

<b>POLI</b> <b>ESCOLA SUPERIOR</b> <b>TECNOLOGIA</b> <b>GESTÃO</b> <b>TÉCNICO</b> <b>GUARDA</b>	<b>SUBJECT DESCRIPTION</b>	<b>MODELO</b> PED.013.03
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Course	Mechanical and Industrial Informatics					
Subject	Advanced Manufacturing Technologies					
Academic year	2023-2024	Curricular year	3rd	Study period	1st semester	
Type of subject	Compulsory	Student workload (H)	Total: 162	Contact: 60	ECTS	6
Professor(s)	Luís Miguel Lopes Lourenço, PhD					
<input checked="" type="checkbox"/> Area/Group Coordinator <input type="checkbox"/> Head of Department	(select)	José Reinas dos Santos André, PhD				

## PLANNED SUBJECT DESCRIPTION

### 1. LEARNING OBJECTIVES

*Upon Intended learning outcomes C1- Acquire theory and practical knowledge of 3D digital modeling (parametric modeling). Modeling of parts and mechanical assemblies.*

*Intended learning outcomes C2- Acquire fundamental theory and practical knowledge about rapid prototyping technologies and reverse engineering techniques.*

*Intended learning outcomes C3- Acquire fundamental knowledge in rapid manufacturing and intelligent production systems.*

*Intended learning outcomes C4- Acquire theory and practical knowledge in CAD/CAM technology. Numerical control programming with CAD/CAM software.*

### 2. PROGRAMME

1. Introduction to advanced manufacturing technologies.
2. Computer-aided three-dimensional design, parametric modeling practice.
3. Digital prototyping. Digital prototyping and traditional prototyping; an introduction to the practice of digital prototyping.
4. Rapid prototyping. Rapid prototyping processes and operating principles - advantages and disadvantages; an introduction to rapid prototyping practice.
5. Reverse engineering. Introduction to reverse engineering technology and reverse engineering practice.
6. Introduction to rapid manufacturing and intelligent production systems.
7. CAD/CAM technology and programming. CAD/CAM systems, programming and machining: hardware and software; materials to be machined; tools and cutting strategies; cutting parameters; analysis and simulation of the machining cycles; machining/job execution.

### 3. COHERENCE BETWEEN PROGRAMME AND OBJECTIVES

*Intended learning outcomes C1 – syllabus contents in 2.*

*Intended learning outcomes C2 – syllabus contents in 1, 3, 4 and 5.*

*Intended learning outcomes C3 – syllabus contents in 1 and 6.*

*Intended learning outcomes C4 – syllabus contents in 1, 2 and 7.*

### 4. MAIN BIBLIOGRAPHY

Hopkinson, N.; Hague, R.; Dickens, P.; Rapid Manufacturing: an industrial revolution for the digital age, Wiley, 2006. ISBN: 978-0-470-03286-2.

Gillespie, Laroux K.; Design For Advanced Manufacturing: Technologies, And Processes, McGraw-Hill, 2017. ISBN: 9781259587450.

Costa, Américo; Autodesk Inventor 2013 - curso completo, FCA, 2013. ISBN: 978-972-722-736-5.

Costa, Américo; Projeto 3D em Solidworks, Cenfim, FCA editora, 2016. ISBN: 978-972-722-820-1.

Costa, Américo; Projeto 3D em Solidworks e Solidcam, Cenfim, FCA editora, 2021. ISBN: 978-972-722-913-0.

Rocha, Joaquim; “Programação de CNC para Torno e Fresadora”, CENFIM, FCA editora, 2016. ISBN: 978-972-722-843-0.

Alavala, Chennakesava R.; CAD/CAM: Concepts and Applications, PHI Learning Ed., 2013. ISBN: 8120333403.

Rocha, Joaquim; Programação CAD/CAM em Mastercam, Cenfim, FCA editora, 2016. ISBN: 978-972-722-842-3.

<p><b>POLI</b>  <b>ESCOLA SUPERIOR</b>  <b>TECNOLOGIA</b>  <b>GESTÃO</b>  <b>TÉCNICO</b>  <b>GUARDA</b></p>	<p><b>SUBJECT DESCRIPTION</b></p>	<p><b>MODELO</b>  PED.013.03</p>
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Putnik, Goran D. et. al; Advanced Manufacturing Systems and Enterprises: Towards Ubiquitous and Cloud Manufacturing; University of Minho, School of Engineering, 2012.

## 5. TEACHING METHODOLOGIES (INCLUDING EVALUATION)

*Teaching methodologies*

*The contents are presented using theoretical-practical lessons (TP).*

*The contents are presented through lectures, using the whiteboard, audiovisual media and demonstrations using CAD/CAM software and laboratory equipment and workshop CNC machines, followed by practice with student participation intended to consolidate acquired knowledge.*

*Student evaluation*

*Ongoing assessment (minimum grade – 10/20):*

*A minimum of 3 practical assignments throughout the semester, including a written report - 50% and their presentation / defense (50%). The evaluation is exclusively ongoing with no possibility to pass via a final exam.*

## 6. COHERENCE BETWEEN TEACHING METHODOLOGIES AND OBJECTIVES

*The oral presentation of the contents, using the whiteboard, audiovisual media, practical examples and practical demonstrations using laboratory / workshop equipment, ensures that students achieve the intended learning outcomes.*

*The ongoing practice throughout the lessons ensures the students acquire skills in advanced manufacturing technologies, particularly in CAD/CAM machining.*

## 7. ATTENDANCE

N.A.

## 8. CONTACTS AND OFFICE HOURS

Professor: Luís Miguel Lopes Lourenço (PhD), [mlopes@ip.pt](mailto:mlopes@ip.pt); office n.º 67. Office Hours: *Monday 16:00-17:30; Wednesday 16:00-17:30; Friday 10:00-11:00 and 16:00-17:00.*

Area Coordinator: José Reinas dos Santos André (PhD), [jandre@ipg.pt](mailto:jandre@ipg.pt); office n.º 13

## 9. OTHERS

N.A.

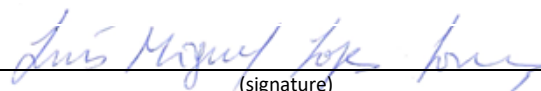
## DATE

**29 de setembro de 2023**

## SIGNATURES

*Professor(s), Area/Group Coordinator or Head of Department signatures*

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