INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES LYON

DPT GENIE MECANIQUE
MECHANICAL ENGINEERING DESIGN & PRODUCT INNOVATION
Domaine Scientifique de la DOUA - Bât. A. de Saint-Exupéry
27, avenue Jean Capelle - 69621 VILLEURBANNE
E-mail : gmc-departement@insa-lyon.fr - Web site : http://gmc.insa-lyon.fr/

Spécialisations

Material Health Assessment Tool

IDENTIFICATION

CODE : GMCIP-5-S2-EC-SSAM
ECTS : 2.0

HOURS

Lectures :	10.0 h
Seminars :	10.0 h
Laboratory :	0.0 h
Project :	0.0 h
Teacher-student contact :	20.0 h
Personal work :	20.0 h
Total :	40.0 h

ASSESSMENT METHOD

Two hours final examination

TEACHING AIDS

polycopiés et tutoriaux

TEACHING LANGUAGE

French

CONTACT

M. LE BOURLOT Christophe
christophe.le-bourlot@insa-lyon.fr
MME SALLE Emmanuelle
emmanuelle.vidal-salle@insa-lyon.fr
Phone : 0472438146
Fax : 0472438525

AIMS

This CE comes under the teaching unit GMCIP-5-SPE-S2, Specialization project and contributes to:
School science skills for engineers:
A5- Process data (level 2)
A6- Communicate an analysis, a scientific approach, a proof or a solution of argued and logical (level 2)

School skills specific to the specialty:
C2- Analyze the needs expressed or assumed and define the design requirements of a mechanical system meeting these needs (level 2)
C7- Use digital simulation tools (level 3)
C8- Modeling the behavior of a multiphysics system or phenomenon (level 2)

By mobilizing the following skills:
A2- Using a model of a real or virtual system
A4- Design a system that meets specifications

By allowing the student to work and be assessed on the following knowledge: - Theory of laminates
- Basics of X-ray interactions theory
- Basic properties of solid materials
- Micro-structure / mechanical properties link

By allowing the student to work and be evaluated on the following capacities:
- Carry out a data setting for a finite element calculation of composite materials
- Using results from a tomographic analysis
- Design composite materials

CONTENT

This course aims to provide the methodological tools for determining the relationship between microstructural properties and usage properties of solid materials, we will successively explore a whole range of tools and methods:
- Laminate theory
- Use of ABAQUS software to carry out data using composite materials
- advanced use of CES Edupack
- Basics of theory for tomography

But to be able to report on trials, it is also important to know how to format scientific results:
- Formatting of scientific documents
- Basics of poster creation

BIBLIOGRAPHY

- Matériaux composites. Daniel Gay. ISBN : 978-2-7462-4707-9.
- Nonlinear continuum mechanics of solids : fundamental concepts and perspectives. Yavuz Bazar, Dieter Weichert ISBN : 3-540-66601-X.
- http://abaqusdoc.insa-lyon.fr:2080/v6.14/books/

PRE-REQUISITE

Basics of Solid Mechanics
Materials science for engineers
Basic use of a finite element code