Mechanics 1	Semester: S5

EU objectives

At the end of this course, students will be able to

- Dimensioning beam structures under static loading
- Analysing specifications
- Write the equations of motion of a mechanical system and determine the characteristics of the links and actuators using Newton Euler's formalism.
- Analyse, equate and solve a continuum mechanics problem, visualise the motion of a continuous medium,

Description of the ECUEs

MATERIAL RESISTANCE

- Introduction: Introduction to strength of materials calculations for structures
- Static torsors and mechanical links
- Beam theory
- Traction, bending, torsion, shearing
- Energy methods
- Solving hyperstatic systems

TD: Static unknowns; N, T, Mf diagrams; bending, tension, torsion dimensioning; energy methods

SYSTEMS MECHANICS 1 and 2

- reminders of kinematics
- kinetic torsor
- dynamic torsor
- fundamental principle of dynamics
- kinetic energy theorem

MECHANICS OF CONTINUOUS MEDIA

- Identify the assumptions, linked to the equations of the mechanics of continuous media, to be applied to a physical case (kinematics of a continuous medium, local study, definition of strain and stress).
- Know how to choose the equations of the mechanics of continuous media according to the physical application being treated (Conservation laws of the physics of continuous media - Application to the conservation of: mass, momentum, energy).
- Be able to argue the choice of hypotheses and equations when modelling a continuous medium in an industrial context.

Prerequisites
Vector calculus, general mechanics, solid kinematics
Bibliography
A. Giet, L. Géminard, Résistance des matériaux, 1997, Dunod Mécanique du solide, Applications industrielles, P. Agati, Y. Brémont, G. Delville, éd Dunod - Mécanique générale, cours et applications, J.C. Bône - J. Morel - M. Boucher, ed Dunod Introduction à la mécanique des milieux continus, P.Germain, P. Muller -- Mécanique des grandes transformations, P. Rougée -- Mécanique des milieux continus, J. Salençon