

Curricular Unit Form (FUC) (FUC)

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|-------------------------------------|--|------------------------|-----|-------------------------|--------------------------|----------|
| Course: | FIRST CYCLE IN MECHANICAL ENGINEERING | | | | | |
| Curricular Unit (UC) | Physical Assets and Industrial Processes | | | | Mandatory | |
| | | | | | Optional | X |
| Scientific Area: | Mechanical Design, Manufacturing and Industrial Maintenance | | | | | |
| Year: 3 | Semester: 2 | ECTS: 4,0 | | Total Hours: 3,0 | | |
| Contact Hours: | T: | TP: 45,0 | PL: | S: | OT: | TT: |
| Professor in charge | | Academic Degree /Title | | | Position | |
| José Augusto da Silva Sobral | | PhD | | | Adjunct Professor | |

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

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

Taking into account the world's increasing reference to the so called "Physical Asset Management" and the importance that it takes to meet the entire lifecycle of assets, and thus realize and understand their performance in any production process, it is fundamental to understand the various degradation mechanisms and the specific failure modes that may occur, not only looking at the equipment itself on a classic view of failure mode analysis, but also including a functional analysis considering the production process where the asset is operating.

It is expected that students have developed and acquired skills to recognize the equipment studied in a separate and different industrial environment of the studied concrete applications, be aware of some industrial processes having a more global view of certain technical operations and have developed the cognitive bases to address their duties with safety in their future professional life, whether linked to production process or over functions related to the maintenance of the facilities.

Syllabus (max. 1000 characters)

Syllabus:

1. Asset Management
2. Standards and Legislation
3. Asset Lifecycle
4. Physical Assets' Reliability, Maintainability and Availability
5. Physical Assets and Design
6. Industrial Processes
7. Failure Modes
8. Failure Modes and their connection to Industrial Processes

9. Degradation Mechanisms
10. Good practices in Production and Maintenance.

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

The syllabus established for the curricular unit are aimed at giving students the basic elements for the understanding of theoretical concepts and the importance of physical assets in the industrial context and added value, while allowing the practice and use of methodologies, tools and methods for correct identification of possible degradation mechanisms and potential failure modes that may occur in each context through real examples of case studies.

Thus, it is considered that the objectives set for the curricular unit will be achieved.

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

The curricular unit will be taught with the help of presentations in PowerPoint, the display of industrial videos involving special equipment studied, as well as through the analysis of technical construction drawings. The unit is also based on practical exercises of the subjects dealt with illustration.

The evaluation consists of one (1) theoretical and practical work (T) and one (1) Examination (E) to be held in any of the examination periods. The work will be done individually and is considered pedagogically fundamental, so its exemption will invalidate the approval on the curricular unit. The final grade (NF) will be determined based on the following expression:

$$NF = 0.6x (T) + 0.4x (E)$$

It is considered approved the student who obtains a final grade (NF) equal to or higher than 10, with a minimum grade required in any of the evaluation elements (T or E) equal to 10 values.

Demonstration of the teaching methodologies coherence with the curricular unit's objectives
(max. 3000 characters)

The teaching methods based on the transmission of theoretical concepts and explanation and demonstration of the various methodologies, tools and methods, as well as the proposed practice of observing videos, analysis of production processes and implementation of individual work focusing on a real equipment, give students the knowledge and skills that are consistent with the objectives for the course.

Main Bibliography (max. 1000 characters)

- ISO 55000: 2014. Asset management - Overview, principles and terminology. ISO, Geneva, Switzerland
- ISO 55001: 2014. Asset management - Management systems - Requirements. ISO, Geneva, Switzerland
- ISO 55002: 2014. Asset management - Management systems - Guidelines for the application of ISO 55001. ISO, Geneva, Switzerland
- Assis, R. (2010). Apoio à decisão em Manutenção na Gestão de Activos Físicos. ISBN 978-972-757-605-0. LIDEL, Lisboa, Portugal
- PAS55-1:2008. Specification for the optimized management of physical assets. The BSI, London, United Kingdom
- PAS55-2:2008. Guidelines for the application of PAS 55-1. The BSI, London, United Kingdom
- Shigley, J., Mischke, C. (1989). Mechanical Engineering Design – 5th Edition. ISBN 0-07-100607-9. McGraw-Hill International Editions, Singapore
- Wilson, A. (2013). Asset Management – Focusing on developing maintenance strategies and improving performance. ISBN 978-0-9506465-6-5, Surrey, United Kingdom