

Course Unit	Manufacturing Process		Field of study	Mechanical Constructions	
Master in	Industrial Engineering - Electrical Engineering		School	School of Technology and Management	
Academic Year	2022/2023	Year of study	1	Level	2-1
Type	Semestral	Semester	1	ECTS credits	6.0
Code	9572-355-1103-00-22				
Workload (hours)	162	Contact hours	T -	TP 60	PL -
			TC -	S -	E -
			OT -	O -	

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) João Eduardo Pinto Castro Ribeiro

### Learning outcomes and competences

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

1. Apply the concepts and the technologies involved in the new manufacturing environment.
2. Know and distinguish the production technologies in the context of computer integrated manufacturing.

### Prerequisites

Before the course unit the learner is expected to be able to:

1. Know and characterize the main conventional manufacturing processes.
2. Have a good knowledge of English language: written and spoken.

### Course contents

Basics notions of Computer Integrated Manufacturing. Production Engineering: Planning and control of production aided by computer. Computer Aided Manufacturing: Multi-axis Machining and High Speed Machining. Simulating the manufacturing processes and virtual manufacturing.

### Course contents (extended version)

1. Basics notions of Computer Integrated Manufacturing: Nature of CIM.
2. Functions of Production. New logics of Production.
3. Manufacturing and Environment.
4. Project for the manufacture and assembly, as well as a Rapid Manufacturing of prototypes.
5. Reverse engineering.
6. Production Engineering:
  - Planning the production aided by computer.
  - Control of production aided by computer.
7. Automated systems to support production.
8. Computer Aided Manufacturing:
  - Multi-axis Machining.
  - High Speed Machining.
  - Advanced Processes for polishing and finishing.
9. Computer Aided Manufacturing: CNC Punch Survey.
10. Simulating the manufacturing processes and virtual manufacturing.
11. Intelligent Manufacturing.
12. Cases of advanced machining -
  - Machining aeronautical materials and biomaterials.
  - Machining biomaterials.

### Recommended reading

1. Ribeiro, J., "Processos de Fabrico", IPB-ESTI, 2009.
2. Teicholz, Eric and Orr, Joel N., "Computer Integrated Manufacturing Handbook", McGraw Hill International Editions; 1989.
3. Chang, Tien-Chien; Wysk, Richard A. e Wang, Hsu-Pin, "Computer Aided Manufacturing", Prentice Hall Inc. ; 1991.
4. Groover, Mikell P., "Automation, Production Systems, and Computer Integrated Manufacturing", Prentice Hall Inc. ; 1987.
5. Rocha, A. Barata; "Puncionadoras CNC", ISBN: 972-8826-01-X.

### Teaching and learning methods

Theoretical-practices classes are used with an expository component of the theoretical subjects and a practical component of problems resolution and practical cases analysis. It is also used the interrogative method, questioning the students systematically about the most important elements of the course. In non-presence environment is proposed the resolution of problems and accomplishment works.

### Assessment methods

1. Alternative 1 - (Regular, Student Worker) (Final)
  - Final Written Exam - 20%
  - Practical Work - 80%
2. Alternative 2 - (Regular, Student Worker) (Supplementary, Special)
  - Final Written Exam - 100%

### Language of instruction

Portuguese, with additional English support for foreign students.

### Electronic validation

João Eduardo Pinto Castro Ribeiro	João da Rocha e Silva	José Alexandre de Carvalho Gonçalves	Paulo Alexandre Vara Alves
06-10-2022	06-10-2022	06-10-2022	04-11-2022