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320134 - TRG - Graphic Representation Techniques

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)
ECTS credits: 6 Teaching languages: Catalan, Spanish

Teaching staff

Coordinator: Francisco Bermúdez Rodríguez

Others: Moisès Morón Soler
Jordi Ventura

Prior skills

Students will be expected to have passed Chemistry and Experimentation in Chemical Engineering.

Degree competences to which the subject contributes

Specific:

4. (ENG) DIS: Domini de les tècniques de representació, concepció espacial, normalització y disseny assistit per ordinador; coneixement dels fonaments del disseny industrial.

Transversal:

1. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 2. Using strategies for preparing and giving oral presentations. Writing texts and documents whose content is coherent, well structured and free of spelling and grammatical errors.
2. TEAMWORK - Level 2. Contributing to the consolidation of a team by planning targets and working efficiently to favor communication, task assignment and cohesion.
3. SELF-DIRECTED LEARNING - Level 2: Completing set tasks based on the guidelines set by lecturers. Devoting the time needed to complete each task, including personal contributions and expanding on the recommended information sources.

Teaching methodology

The following methods are used:
- Independent learning and exercises.
- Project-based cooperative learning sessions in which students will work in teams to do problem solving exercises and projects assessed on the basis of team performance.
In the lectures, the lecturer will introduce the theoretical fundamentals of the subject, concepts, methods and results, which will be illustrated with relevant examples to facilitate their understanding.
The practical class sessions will consist of directed work on statements and processes to obtain a result.
Students will be expected to study in their own time so that they are familiar with concepts and are able to solve the exercises set.

Learning objectives of the subject

Facilitate and strengthen the ability for abstract thinking.
Develop and exercise spatial imagination.

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Introduce concepts, techniques and methodologies inherent to the field of engineering presentation.
Interpret and draw plans.
Become familiar with presentation techniques in the design of objects (2D and 3D sketching techniques and parametric CAD software).

Study load

Total learning time: 150h	Hours large group:	15h	10.00%
	Hours medium group:	0h	0.00%
	Hours small group:	45h	30.00%
	Guided activities:	0h	0.00%
	Self study:	90h	60.00%

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Content

TOPIC 1: ANALYSIS OF PLANE SHAPES	Learning time: 20h Theory classes: 2h Laboratory classes: 6h Self study : 12h

Description:
1.1 Reasoned constructions of polygonal shapes
1.2. Proportion and similarity
1.3. Simple and double ratios
1.4. Geometric transformations

Related activities:
AV0: Introduction to the subject
AV1: The design of simple and composite shapes

Specific objectives:
OE1: Become familiar with plane shapes and their construction, ratio and composition in a plane.

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TOPIC 2: THE CONSTRUCTION OF 3D SURFACES	Learning time: 40h Theory classes: 4h Laboratory classes: 12h Self study : 24h

Description:
2.1 Ruled surfaces
2.1.1 Polyhedral ruled surfaces
2.1.2 Radiated ruled surfaces
2.1.3 Helical ruled surfaces
2.1.4 Director plane ruled surfaces
2.1.5 Ruled surfaces with three directrices
2.2 Non-ruled surfaces
2.2.1 Quadric non-ruled surfaces
2.2.2 Toric non-ruled surfaces
2.2.3 Other curved surfaces
2.3 Developable surfaces
2.3.1 Right sections. Developable from a prismatic or cylindrical surface (right and oblique)
2.3.2 Perpendicular sections. Developable from a regular flat, pyramidal oblique or conical surface
2.3.3 Development of the developable helicoid
2.4 Intersection of surfaces

Related activities:
Design polyhedral structures. Design objects using ruled, non-ruled, developable and other surfaces.

Specific objectives:
OE2: Use surfaces in the design of objects with simple and complex shapes.
OE3: Design objects using sketch views and their curves in space.

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TOPIC 3: DESIGN OF 3D AND 2D OBJECTS	Learning time: 40h Theory classes: 4h Laboratory classes: 12h Self study : 24h

Description:
3.1 Design perspectives
3.2 Sketches of objects
3.3 Design of objects in 3D
3.4 Design of objects based on sketch views
3.5 Design tables
3.6 Plans with all the information required to identify an object

Related activities:
Obtaining the 3D design of an object from any field of industrial design based on its planimetrics.
Redesigning and simulating real-life objects in 3D.
Sketching, measuring and designing an object, and compiling its technical specifications based on a photograph of it.
Sketching objects from 3D drawings, determining their views, cuts and elevations, and compiling the technical specifications required to identify them.
Presenting plans in all technical information.

