behaviour (copying, plagiarism, unauthorized use of electronic devices, etc.) shall be deemed that the student does not meet the requirements for passing the subject. In this case, the overall rating in the current academic year will be Fail (0.0).

Responsible professors of groups:

Group To: Javier *Corralo *Domonte.

Group *B: Carlos *Troncoso *Saracho.

Group C: Antonio Fernández Álvarez.

Group D: Carlos *Troncoso *Saracho.

Group G: Ernesto *Roa Farmyard.

Group *H: Esteban López *Figueroa.

Group I: Faustino *Patiño *Barbeito.

Group *J: Ernesto *Roa Farmyard.

Group *K: Manuel Adán Gómez.

Group L: Faustino *Patiño *Barbeito.

Sources of information

Basic Bibliography

Corbella Barros, David, **Trazados de Dibujo Geométrico 1**, Madrid 1970,

Ladero Lorente, Ricardo, **Teoría do Debuxo Técnico**, Vigo 2012,

Asociación Española de Normalización (AENOR), **Normas UNE de Dibujo Técnico**, Versión en vigor,

Félez, Jesús; Martínez, Mª Luisa, **DIBUJO INDUSTRIAL**, 3ª Edición, ISBN: 84-7738-331-6,

Casasola Fernández, Mª Isabel y otros, **Sistemas de representación I, Teoría y problemas**, ISBN 978-84-615-3553-8, Ed. Asociación de Investigación, 2011

Complementary Bibliography

López Poza, Ramón y otros, **Sistemas de Representacion I**, ISBN 84-400-2331--6,

Izquierdo Asensi, Fernando, **Geometría Descriptiva**, 24ª Edición. ISBN 84-922109-5-8,

Auria, José M.; Ibáñez Carabantes, Pedro; Ubieto Artur, Pedro, **DIBUJO INDUSTRIAL. CONJUNTOS Y DESPIECES**, 2ª Edición, ISBN: 84-9732-390-4,

Guirado Fernández, Juan José, **INICIACIÓN Á EXPRESIÓN GRÁFICA NA ENXEÑERÍA**, ISBN: 84-95046-27-X,

Ramos Barbero, Basilio; García Maté, Esteban, **DIBUJO TÉCNICO**, 2ª Edición, ISBN: 84-8143-261-X,

Manuales de usuario y tutoriales del software DAO empleado en la asignatura,

Giesecke, Mitchell, Spencer, Hill, Dygdon, Novak, Lockhart, ⬛ **Technical Drawing with Engineering Graphics,**, 14ª, Prentice Hall, 2012

David A. Madsen, David P. Madsen, ⬛ **Engineering Drawing & Design**, 5ª, Delmar Cengage Learning, 2012

Recommendations

Other comments

It is recommended for a suitable follow-up of the subject have of previous knowledges of drawing, to the level of the studies *cursados in the *Bachillerato of the Scientific Option-Technological.

In case of discrepancies between versions shall prevail spanish version of this guide.