1EL5000 - Mécanique des milieux continus

**Syllabus**

- Modeling the behaviour of materials:
- Continuum Mechanics (recalls)
- Anisotropy of natural composites
- Viscoelasticity of soft tissues

- Experimental and numerical approach:
    - Introduction to bibliographic research
    - (morphological and mechanical) characterization/modelling of tissues or cells in an experimental and numerical way
- Opening seminar with the participation of researchers working on "Biomechanics" in the broad sense

**Class components (lecture, labs, etc.)**
12h course ; 21h pratical work

**Grading**
Continuous control (40% of the mark) ; oral and/or report on practical work (60% of the mark)
The practical work sessions are mandatory.

**Resources**
Teacher : Elsa VENNAT
Softwares : Comsol Multiphysics, ImageJ (or FIJI)

**Learning outcomes covered on the course**
At the end of this course, the students will be able to, among other things:

- describe the behaviour of biological tissues from experimental curves,
- use the symmetries of its morphology to propose a simplified form for its rigidity matrix,
- propose an experimental protocol to characterize a tissue in tension/compression and to analyse the results of such a test,
- describe the tests to characterize the viscoelasticity of a tissue,
- propose a rheological model to model the viscoelastic behaviour of a tissue,
- conduct a bibliographic study,
- characterize a porous biological tissue by image analysis using ImageJ software,
- propose a finite element model of this porous medium to evaluate its Young's modulus or permeability