Safety Testing and Evaluation

Component
École Nationale Supérieure d'Électrotechnique d'Électronique

In brief

- **Ametys Code:** N9EE20C
- **Open to exchange students:** Yes

Presentation

Description

Introductory concepts: purpose of testing, other verification approaches (reviews and inspections, abstract interpretation, theorem proving, model checking, symbolic execution), cost of fault elimination, oracle problem, test selection problem.

Structural testing methods: control graph, coverage criteria (instructions, branches, paths, loops, MCDC).

Functional testing methods: equivalence classes and boundary values, decision table coverage, testing using a finite state machine.

Non-deterministic generation: fuzzing, operational testing, testing based on metaheuristic search.

Illustration with examples.

Evaluation:

Failure prediction.

Ordinal (or qualitative) and stochastic (or quantitative) evaluations.

Stable vs. evolving (increasing, decreasing) reliability.

Reliability measurements (or metrics).

Evaluation approaches: modeling (FMEA, reliability diagrams, fault trees), measurements.

Pre-requisites

Basic knowledge of computer science (hardware, operating systems, languages)

Concept of behavioral modeling of computer systems