

### Curricular Unit Form (FUC)

Course:	<b>FIRST CYCLE IN MECHANICAL ENGINEERING</b>					
Curricular Unit (UC)	<b>Maintenance Management</b>				Mandatory	<b>X</b>
					Optional	
Scientific Area:	<b>Mechanical Project, Manufacturing and Industrial Maintenance</b>					
Year: <b>3</b>	Semester: <b>6</b>	ECTS: <b>5,0</b>		Total Hours: <b>135</b>		
Contact Hours:	T:	TP: <b>67,5</b>	PL:	S:	OT:	TT:
Professor in charge		Academic Degree /Title		Position		
<b>José Augusto da Silva Sobral</b>		<b>PhD</b>		<b>Associate Professor</b>		

T- Theoretical ; TP – Theory and practice ; PL – Laboratory ; S – Seminar ; OT –Tutorial ; TT – Total of contact hours

Entry into Force	Semester: <b>Winter</b>	Academic Year: <b>2016/2017</b>
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#### Objectives of the curricular unit and competences (max. 1000 characters)

- Acquire knowledge about Maintenance concepts and Maintenance terminology
- Acquire and apply knowledge about materials usually applied in Maintenance activities
- Know how to analyze and make diagnostics about component and system failures
- Know principles of asset management
- Know how to manage and control risk through Maintenance activities

With this curricular unit students must recognize Maintenance methods, know how to apply reliability basic concepts as a Maintenance support decision tool, deal with Maintenance materials and should know how to do a Maintenance Plan.

#### Syllabus (max. 1000 characters)

- 1 - Introduction to Maintenance
- 2 - Maintenance Basic Concepts
- 3 - Evolution of Maintenance Methods (including TPM and RCM)
- 4 - Reliability, Maintainability and Availability
- 5 - Materials used in Maintenance
- 6 - Maintenance Planning and Maintenance Control
- 7 - Quantification of Maintenance Decisions
- 8 - Planned Maintenance and Planning Techniques (PERT e CPM)

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### Demonstration of the syllabus coherence with curricular unit's objectives (max. 1000 characters)

Chapter 1, 2 and 3 allow acquiring knowledge about Maintenance and all existing Maintenance methods. Chapter 4 gives the ability to apply reliability concepts and to determine component or system reliability and availability. Chapter 5 allows dealing with most common Maintenance materials and Chapter 6, 7 and 8 give students the knowledge to be able to perform a Maintenance Plan.

### Teaching methodologies (including evaluation) (max. 1000 characters)

The teaching methodology is based in theoretical and practical classes, including student autonomous work (investigation). An investigation work is proposed, ending with an oral (PowerPoint) presentation in front of all classmates.

Theoretical classes are supported by existing hardware devices and explained with practical case studies.

Practical classes include software usage in a way to perform a Maintenance Planning.

Evaluation / Assessment:

- Investigation work (with oral presentation included) = 25%
- Practical work in Microsoft Project (with final report) = 10%
- Written Examination = 65%

NOTE: Both works are pedagogically fundamental, so that the student submission to the written examination does not avoid their presentation, until the indicated date.

### Demonstration of the teaching methodologies coherence with the curricular unit's objectives

(max. 3000 characters)

Teaching methodology includes theoretical classes giving Maintenance basic concepts to students allowing knowledge and comprehension of all topics of the curricular unit program. Practical classes complement the theoretical ones where problems and exercises are solved by the students allowing the consolidation of all concepts. Practical classes include case studies about reliability determination and how to perform a Maintenance plan taking into account economical and safety purposes.

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### Main Bibliography (max. 1000 characters)

#### Main

- ROCHA J.S., Gestão da Manutenção (Apontamentos) – AEISEL

#### Complementary

- AMARAL, F.D., Gestão da Manutenção na Indústria, LIDEL, ISBN: 978-989-752-151-5
- FERREIRA L.A., Uma Introdução à Manutenção, Publindustria, ISBN: 972-95794-4-X
- CABRAL J.S., Organização e Gestão da Manutenção, Lidel, ISBN: 972-757-052-6
- ASSIS R., Manutenção Centrada na Fiabilidade, Lisboa, Lidel, ISBN: 972-757-037-2
- SOURIS J. Paul, Manutenção Industrial Custo ou Benefício, Lidel, ISBN: 972-9018-25-1
- MOUBRAY J., Reliability-Centered Maintenance, Butterworth Heinemann, ISBN: 0-7506-33581
- HIGGINS L., Maintenance Engineering Handbook, McGraw Hill, ISBN: 0-07-028766X
- MONCHY F., La Fonction Maintenance, Masson, ISBN: 2-225-807757-4
- MONCHY F., Maintenance, Méthodes et Organisations, Dunod, ISBN: 2-10-007816X