

Reliability models and Reliability statistical methods



SCHOOL

Polytech Graduate School of
Engineering



CAMPUS

Belle-Beille



LEVEL

Engineering 4th year



OPEN TO EXCHANGE STUDENTS

Yes



SEMESTER

Fall (S1)

> **Degree course:** Quality, Innovation and Reliability Engineering

> **Teaching unit:** UE 7-2 Science and technologies

> **Course language:** English

> **Duration (hours):** 40

> **ECTS:** 2

> **Teacher(s):** Mihaela Barreau and Bruno Castanier

> **Assessment:**

Continuous assessment

Final exam

> **Teaching methods:**

Lecture course 18.67 hours

Tutorial course 21.33 hours

Practical work hours

Case study

Project

COURSE DESCRIPTION

Introduction : provisional dependability

- Reliability block diagrams (RBD)
- Series and parallel RBD, series/parallel and parallel/series RBD, complex RBD
- Failure trees
- Representation, Construction rules, Boolean expression, Quantitative analysis
- Reliability postmortem (feedback) databases
- Databases for electronic parts, for non-electronic parts, other reliability databases
- Statistical methods for reliability data
- Complete and censored reliability estimation methods
- Estimation of the reliability metrics in case of weak information
- Degradation-based reliability model estimation
- How to assess the reliability metrics in various mission profiles

OBJECTIVES

Assessing the system reliability in the design phase, studying dependability in design phase, estimating the reliability metrics of a product in the operating phase, verifying the validity of the reliability design specification

PREREQUISITES

Dependability, Basics in reliability, Reliability engineering, Probability and Statistics

SELECTIVE BIBLIOGRAPHY

- « Sûreté de fonctionnement des systèmes industriels », A. Villemeur, Eyrolles, 1988
- « System Reliability Theory », A. Hoyland et M. Rausand, Wiley, 1994
- « Arbres de défaillance », N. Limnios, Hermes, 1991 - « Processus stochastiques », A. Ruegg, Presses Polytechniques Romandes, 1989
- « Statistical Methods for Reliability Data », W. Meeker et L. Escobar, Wiley, 1998