Specific objectives:
OE4: Interpret and read plans.
OE5: Learn to draw sketch views.
OE6: Learn to draw objects in planimetrics.
OE7: Use 3D object design techniques.
OE8: Interpret objects designed in 3D.
OE9: Present part of the technical specifications for the design of objects (plans).

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TOPIC 4: DESIGN OF OBJECTS. 2D AND 3D ASSEMBLIES	Learning time: 50h Theory classes: 5h Laboratory classes: 15h Self study : 30h

Description:

4.1 Analysis of finished assemblies
4.2 Redesign of assemblies
4.3 Introduction to ascending and descending assemblies
4.4 Sketches of individual and assembled components
4.5 3D design of the components that make up an assembly
4.6 Plans of components and assemblies
4.7 Design presentation

Related activities:

Group work: students will use real-life objects, drawings and photographs of objects with more than one component to design them using any sketches that may be required, simulate them in 3D and draw them according to standard specifications.

Specific objectives:

OE10: Draw objects with more than two components: 3D CAD, plans and introduction to virtual presentation and animation.

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Planning of activities

(AV0) PRESENTATION OF THE COURSE	Hours: 0h 15m Theory classes: 0h 15m
(AV1): ANALYSIS OF SIMPLE SHAPES.	Hours: 9h 45m Theory classes: 0h 45m Laboratory classes: 3h Self study: 6h
(AV2) : GENERATION OF SURFACES. DESIGN OF REGUALTED SURFACES AND UNREGULATED.	Hours: 37h Theory classes: 4h Laboratory classes: 9h Self study: 24h
(AVC1) : INDIVIDUAL TEST	Hours: 3h Laboratory classes: 3h
(AV3) OBJECT DESIGN (3D AND 2D).	Hours: 40h Theory classes: 4h Laboratory classes: 12h Self study: 24h
C2 (AVC2) : INDIVIDUAL TEST	Hours: 3h Laboratory classes: 3h

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Qualification system

Model of continuous assessment.
The evaluation of knowledge acquisition, skills and abilities is made from:

Scheduled deliveries.....30%
Partial Exam.....20%
Final Exam.....20%
Report and oral presentation of workgroup.....30%

For those students who meet the requirements and submit to the reevaluation examination, the grade of the reevaluation exam will replace the grades of all the on-site written evaluation acts (tests, midterm and final exams) and the grades obtained during the course for lab practices, works, projects and presentations will be kept.
If the final grade after reevaluation is lower than 5.0, it will replace the initial one only if it is higher. If the final grade after reevaluation is greater or equal to 5.0, the final grade of the subject will be pass 5.0.

Regulations for carrying out activities

The activities must deliver on the dates established

Bibliography

Basic:

Corbella Barrios, D. Técnicas de representación geométrica: con fundamentos de concepción espacial. Madrid: l'autor, 1993. ISBN 9788460474951.

Corbella Barrios, D. Dibujo técnico, vol. 2, Sistema diédrico: fundamentos y representaciones. Madrid: l'autor, 1968-1983. ISBN 8430094555.

Corbella Barrios, D. Dibujo técnico, vol. 3, Elementos de normalización. Madrid: l'autor, 1968-1983. ISBN 8430094555.

Gonzalo Gonzalo, J. Dibujo geométrico: arquitectura, ingeniería. San Sebastián: Donostiarra, 2001. ISBN 8470632876.

Rodríguez de Abajo, F. 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, P. Curso de geometría métrica. Madrid: Euler, 1986.

Cobos Gutiérrez, C.; Rio Cidoncha, M. G. del. Ejercicios de dibujo técnico I: resueltos y comentados. Albacete: Tébar Flores, 1996. ISBN 8473601602.

Félez, J.; Martínez, Mª L. Dibujo industrial. 3ª ed. Madrid: Síntesis, 1999. ISBN 8477383316.

Auria, J. M.; Ibáñez, P.; Ubieto, P. Dibujo industrial: conjuntos y despieces. Madrid: Paraninfo, 2000. ISBN 8428327297.

French, M. J. Conceptual design for engineers. 3rd ed. London: The Design Council, 1999. ISBN 1852330279.

Giesecke, Frederick E. [et al.]. Technical drawing. 13th ed. Upper Saddle River, NJ: Prenctice Hall, 2009. ISBN 9780135135273.

Ramos Barbero, B.; García Maté, E. Dibujo técnico. 2ª ed. Madrid: AENOR, 2000. ISBN 9788481434743.

Senabre, Jorge. Dibujo técnico. Zaragoza: Luis Vives, 1978. ISBN 8426304117.