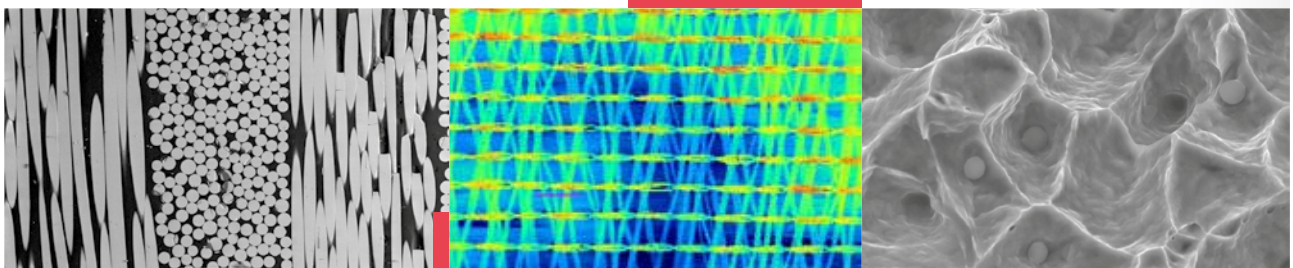




2ND AND 3RD YEAR SPECIALISATION

MECHANICAL ENGINEERING FOR MATERIALS & MANUFACTURING PROCESSES

To train general engineering students in materials mechanics with particular expertise in manufacturing and implementation processes. Apprehend a design and/or manufacturing problem in its entirety and complexity: choose the material and the process, evaluate the mechanical strength and durability, with a constant emphasis on innovation and respect for ecological principles.



COURSE CONTENT

- > Materials selection in mechanical design
 - > Experimental methods in materials science
 - > Multi-physics modelling
 - > Finite Element Method
 - > Conferences and company visits
 - > Metallurgy
 - > Mechanics of elastomers
 - > Polymers and composites
 - > Project 1
- > Materials and society
 - > Fatigue and fracture of materials
 - > Metal processing
 - > Polymer processing
 - > Project 2
 - > Internship



INDUSTRY SECTORS

- > Transport (aeronautic, naval)
- > Energy (nuclear, renewable)
- > Raw materials (development, purchasing)
- > Consultancy: engineering, sustainable development

CAREER PROSPECTS

- > Design and Methods Office
- > Research and development: tests, processes, calculation

TEACHING STAFF

HEAD OF SPECIALISATION:

Sébastien Comas-Cardona

LECTURERS:

Christophe Binetruy, Christian Burtin, Sébastien Comas-Cardona, Michel Coret, Thomas Corre, Bertrand Huneau, Jean-Michel Lebrun, Adrien Leygue, Guillaume Racineux, Erwan Verron

EXTERNAL SPEAKERS:

Naval Group, Michelin, RATP, Constellium, Saint-Gobain

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EXAMPLES OF PREVIOUS PROJECTS

- > Composite processes applied to electric motors: definition and testing of capillary impregnation in fibrous media
- > Determination of the characteristics of «eco-responsible» composites
- > Construction of a multiaxial fatigue curve for synthetic rubber
- > Optimal coupling of data-driven mechanical simulation and numerical homogenization techniques for structural calculations
- > A fractal material to trap cracks?
- > Additive manufacturing and composite materials: specifications and limitations
- > Magnetic pulse spot welding of metal alloys

EXAMPLES OF PREVIOUS INTERNSHIPS

- > Study of the natural character of flax fibre: influence of beam variability on their mechanical behaviour (Depestele, France)
- > Dynamic transformation in titanium alloy Ti-10-2-3 (Ecole de Technologie Supérieure, Canada)
- > Simulation of metallic additive manufacturing (Naval Group, France)
- > Study of the behaviour of a seal in a fuel cell (Faurecia, France)
- > Modeling the behaviour law of a polymer used for sports shoe soles (Arkema, France)
- > Mechanical characterization of a composite with long staple fibres (Safran, France)
- > Compensation of microstructure effect during ultrasonic residual stress measurement, Veqter (Bristol, UK)
- > Reuse of waste plastic fibres from discarded fishing nets as shrinkage cracking prevention of cement-based specimen, DTU (Copenhagen, Denmark)
- > Study of the weldability of a new superalloy, Aubert & Duval (Clermont-Ferrand, France) / TWI (Cambridge, UK)

