GEOMETRY AND PROJECTION II

Degree in Graphical Design

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Code: 11509

Main Scientific Area: Drawing

Lecturer: Manuel António Carneiro Gaspar de Melo Albino

Language of Instruction: Portuguese

Regime: S2

Contact Hours: 60h Total Workload: 95h

ECTS: 6,0

Objectives

Development of the communicational and expressive possibilities of analytical technical drawing through the study of the various three-dimensional projection systems. Representation, through coordinate views, of three-dimensional objects in orthogonal projection. Graphic representation standards. Orthogonal axonometric projections of solids of revolution and composite solids. Introduction to conic perspective system of representation.

Learning Outcomes

Contact with the concepts inherent to the various forms of projective geometry: frontal orthogonal projections, orthogonal axonometric projections and conical perspective. Contact with the methodologies of analysis and survey of objects starting from rigorous representations of orthogonal projections, whether frontal or axonometric, exercising the relationship between the real object and the projected object, between reality and the representation in the projection plane, always taking into account the standards of graphic representation. Acquire a comprehensive view of the different systems of rigorous graphic representation, their properties, expressions and applicability. Acquire methodologies at the level of in-depth study of the shapes of objects.

The program targets of Geometry and Projection II are: to cover geometric representation of three-dimensional objects, to know, and use correctly the normalization standards of representation in technical drawing, and to learn the different forms of rigorous representation of objects in design practice.

Course Contents

A-Technical drawing:
A.1 Brief introduction to the typology of surfaces: ruled surfaces, surfaces of revolution, flat surfaces, and warped surfaces;
A.2 Intersections of geometric surfaces in orthographic representation:
a) Intersection of a projecting plane: with a cylinder with a cone with a sphere with an ellipsoid, with a torus.
b) Intersection between solids of revolution: between two cylinders, between a sphere and a cylinder between a cylinder and a cone between two cones, between a cylinder and an ellipsoid.
A.3 Orthogonal representation of composite three dimensional objects:
a) Identification of different geometric entities in a three-dimensional object;
b) Use of auxiliary processes for the accurate representation of three-dimensional objects composed of surface intersections;
A.4 Standards for representation.

B. Axonometric representations
B.1 Non-accurate axonometric representation (development grid);
B.2 Principles of axonometric representations;
B.3 Transference and relations of frontal orthogonal and an axonometric orthogonal systems;
B.4 Orthogonal axonometric representations:
B.4 a) Isometric;
B.4 a) Dimetric;
B.4 a) Trimetric;
B.5 Visible contours of a cylinder, a cone, a sphere, and a toros;
B.6 Axonometric representation of composite solids of revolution (intersection of solids of revolution: cylinders, cones, spheres, tori and scotia).

C- Introduction to three-dimensional projection methods (conical perspective)
C 1 Conical Perspective;
C 1.1 - Front-Centered Perspective;
C 1.2 - Angular Perspective with 2 points;
C 1.3 – General method of representation in conical perspective.

Recommended Bibliography

Abajo, F. J. Rodriguez Bengoa; Alvarez, V. (1992). Curso de Dibujo Geométrico y de Croquizacion. Ed. Donostiarra: San Sebastian.
Abajo, F. J. Rodriguez Bengoa; Alvarez, V. (1991). Geometria Descriptiva . Tomo 3 . Sistema Axonométrico. Ed. Donostiarra: San Sebastian.
Asensi, I. F. (2004) Geometria Descriptiva I (Sistemas y perspectivas). Ed. Dossat: Madrid.
Asensi, I. F. (2004) Geometria Descriptiva II (Líneas y Superficies). Ed. Dossat: Madrid.
Cunha, L. V. DA (1982). Desenho Técnico . Fundação Calouste Gulbenkian, Lisboa.
Gill, R. W. (2006) Perspective . Thames Hudson, London
Massironi, M.(1983). Ver pelo Desenho . Ed. 70, Lisboa.
Morais, S. (2007) Desenho Técnico Básico . Porto Editora, Porto

Learning and Teaching Methods

The Curricular Unit is divided into three phases.
The first, in which the student makes contact with the frontal orthogonal representation of objects, reading coordinate views, learning processes and methods of graphic representation, studying the properties of basic solids of revolution and their relationships and intersections.
The second, in which the student studies the different forms of graphic representation possible through parallel projections, producing orthogonal axonometries through the counter-reflection of the frontal views of objects, analyzing through practice the relationship, the differences, and the different possibilities, in the relationship between the coordinate frontal projections and the axonometric representation of a three-dimensional object.
The third phase constitutes an introduction to representation in conical perspective. The approach to this representational system starts from the knowledge acquired in the previous stages of orthogonal representation as a definition of the representation of three-dimensional objects, now adding the point of view, that is, the observer and his relationship with the object to be represented.

Assessment Methods

Continuous evaluation

The evaluation is continuous (according to point 1 of article 3 of the RACC of the ESD) and foresees the presence of the student in at least 75% of the classes taught (according to point 2 of article 3 of the RACC of the ESD).

Students should consult the Academic Regulation (RA) of the IPCA and the Regulation for the Assessment of Knowledge and Skills (RACC) of the ESD.

The evaluation of the course is made by presenting three proposals of practical works, and a theoretical and practical examination test at the end of the semester:

- Proposal 01 – 30 % (thirty percent);

- Proposal 02 – 30 % (thirty percent);

- Proposal 03 – 20 % (twenty percent);

- Presence, attitude, and work developments in class: 10 % (ten percent included in the final grade in each of the three motions);

- Examination test – 20 % (twenty percent): Two hours long (already including time tolerance).

End of Semester = [prop.01] + 0.3 x [prop.02] x 0.3 + [prop.03] x 0.2 + [Test] x 0.2

Penalty for non-compliance with delivery dates

In case a job proposal is not delivered on the stipulated date, the penalty works as follows:

10% penalty for the class following the due date;

20% penalty 2 lessons after the due date;

40% penalty 3 lessons after the due date.

After these dates of possible delivery of the work proposal, the evaluation will be considered with a 0% evaluation.

The last work proposal cannot be delivered out of date due to compliance with the academic calendar.
Attendance to the assessment test is mandatory for all students, including students in special attendance regime.

Assessment to Exam Season

In this curricular unit, the exam period of the 2nd semester is applied (according to article 209 of the Academic Regulation of the IPCA) as a complement to the evaluation by frequency.

If the student does not have a minimum grade of 7 (seven) at the end of the evaluation, he will not be able to register for the 2nd semester exam, being automatically reproved.

The 2nd semester exam will be worth 20% (twenty percent) of the final grade, and the remaining 80% (eighty percent) will be the grade of the Assessment by frequency.

Any student with a positive performance in the current curricular year will be able to improve their grade at this time, with the calculation of the grade equivalent to the one mentioned above.

Thus, with the Final Grade (NF) = [prop.01] x 0.3 + [prop.02] x 0.3 + [prop.03] x 0.2 + [test] x 0.2 the Grade in 2nd semester exam will be:

[NF] + 0.8 x [Examination of Appeal] x 0.2

Assessment to Special Season Exames

The special exam season applies to students who are in any of the special attendance regimes (as specified in article 5 of the ESD's Regulation for the Assessment of Knowledge and Competences (RACC)).
This exam lasts 2h30 (+ 30 minutes of tolerance) and is autonomous, that is, the grade in this exam totals the final grade to the Curricular Unit of Geometry and Projection II.