MECHANICAL TECHNOLOGY

Code: 322153

Main Scientific Area: Mechanics and industrial processes

Lecturer: Luís Miguel Morais Gomes do Vale

Language of Instruction: Portuguese

Regime: S1

Contact Hours: 30h Total Workload: 45h

ECTS: 3,0

Objectives

I - Introduction to machining and mechanical production technologies.
II - Acquisition of the concepts necessary for the theoretical and practical analysis of the manufacturing processes and in particular the technological processes related to the plastic forming technologies and the machining technologies.
III - Mechanical joining technologies (welding, bonding, riveting, bolted connections).

IV - Application of these concepts to product development and the design and realization of products and tools.

Learning Outcomes

The student will be able to:
Identify and describe the manufacturing technologies associated with your activity.
Understand the characteristics, advantages and limitations of each of these technologies.
Understand the implications and requirements created for your tasks by these technologies, namely:
Choose the type of mechanical joints most suitable for a given situation.
Know the most common mechanical components and components of application to mechanical design.
Apply these concepts in the design of parts and assemblies, so as to enable their production within the

established requirements.

Course Contents

Types of mechanical connections - Design with mechanical connections
Connections with threaded parts
Connections with rivets
Welding processes - Types of welding - Electric arc welding, oxyacetylene, MigMag and Tig
Project with welded parts
Processes for obtaining metal parts
Machine tools, metal machining - parts and accessories
Cutting Technology
Machining by chip removal, main features
Cutting fluids
Types of Movements in Machining
Turning
Milling
Understanding machining sequences
Design of parts for turning and milling - practical class
Continuation: Design of parts for turning and milling - practical class

Metal materials (ferrous and non-ferrous)
Boring machine: Types; Constitution, methods of manufacturing parts; Boring heads; Most used cutting tools
Abrasive machines: forming and grading of grinding wheels - grinding, grinding and grinding machines: types and applications
Steels and metals - non-metallic materials
Identification of foundry processes:
The steel industry; The blast furnace; Cast iron tuning
Molds and plates mold; Types, properties, materials and characteristics
Feeding and gutting systems - Casting sands - Molding processes - Connection processes
Classification of plastic forming processes; Plastic and sheet metal forming
Embedded Technology
Forging
Rolling
Extrusion; Stretching

Profiling; Sheet metal cutting and bending - practical design

Recommended Bibliography

Davim, João Paulo; Princípios da maquinagem. ISBN: 972-40-0878-9
Gerling, Henrich; À volta da máquina-ferramenta ISBN 84-291-6050-7
Dieter, George; Mechanical Mettalurgy. ISBN 0-07-100406-8
A.D.Santos, A.B.Rocha, J.F.Duarte; Tecnologia da embutidura. ISBN: 972-8826-00-1

Jorge Rodrigues, Paulo Martins; Tecnologia Mecânica – Tecnologia da deformação plástica, Escolar Editora , 2005

Learning and Teaching Methods

The program contents were defined according to the objectives and competencies to be acquired by the students. The program content includes the main manufacturing technologies related to its activity that gives students the ability to critically select the most appropriate existing method and solutions to use to solve problems.
At the same time, students will be able to interpret and analyze the entire manufacturing process, contextualizing

their activity within it.

Assessment Methods

Miminum grade for approval > 9.5
Nº of credits (ECTS) : 3
Weighted average of:
attendance and homeworks and class exercises (40%)

Exam - (60%)