

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	Level	1-1	ECTS credits 6.0
Туре	Semestral	Semester	2	Code	9123-759-1203-00-23	
Workload (hours)	162	Contact hours	T - Dectures; TP - Lectures a	60 PL - T nd problem-solving; PL - Problem-	C - S -	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 2
- Read and produce 2D and 3D part and assembly drawings. Represent mechanical parts such as: screwed, welded, cottered and riveted connections, elastic rings, gears and others.

Represent mechanical mechanisms through assembly drawings and parts through definition drawings.
 Execute geometrical and dimensionional tolerances.
 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. Intoduction 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 drwaing:
  - Threaded parts and binding.
     Pin and rivet binding.
  - Elastic and retention rings.

  - Key binding.Weldements.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

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

### Teaching and learning methods

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

#### Assessment methods

- 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