

Course Unit	Drawing and Geometric Modeling	Field of study	Mechanical Constructions
Bachelor in	Mechanical Engineering	School	School of Technology and Management
Academic Year	2023/2024	Year of study	1
Type	Semestral	Semester	2
Workload (hours)	162	Contact hours	T - TP 60 PL - TC - S - E - OT - O -
		Level	1-1 ECTS credits 6.0
		Code	9123-759-1203-00-23

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s) Luís Miguel Cavaleiro Queijo

#### Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:

1. Read and produce 2D and 3D part and assembly drawings.
2. Represent mechanical parts such as: screwed, welded, cottered and riveted connections, elastic rings, gears and others.
3. Represent mechanical mechanisms through assembly drawings and parts through definition drawings.
4. Execute geometrical and dimensional tolerances.
5. Apply CAD tools and the drawing rules to the conception and representation of 2D and 3D objects.

#### Prerequisites

Before the course unit the learner is expected to be able to:  
Non applicable.

#### Course contents

2D and 3D part and assemblies drawing and modelling using the geometric modelling software tool SolidWorks®. Dimensional and geometrical tolerances.

#### Course contents (extended version)

1. Introduction to the geometric modelling using the parametric CAD software Solidworks®.
  - Examples.
2. Basic functions of geometric modelling.
  - drawing commands;
  - features functions.
3. Mechanical parts modelling.
  - Examples.
4. Mechanical parts definition drawing:
  - Threaded parts and binding.
  - Pin and rivet binding.
  - Elastic and retention rings.
  - Key binding.
  - Weldments.
  - Gears.
  - Bearings.
  - Springs.
  - Shafts.
5. Bidimensional representation of mechanical parts from a geometric modelling:
  - Views.
  - Perspectives.
  - Cuts and sections.
  - Details.
6. Assembly drawing:
  - Interpretation and representation.
  - Exploded views.
7. Tolerances:
  - Dimensional tolerances.
  - Geometrical tolerances.
  - General tolerances.
  - Fittings.
  - Surface finishing states.
8. Analysis:
  - Interference analysis.
  - File export formats to CAE software applications.

#### Recommended reading

1. Normas Portuguesas, I. P. Q;
2. L. Veiga da Cunha, "Desenho Técnico" - Fundação Calouste Gulbenkian;
3. Simões Morais, "Desenho Técnico Básico - 3, Porto Editora;
4. Arlindo Silva/ João Dias/Luís Sousa, Desenho Técnico Moderno, LIDEL.
5. Apontamentos fornecidos.

#### Teaching and learning methods

The classes are based in students participation in theoretical contents explanation as in his application to the drawings in exercises solved in class. In non-class times, some works and exercises are done to increase their independency and creativity.

#### Assessment methods

1. Alternative 1 - (Regular, Student Worker) (Final, Supplementary, Special)
  - Final Written Exam - 30%
  - Practical Work - 40%
  - Intermediate Written Test - 30%

**Assessment methods**

2. Alternative 2 - (Regular, Student Worker) (Supplementary, Special)  
- Final Written Exam - 100%

**Language of instruction**

Portuguese

**Electronic validation**

Luís Miguel Cavaleiro Queijo	João Eduardo Pinto Castro Ribeiro	João da Rocha e Silva	José Carlos Rufino Amaro
06-03-2024	06-03-2024	09-03-2024	16-03-2024