GEOMETRY AND PROJECTION I

Degree in Graphical Design

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Code: 11508

Main Scientific Area: Drawing

Lecturer: Manuel António Carneiro Gaspar de Melo Albino

Language of Instruction: Portuguese

Regime: S1

Contact Hours: 60h Total Workload: 95h

ECTS: 6,0

Objectives

Discover the history and the cultural relations present in the concepts of geometry as a discipline that relates design, mathematics and art.
Promote a rigorous and rational approach to the design and mathematical principles underlying it in various systems of representation.
Cultivating the spirit of rigor, discovering the potential of a rational approach to graphical representation and its communicative and plastic properties.

Learning Outcomes

- Have the analytical ability to interpret geometrically visual and spatial forms;

- Enhance the creativity in the production of visual patterns using geometric transformation processes;

- Have the capacity of producing formal synthesis;

- Have the power to understand and decode representations in technical drawing acquiring knowledge of their representation standards.

Course Contents

Two-dimensional constructions:
Simple geometric constructions: parallelism, squareness, typology and properties of angles between two straight lines, properties and typology of polygons, homotheties, symmetries, concetricity and eccentricity between circumferences, notions of scale, etc.;
Tangency and concordances between lines and circles using various concepts and constructs: positive and negative dilation centers, radical axis of two circunferences and radical center of three circunferences.
Conic curves: construction and geometric properties of circles, ellipses, parabolas and hyperbolas.
Introduction to geometric transformations.
Introduction to regular division of surface and symmetries in the plan.

Technical drawing:
Representation standards in technical drawing (dimensioning, subtitles, type of strokes, project sheets, representation and function of cuts and sections in standard technical drawings);

Distinction between European and American methods of projection;
Representation of polyhedrons;
Representation of solids of revolution;
Representation of compounds of solids of revolution (intersection of projecting plans with cylinders, cones, spheres, ellipsoids, and torus; intersection of solids of revolution: two cylinders, a cylinder and a sphere, a cylinder and a cone, two cone, a cylinder and an ellipsoid, a torus and a cylinder, etc.);

Recommended Bibliography

Cunha, L. V. (1982). Desenho Técnico . Fundação Calouste Gulbenkian, Lisboa.

Morais, S.(2007) Desenho Técnico Básico 3, 24ª Edição . Porto Editora: Porto.

Abajo, F. J.R.B.; Álvares, V. (1984) Dibujo Tecnico . Ed. Donostiarra: San Sebastian, Espanha.

Learning and Teaching Methods

The two work proposals submitted in Geometry and Projection I cover the main objectives of the course because: When addressing the divisions of regular surfaces the student comes into direct contact with various geometric constructions problems, including regular polygons, with a practical outcome of wide application in different areas of Design: standardization, modularization, illustration, etc. In the second work proposal the student have to represent accurately a wrought iron panel using only tangent circles and straight lines in order to verify the properties of the simplest geometrical shapes and their relations: secant, tangent, parallel, concentric, eccentric, etc.
Finally the technical drawing is a crucial stage of the semester in which the student ceases to think only in two-dimensional shapes and comes to represent three-dimensional objects. It is with this experience that the student begins to realize the problems of rigorous measurement and representation.

Assessment Methods

Continuous assessment

The assessment system in this curricular unit is continuous assessment (according to point 1 of article 3 of the RACC of the ESD).

35% Project 01> Isometries in the Plan
(Visual patterns and regular surface division)
Creating original compositions of geometric patterns (3 studies in A3 sheets). Study and analysis of Islamic patterns (3 studies in A3 sheets).

35% Project 02> geometric constructions and concordances
Interpretation and synthesis, in rigorous geometric design, a wrought iron panel.
Research (5%): 6 (six) studies on A3 sheets of parchment paper or millimetre paper in pencil, and previous studies of synthesis of form made with teacher monitoring.
Final Object (20%): pencil end panel A3 sheet of paper horse.

Avaliation Test
30% of the evaluation will be dedicated to a theoretical and practical test carried out in class. This test is of mandatory presence and execution.

Summary
35% (7 values in 20) - Projeto 01 > Isometries in the Plane [Proj.1]
35% (7 values in 20) - Projeto 02 > Geometric constructions and concordances [Proj.2]
30% (6 values in20) - Avaliation Test [Test]
Normal Season (N.S.) = (Proj.1 x 0,35) + (Proj.2 x 0,35) + (Test x 0,3)

Appeal period

This curricular unit does not allow exams (according to section 4 of article 4 of the RACC of the ESD) except as a complement to the continuous assessment. In this sense the regular season exam will have a moderation of 20% of the grade, being the end-of-semester grade considered in the remaining 80%, according to the formula (SFG: semester final grade; ExG: exam grade; final grade after exam: FGAEx): SFG*0,8+ExG*0,2=FGAEx

The minimum mark in attendance for access to the recourse exam is 7 (seven) values. Any student with positive performance in the current curricular year may also improve their grade at this time, with the calculation of the grade equivalent to the above mentioned.

Special Season Assessment

This season is only available for students who are in the special frequency regime (as described in section I, article 135 and point 5, article 209 of the Academic Regulation of IPCA).

The student must inform the teacher of his intention to apply for the special season.

The Special Season Exam of this Curricular Unit consists in a test to be taken in a single moment in the day scheduled for that purpose.