

Sheet course ()

Course	MSc IN MECHANICAL ENGINEERING		
Unit	Reliability	Mandatory	<input type="checkbox"/>
		Optional	<input checked="" type="checkbox"/>
Unit scientific area	Industrial and Maintenance Engineering	Category	B

Unit category: B - Basic; C - Core Engineering; E - Specialization; P - Complementary.

Year: 1st	Semester: 2nd		ECTS: 5,0			
Contact time	Total:	T:	TP: 45,0	PL:	S:	OT:

T - Lectures; TP - Theory and practice; PL - Lab Work; S - Seminar; OT - Tutorial Guidance.

Unit Director	Title	Position
José Augusto da Silva Sobral	Ph.D.	Assistant Professor

Learning Objectives (knowledge, skills and competences to be developed by students)

(max. 1000 characters)

Objective: To enable the student of Mechanical Engineering (MSc) with basic knowledge of the theory of reliability and their industrial applications, including methods of Reliability Centered Maintenance.

Skills:

- Knowledge of scientific methods of evaluation of probability of failure of equipment for maximizing its safety and availability at minimum life cycle costs;
- Recur to the reliability theory potential as a support for engineering specifications production aiming the prevention of in-service failures (Maintenance Program);
- Good information and critical attitude, in general, to the phenomena of Uncertainty and Risk in Engineering, and knowledge of their statistical/probabilistic methods of control;
- Practice of Statistical Analysis of Failure not only for obtaining improved reliability but also for equipment reliability warranty argumentation purposes.

Syllabus

(max. 1000 characters)

1. Introduction
2. Reliability Function and Life of Components

3. Systems Reliability
4. Failure Analysis and Prevention
5. Reliability and Maintenance

Demonstration of consistency of the syllabus with the objectives of the course

(max. 1000 characters)

The syllabus of this course provides students with an evolutionary learning on the objectives and competencies to be acquired. Thus, throughout the chapters are provided all the basic knowledge of the area of Reliability. Fundamentally and as regards the useful life of assets and production equipment, the unit aims to highlight their availability for assuring the functions which are designed and engineered by linking the probability of its good performance (reliability) to the high probability of durations of interventions Maintenance required. Thus the student can acquire skills on the concepts underlying the theory of Reliability and its conceptual integration.

Teaching methodology (evaluation included)

(max. 1000 characters)

Teaching methodology - Theoretical classes (approx. 60%) and practical (on issues related with practical cases, approx. 40%); - Lecture exposition supported on the board (approx. 60%) and by IT (power point, approx. 40%).

Assessment. It can be done by one of two alternative modes:

- Continuous assessment based on two tests (one carried out at mid-semester and another one at the end of the same). The "weights" of the tests are 50% each, being required, for approval on the chair, a minimum of 8 points in any of the tests and an average of 10 points minimum (in 20 max.) on both tests. The retrial of one of the two tests, during the 1st season of examination, is allowed.

- Examination. In this mode, the test questionnaire is in fact, and whichever the examination season, a set of two tests - one 1st test and one 2nd test. For approval on the chair, the same rules as above apply to the set of tests.

Demonstration of consistency of teaching methods with the learning objectives of the course

(max. 3000 characters)

Taking into account the objectives of this course, the teaching methodology used here allows the student to

have contact in the classroom and laboratory, with educational resources enabling them to obtain the theoretical and practical skills on the fundamental concepts of this course. With this in mind, oral and written classroom learning, resolution of exercises, simulations with appropriate software, the research work fostered during lectures and presentation / analysis of case studies is essential.

Main Bibliography

(max. 1000 characters)

CARINHAS, H.P., "Fiabilidade" (Didactic Reliability Manual for students support)

AMARAL, F.D., "Gestão da Manutenção na Indústria", LIDEL, 2016

O'CONNOR, P., "Practical Reliability Engineering", John Wiley & Sons Ed., 2002

MONCHY, F., "Maintenance - Méthodes e Organisations", Ed. Dunod, 2003

MOUBRAY, J., "Reliability Centered Maintenance", Butterworth Heinemann Ed., 1997