

Mechanical Design

Continuum Solid Mechanics

IDENTIFICATION

CODE : GCU-3-S1-EC-MMC
ECTS : 2.0

HOURS

Lectures : 10.0 h
Seminars : 16.0 h
Laboratory : 0.0 h
Project : 0.0 h
Teacher-student
contact : 26.0 h
Personal work : 26.0 h
Total : 52.0 h

ASSESSMENT METHOD

Multiple-choice questionnaire
Written exam

TEACHING AIDS

On-line documents

TEACHING LANGUAGE

French

CONTACT

M. BUI Tan Trung
tan-trung.bui@insa-lyon.fr
M. D'AGOSTINO Marco
marco-valerio.dagostino@insa-lyon.fr

AIMS

To develop skills in the analysis of complex mechanical problems:
- acquisition of a theoretical background on continuum solid mechanics
- initiation to the law behaviour modelling of solid materials

CONTENT

Solid deformation: displacement and strain tensor, properties of the strain tensor, graphical representations, infinitesimal strain tensor, integrable conditions of the strain tensor

Force study: fundamentals of statics ; external forces: volume and surface forces ; internal forces: stress vector, stresses, stress tensor ; properties of the stress tensor ; graphical representations ; equilibrium equations: internally and at the surface of solids

Stress-strain relations: behaviour laws ; experimental views for isotropic and anisotropic materials ; time and temperature influence on law material behaviour

Elasticity: assumptions ; constitutive equations ; Hooke law for isotropic and anisotropic materials

BIBLIOGRAPHY

TIMOSHENKO S., GOODIER J.N. Theory of elasticity, 3d ed., New York, McGraw-Hill, 1970.
BAMBERGER Y. Mécanique de l'ingénieur - milieux déformables. HERMANN, 1984.
MANDEL J. Cours de mécanique des milieux continus GAUTHIERS-VILLARS, 1966.
OBALA J. Exercices et Problèmes de mécanique des milieux continus. MASSON, 1988.
SALENCON J. Mécanique des milieux continus. Cours de l'école polytechnique, 1988.

PRE-REQUISITE

Differential calculus - Integral calculus - Matrix calculus
General background on general solid mechanics without deformation