

EX212 : Optional units O82 (if B2 validated)

Shared by UV(s) :

M8-C Optional unit O81-O82 - Project in a research laboratory page 0

To choose from :

AN202 High Performance Computation page 0
OA201 Physical Acoustics page 0
PS201 Probabilistic methods in Reliability page 0

ECTS credits :

3.00

Number of hours :

Combined lecture and tutorial classes : 36.00
Individual work : 18.00

Teacher(s) :

BODIGUEL Hugues

Title :

Optional units O82 (if B2 validated)

AN202 : High Performance Computation

Shared by choice module(s) :

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ECTS credits :

3.00

Evaluation :

S1: CC; S2: ET(2h,E,sd,sc)

Number of hours :

Combined lecture and tutorial classes : 36.00

Individual work : 18.00

Teacher(s) :

BEAUGENDRE Héloïse

Title :

High Performance Computation

Abstract :

Goal: Learn the basis notions to create parallel codes using the library MPI (Message Passing Interface) and OpenMP directives. Based on Fortran 90.

Plan :

- * Introduction
- * Parallel algorithm
 - Definitions
 - Physical and logical organization of the memory
 - Simple parallel algorithms
 - Definition of the speed-up and the efficiency of a parallel code
- * Parallel architecture and programming model
 - Shared memory parallel machine
 - Distributed parallel machine
- * OpenMP directives in a Fortran code
- * MPI library
- * Conclusion: development of a code to solve the heat equation using MPI library.

OA201 : Physical Acoustics

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ECTS credits :

3.00

Evaluation :

S1: ET(2h,E,sd,sc) x1

Number of hours :

Combined lecture and tutorial classes : 36.00

Individual work : 18.00

Teacher(s) :

BRUNET Thomas

Title :

Physical Acoustics

Abstract :

This module aims to convey the basic physical principles of physical acoustics. The equations governing wave propagation in various media, fluid and solid, are established. Depending on the geometry of the problem (infinite or bounded media), solutions of these wave equations are considered taking into account the boundary conditions. Each scenario studied is illustrated through applications across the industrial world.

Plan :

Acoustic waves in fluids

- Progressive, stationary and guided waves.
- Equation of propagation for a plane wave.
- Reflection/Refraction of plane waves.
- Spherical waves - Radiation.

Elastic waves in solids

- Propagation in infinite media.
- Propagation in semi-infinite media (Rayleigh waves).
- Propagation in bounded media (Lamb waves).
- NDT methods and applications.

PS201 : Probabilistic methods in Reliability

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ECTS credits :

3.00

Evaluation :

S1: CC; S2: ET(2h,E,sd,sc)

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Teacher(s) :

FERAL Delphine

Title :

Probabilistic methods in Reliability

Abstract :

In this course, it will be introduced basic and advanced probabilistic tools for analyzing practical reliability problems such as structural reliability.

Plan :

- * Compléments aux calcul des probabilités
 - Somme de variables aléatoires indépendantes, variable aléatoire gaussienne.
 - Convergence des variables aléatoires : convergence en probabilité, convergence presque sûre.
 - Convergence en loi. Loi des grands nombres. Théorème limite centrale.
 - Espérance conditionnelle: définition et propriétés.
- * Statistique
 - Théorie des tests et de l'estimation

Document(s) :

J. Jacod, P. Protter, L'essentiel en théorie des probabilités, Cassini, 2003.
J.-Y. Ouvrard, Probabilités Tome I et II, Cassini, 2004.