Reliability and risk analysis of industrial installations

Lecturer
Pierre-Etienne LABEAU (Coordinator)

Course mnemonic
PHYS-H524

ECTS credits
4 credits

Language(s) of instruction
English

Course period
First term

Campus
Solbosch

Course content

Relevance of RAMS (Reliability, Availability, Maintainability and Safety) studies. Basic concepts. Operational feedback in RAMS. Modelling of one component – elements of renewal theory. Boolean qualitative and quantitative analysis methods for multi-component systems (reliability block diagrams, fault trees, event trees). Markovian reliability and modelling of functional dependencies. RAMS modelling based on Petri nets and Monte Carlo simulation. Maintenance policies.

Objectives (and/or specific learning outcomes)

This course treats the issues of safety and performances of industrial systems subject to failures. It provides an overview of the main methodologies used in RAMS (Reliability, Availability, Maintainability and Safety) assessments.

Teaching method and learning activities

Oral lectures with many exercises and tutorials, some of which on commercial software. Seminars
Lectures are also available online, given the sanitary situation.

Contribution to the teaching profile

This teaching unit contributes to the following competences:

> Work in an industrial environment with attention to safety, quality assurance, communication and reporting

> Consciousness of the ethical, social, environmental and economic context of his/her work and strives for sustainable solutions to engineering problems including safety and quality assurance aspects

> The flexibility and adaptability to work in an international and/or intercultural context

References, bibliography and recommended reading

A.Pagès & M. Gondran, "Fiabilité des Systèmes", Eyrolles, Paris, 1980. H. Kumamoto & E.J. Henley, « Probabilistic Risk Assessment and Management for Engineers and Scientists », 2nd edition, IEEE Press, New York, 1996. M. Modarres, "What Every Engineer Should Know about Reliability and Risk Analysis", Marcel Dekker Inc., New York, 1993. A. Lannoy, "Analyse Quantitative et Utilité du Retour d'Expérience pour la Maintenance des Matériels et de la Sécurité », Eyrolles, Paris, 1996. A. Dubi, « Monte Carlo Applications in System Engineering », John Wiley & Sons, Chichester, 1999. J. Libmann, "Eléments de Sûreté Nucléaire", IPSN, Les Editions de Physique, 1996. T. Bedford & R. Cooke, « Probabilistic Risk Analysis – Foundations and Methods », Cambridge University Press, 2001.

Other information

Place(s) of teaching

Solbosch

Contact(s)

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Evaluation method(s)

Other

Evaluation method(s) (additional information)

written exam for PE Labeau's part (open book), oral exam for P.Hoorelbeke and D.Roosendans 's part

Determination of the mark (including the weighting of partial marks)

5/8 for the part of P.E.Labeau and 3/8 for the part of M.Van Overmeire (if a minimum threshold of 08/20 is reached for each part, otherwise the lower mark is absorbing)

Main language(s) of evaluation

English

Programmes

Programmes proposing this course at the
Brussels School of Engineering

MA-IREM | Master of science in Electromechanical
Engineering | finalité Operations engineering and management/unit

2 and MA-IRMA | Master of Science in Chemical and Materials
Engineering | finalité Professional/unit 2