



Faculté des sciences appliquées

FSA

MAPR2481 **Deformation and fracture of materials**

[37.5h+30h exercises] 6 credits

This course is taught in the 1st semester

Teacher(s): Francis Delannay, Thomas Pardoën
Language: french
Level: 2nd cycle course

Aims

This course covers two approaches. On the one side, the macroscopic behaviour of solids during deformation and fracture is analysed for the different classes of materials. On the other side, the microscopic phenomena responsible for the deformation and fracture of materials are discussed and related to the macroscopic properties.

Main themes

1. reversible déformation
 - Elasticity, thermoelasticity
 - viscoelasticity, anelasticity
2. irreversible déformation
 - plasticity - the macroscopic point of view
 - plasticity - dislocation theory and hardening mechanisms
 - viscoplasticity and creep
3. Damage and fracture
 - damage
 - introduction to fracture mechanics
 - fracture mechanisms
 - fatigue and sub-critical crack growth

Content and teaching methods

Physics and mechanics of the phenomena governing the resistance to the deformation and fracture of materials

Other credits in programs

MATR22	Deuxième année du programme conduisant au grade d'ingénieur civil en science des matériaux	(6 credits)	Mandatory
MECA22	Deuxième année du programme conduisant au grade d'ingénieur civil mécanicien	(6 credits)	
MECA23	Troisième année du programme conduisant au grade d'ingénieur civil mécanicien	(6 credits)	