

UE Diagnosis, Reliability & Maintenance

 ECTS
6 crédits

 Composante
UFR Physique,
Ingénierie,
Terre,
Environnement,
Mécanique
(PhITEM)

 Période de
l'année
Automne (sept.
à dec./janv.)

Diplômes intégrant cet élément

- Master Electronique, énergie électrique, automatique

- Langue(s) d'enseignement: Anglais
- Ouvert aux étudiants en échange: Oui
- Code d'export Apogée: PAX9MIAD

Présentation

Description

This course offers a comprehensive and practice-oriented introduction to safety, supervision, and fault diagnosis in modern industrial systems. Students explore the key principles of detecting and isolating faults in complex processes through three complementary approaches: model-based methods, signal-processing techniques, and data-driven analytics. The class combines solid theoretical foundations with hands-on laboratory sessions, where learners apply advanced supervision tools to real-world scenarios ranging from fluid systems and EEG-based sleep monitoring to mineral processing and environmental sensor networks. Designed for future engineers and researchers, this course provides the essential skills needed to ensure reliability, performance, and safety in today's automated industrial plants.

Systems reliability and maintenance : the objective of this course is to provide a comprehensive foundation in system reliability theory and dependability analysis methods :

- Probabilistic failure models and lifetime modelling of engineering components

- Qualitative approaches to system reliability analysis (FMECA, ...)
- Reliability modelling and analysis of systems and networks of independent components (Fault Tree Analysis, Reliability Block Diagrams, Event Tree Analysis, Structure Function, Minimal Cutsets, Importance Measures)
- Markov processes for systems and networks reliability modelling (systems with dependent components, passive redundancies, tested components, ...)
- Reliability of maintained systems and maintenance policies modelling

Heures d'enseignement

CMTD	Cours magistral - Travaux dirigés	33h
TP	TP	21h

Bibliographie

Reference textbooks :

- S. Gentil (Ed.), "Supervision des procédés complexes", HERMES Systèmes automatisés, 2007.
- Isermann, "Fault diagnosis systems", Springer, 2006.
- Blanke, Kinnaert, Lunze, Staroswiecki, "Diagnosis and fault tolerant control", Springer, 2003.
- Marvin Rausand, Arnljot Hoyland, System Reliability Theory - Models, Statistical Methods and Applications. Wiley Series in Probability and Statistics. 2004.
- J.D. Andrews, T.R. Moss, Reliability and Risk Assessment. Longman Scientific & Technical. 1993
- M. Modarres, What every engineer should know about Reliability and Risk Analysis. Marcel Dekker. 1993

Infos pratiques

Campus

➤ Grenoble - Polygone scientifique