GÉNIE MÉCANIQUE TECHNOLOGIE-MÉCANIQUE GÉNÉRALE-RDM

MECHANICAL ENGINEERING

Lecturers: **Olivier DESSOMBZ, Bertrand HOUX, Didier LACOUR, Emmanuel RIGAUD,**

| Lecturers : 18.0 | TC : 22.0 | PW : 0.0 | Autonomy : 0.0 | Study : 0.0 | Project : 0.0 | Language : FR

Objectives

Approaching the design, dimensioning and construction of a mechanical system, as well as the study of its operation. The 1st part makes it possible to understand the architecture of a mechanical system from the description of the connections between the parts and to define the toleranced geometry of the functional surfaces. The 2nd part makes it possible to establish the equations of motion of a system of solids, from a Newtonian approach or a Lagrangian approach based on the principle of virtual power. The 3rd part makes it possible to dimension the slender deformable structures in stresses and displacements, from the internal forces induced by the loading and the reactions to the connections.

Keywords : Forces and connections, Functional dimensioning, Analytical mechanics, Principle of virtual power, Lagrange equations, Beam theory, Stress and displacement dimensioning

Programme	- Mechanical Technology Program: Forces and connections in mechanical systems. Functional specifications and product definition. - General and analytical mechanics of rigid body systems: Description of the movement, fundamental principle, principle of virtual powers (PPV), model assumptions. PPV for a single solid, definition of the different torsors, kinetic energy theorem. PPV for a system of solids, diagramming of connections, Lagrange equations. Limits of the model. - Strength of materials: Definition, diagram of a beam and model assumptions; inner efforts. Elastic sizing. Constitutive law. Limits.
Learning outcomes	• Knowing how to analyse the architecture of a mechanical system and its geometric description from technical drawings. • Knowing how to design a mechanical system and define its rating that respects the conditions for proper operation. • To be able to analyse the dynamic behavior of a system of rigid solids. • Know how to size a slender part subjected to static loading.
Independent study	Objectifs : Understand and assimilate the course.
	Méhodes : Complementary exercises to the tutorials available online, to be solved in self-assessment. Corrected exercises available on the educational server.
Core texts	Trotignon JP, *PRÉCIS DE CONSTRUCTION MÉCANIQUE TOMES 1 ET 2*, Nathan,, 2007 Brousse P *MÉCANIQUE ANALYTIQUE*, Vuibert, 1981 Timoshenko SP*RÉSISTANCE DES MATÉRIAUX, TOMES 1 ET 2*, Dunod, 1990
Assessment	Final mark = 100% Knowledge Knowledge = 84 % final exam + 16% continuous assessment