

Department: Civil & Environmental Engineering
Level and Major: Graduate – General Course

Division: Civil engineering

Course Title: Continuum mechanics

Number of Credits: 3

Prerequisite (Corequisite): Structural analysis (I), Concrete Technology Lecturer: -

Course Topic

- tensor :conversion of basic tensor vectors, tensor account, principal values and principal directions ,Cayley- Hamilton theory
- cinematic continuous environment ;material expression ,spatial expression ,relative expression ,material time rete ,deformation rete ,rotation rate
- limited strain and deformation, displacement gradient, ,Lagrangian expression Eulerian expression elongation ,angle change ,changing direction ,volume change, surface change, right and left deformation tensors, tensile and rotational tensors, rate of change of tensile and rotation tensors ,compatibility of strains
- survival of mass and coherence equations:coherence equations, material expression of coherence conditions, material derivative of volumetric integrals
- stress and principles of momentum: Cauchy stress, coupling stress , the first and second piola –Kirchhoff stresses, types of stresses, binary strains and their relations ,equations of motion and equilibrium
- energy rules for continuous environment:the first law o fthermodynamic for continuou s environment, stress power ,internal energy ,entropy and the second law of thermodynamic ,reversible and irreversible processes, variables and state functions ,free energy of Holm – Holtz ,enthalpy ,Gibbs function ,decay function
- material constitutions of basic laws :isotropic tensors, reference device modification and incident conversion, vector and tensor ,objectivity ,objective derivatives of Jaumann and others, separation of elastic and non-elastic deformations

Course Description:

Reading Sources:

Course Goals and objectives:

Evaluation:

Course topics:

The course aim st:o