

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 analytical technical drawing in students through the study of the various three-dimensional projection systems. Representation of three-dimensional objects in space. Technical drawing and representation standards. Introduction to axonometric projections. Introduction to representation in conical perspective.

Learning Outcomes

Contact with the concepts inherent of various forms of projective geometry: orthogonal projections, axonometric projections and perspective. Contact with methods of analysis and survey of industrial objects, starting from strict representations of orthogonal projections, either front or axonometric, exercising the relationship between the real object and the object contemplated, between reality and representation in the projection plane, having always into account the standard terms of representation in technical drawing. Acquire a comprehensive overview of the different accurate representation systems of design, their properties and applicability. Acquiring methodologies of the detailed study of the forms of objects.

The program targets of Geometry and Design 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 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.

A1.1. Standard representation of intersections of surfaces in technical drawing.

A.2 Auxiliary Views

A.3 Sections

A 3.1. Standards for representation

A 3.2. Full cut

A 3.3. Partial cut

A 3.4. Local cut

B. Axonometric representations

B. 1. Principles of axonometric representations;

- B. 2 Transfer of a frontal orthogonal system to an axonometric orthogonal system;
- B. 3. Axonometric representations;
- B. 4. Normalized axonometric representation:
- B. 5. Isometric representation;
- B. 6. Dimetric representation;
- B. 7. Trimetric representation;
- B. 9. Isometric representation in exploded display
- B. 10. Visible contours of a cylinder, a cone, a sphere, and a toros;
- B. 11. Platonic and Archimedean solids (introduction to the geometric regular division of space);
- B. 12. Axonometric representation of intersections of solids of revolution (between two cylinders, cylinder and cone, cylinder and sphere, ellipsoid and cylinder, between two cones).

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. JAVIER RODRIGUEZ BENGUA, VICTOR ALVAREZ (1992). Curso de Dibujo Geométrico y de Croquisación . Ed. Donostiarra, San Sebastian

ABAJO, F. JAVIER RODRIGUEZ BENGUA, VICTOR ALVAREZ (1991). Geometria Descriptiva . Tomo 3 . Sistema Axonométrico. Ed. Donostiarra, San Sebastian.

ASENSI, Izquierdo F. (2004) Geometria Descriptiva I (Sistemas y perspectivas)

ASENSI, Izquierdo F. (2004) Geometria Descriptiva II (Líneas y Superficies)

CUNHA, Luís Veiga da (1982). Desenho Técnico . Fundação Calouste Gulbenkian, Lisboa.

GILL, R. W. (2006) Perspective . Thames Hudson, London

MASSIRONI, MANFREDO (1983). Ver pelo Desenho . Ed. 70, Lisboa.

MORAIS, Simões (2007) Desenho Técnico Básico . Porto Editora, Porto

Learning and Teaching Methods

The unit of Geometry and Projection II, aims at contributing to the development of analytical technical drawing in students, through the study of various systems of three-dimensional projection. It is intended to give students the basic tools of representation in the space of three-dimensional figures and objects. The course is divided into three distinct phases. The first of which will consist of matters related to technical drawing: cuts, intersections of geometric surfaces in orthographic representation, standard representations, etc., addressed in the first half. In the second stage, students will have a rigorous approach to the representation through the use of three-dimensional axonometric projections. The third phase is an introduction to perspective representation, in which students, starting from the orthogonal projections of the object that accompanied them throughout all the semester, will build an axonometric representation.

Assessment Methods

The evaluation process in this course is that of continuous and regular evaluation, as provided for in Article 7 of RIAPA.

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 five percent);- Proposal 02-35 % (thirty five percent);- Proposal 03-15 % (ten 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 0.35 + [prop.03] x 0.15 + [Test] x 0.2

Faults Regimen

In the case of the student exceed 1/3 (one third) of the total number of faults he is reprovved, with the exception of students who have student-worker status.

In the case of the student-workers it is required the submission of the working proposals in the dates and times prescribed.

Although there are no limit of absences for the student-workers, it is required him to present the development of the process of execution of class exercises in the classroom, or in the attendance hours, this absence may be sufficient for reprove.

Evaluation in the Period of Appeal

This exam serves to complement the evaluation by frequency on class. In case the student does not account for a minimum score of 7 (seven) values at the end of the semester it can not sign up to this period of exams, and he is automatically disqualified. Examination of Appeal will be worth 20 % (twenty percent) of the final grade , with the remaining 80 % (eighty percent) being from the evaluation by frequency on class. Any student with positive performance in curriculum year may hold grade improvement in this unit, the calculation of the grade is equivalent to the abovementioned.

Final note (NF) = [prop.01] + 0.3 x [prop.02] x 0.35 + [prop.03] x 0.15 + [Test] x 0.2

Evaluation in the Period of Appeal = [NF] + 0.8 x [Examination of Appeal] x 0.2

Assessment in Special Season

Time Length of the exam: 2:30 (+ 15 minutes of tolerance)

The finalists and special statutes students have access to special examination period that follows the end of the school year, as provided in RIAPA.