Continuum Mechanics

1. **Course number and name:** 020MMDGS1 Continuum Mechanics

2. **Credits and contact hours:** 4 ECTS credits, 2x1.25 hours

3. **Name(s) of instructor(s) or course coordinator(s):** Fouad KADDAH

4. **Instructional Materials:**
   a. Instructor's course notes

   b. Traite de Genie Civil de l'Ecole polytechnique federale de Lausanne Volume 3 : Analyse des structures et milieux continus ; Mecanique des solides ; Auteurs Francois Frey.

   c. Mecanique de l'ingenieur Tome 2 : milieux continus ; Tome 3 : Solides deformables ; Auteur : Yves Bamberger ; Editions : Hermann

   d. Mecanique des structures Tome 1 2e edition: Solides elastiques et plaques et coques; Auteurs: S. Laroze et J.-J. Barrau ; Eyrolles Masson 1988

   e. Introduction to continuum mechanics, fourth edition, Michael Lai, Erhard Krempl, David Ruben, Elsevier, 2010.

   f. Elasticity Theory, Applications, and Numerics; Martin H. Sadd, Academic Press, Elsevier, 2021.

   g. Continuum mechanics modelling of material behavior, Martin H. Sadd, Academic Press, Elsevier 2019.

5. **Specific course information**
   a. **Catalog description:** Introduce the assumption of continuity of mater, assimilate the notions of stresses and strains and the stress/strain relationships; provide the calculation methods according to the theory of elasticity.

   b. **Prerequisites or co-requisites:** 020STANI4 or 020STACI4 Statics

   c. **Required:** Required for all Civil Engineering students.

6. **Educational objectives for the course**
   a. **Specific outcomes of instruction:**
      - Know how to formulate a problem of deformation of a solid
      - Assimilate the theory of elasticity, widely used in design
      - Understand the stress path in a structure
   b. **PI addressed by the course:**

PI	1.1	1.2	1.3	1.4	6.4
Covered	yes	yes	yes	yes	yes
Assessed					

7. **Brief list of topics to be covered:**
   a. General introduction to the continuum mechanics (2 hours)
   b. Kinematics of a continuum (10 hours)
   c. Dynamics of a continuum (8 hours)
   d. Thermodynamic of a continuum and Stress/strain relationships (6 hours)
   e. Equations of the infinitesimal theory of elasticity (4 hours)