

# Reliability and risk analysis of industrial installations

## Titulaire

Pierre-Etienne LABEAU (Coordonnateur)

## Mnémonique du cours

PHYS-H524

## Crédits ECTS

4 crédits

## Langue(s) d'enseignement

Anglais

## Période du cours

Premier quadrimestre

## Campus

Solbosch

## Contenu du cours

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.

## Objectifs (et/ou acquis d'apprentissages spécifiques)

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.

## Méthodes d'enseignement et activités d'apprentissages

Oral lectures with many exercises and tutorials, some of which on commercial software. Seminars

Lectures are also available online given the sanitary situation.

## Contribution au profil d'enseignement

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

## Références, bibliographie et lectures recommandées

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.

## Autres renseignements

### Lieu(x) d'enseignement

Solbosch

### Contact(s)

Métrologie nucléaire Bât D, Porte B, Niv 3, local 153 Tél : 02/650 20 60 Mail : pierre.etienne.labeau@ulb.be

## Méthode(s) d'évaluation

Autre

### Méthode(s) d'évaluation (complément)

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

### Construction de la note (en ce compris, la pondération des notes partielles)

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)

### Langue(s) d'évaluation principale(s)

Anglais

## Programmes

### Programmes proposant ce cours à l'école polytechnique de Bruxelles

MA-IREM | Master : ingénieur civil électromécanicien | finalité  
Operation engineering and management/bloc 2 et MA-IRMA | Master :

