université de BORDEAUX **Faculty of Science and Engineering (UF SDI)**

Continuum mechanics and Finite Element method applied to Solid Mechanics (6 ECTS)

Professor(s): Dr. Stephane Baste and Dr. Yann Ledoux

Location of courses: Talence Campus

Language: English

Distribution of courses: Lectures: 20h (14h sb, 6 yl), Tutorials: 16h (14 sb, 2h yl), Lab: 15h

Description:

Introduction to Mechanics of Continuous Medium

This course is intended for use by engineers and scientists who have a need for an introduction to the general principles employed in the study of solid and fluid mechanics. It deals with concept of continuity, deformations, and external forces acting on a medium, constitutive relation and associated modelling through some examples.

1.   Concept of continuity.

2.   Kinematics of Continuum Motion– Deformations

3.   Balance of Continuum Medium – Stress

1.   Constitutive Relations – Solids – Fluids

2.   Equations of Continuity - Conservation of Mass

3.   Coming Back to the Fundamental Principle of Dynamics.

Finite element theory and application

4.   Introduction to Finite element approach

5.   Construction of stiffness matrix (truss and beam elements)

6.   Assembly of elementary matrix and introduction of boundary conditions

7.   Variational approach

8.   Applications on industrial code: Abaqus

Evaluation:

First session

Lab test - coef. 0.2

Supervised assignment (SA1 1h30) - coef. 0.2

Supervised assignment (SA2 1h30) - coef. 0.2

Final Assignment (3h00) - coef. 0.4

Second session

Written or oral assignment (3h00) - coef. 0.8

Others (report of Lab rating) - coef. 0.2