

UE Microscale mechanics and fluidics I : Mechanics



Level
Baccalaureate
+4



ECTS
3 credits



Component
UFR PhITEM
(physique,
ingénierie, terre,
environnement,
mécanique)



Semester
Automne

- > **Teaching language(s):** English
- > **Open to exchange students:** Yes
- > **Code d'export Apogée:** PAX7NFAH

Presentation

Description

Goal: Mechanics plays a forefront role at the nanoscale, from the generation of nano-structures by growth instabilities to the properties of nano-composite materials, the design of micro and nano-mechanical devices, the nano-imaging techniques, the control of biologic functions. This course introduces the mechanics of continuous media and its main applications to nanosciences and nano-technologies.

Content:

- Simple deformations, definition of elastic moduli E , G , K , ν
- Flexion of beams, static, dynamics and waves. Example: the AFM cantilever.
- 3D linear elasticity of isotropic media: strain tensor ; elasticity as a field theory (expression of the free energy) ; stress tensor ; general equilibrium equation
- elastic instabilities in thin films
- elasticity of membranes, ADN coil.

Course parts

UE Mechanics at the micro & nano-scale - CMTD

Lectures (CM) & Teaching Unit (UE)

24h

Period : Semester 7

Useful info

Place

› Grenoble

Campus

› Grenoble - University campus