



Mechanics of Continuum

Katarzyna Kowalczyk-Gajewska, Ph.D., Dr. Habil., Eng.

Department of Mechanics of Materials

The course presents basic concepts of continuum mechanics, namely description of kinematics of deformable material body within the large strain framework, the stress measures definitions, conservation laws and a short overview of classical constitutive models.

Main topics:

1. Description of motion and deformation of a body within the large strain regime (e.g.: deformation and strain measures, interpretation of their components, velocity field and a material derivative, the change of the infinitesimal volume and surface elements).
2. Stress state (e.g: Cauchy stress principle, eigen-value problem for the stress tensor, stress measures at the reference configuration).
3. Conservation laws in Continuum Mechanics (e.g.: global and local formulations in the current and reference configurations).
4. Constitutive equation (e.g.: objectivity principle, anisotropic linear elasticity and thermo-elasticity at small strains, hyper-elasticity and hypo-elasticity at finite strains, fundamentals of plasticity and visco-plasticity theory).

The total number of lecture hours: 30, laboratory exercises: 15 hours, self-teaching: 40, direct tutoring and consultations: 15 hours.

ECTS Points: 4