Mechanics of Continuum

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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