# UE Mechanics of damage and rupture

ECTS
3 crédits

Composante
UFR Physique, Ingénierie, Terre, Environnement, Mécanique (PhITEM)

Période de l'année
Automne (sept. à dec./janv.)

## Diplômes intégrant cet élément

- Master Génie civil

**Langue(s) d'enseignement:** Anglais
**Ouvert aux étudiants en échange:** Oui
**Code d'export Apogée:** PAX9CEAE

# Présentation

## Description

This course is dedicated to constitutive models for structural failure. If plasticity is suitable to represent permanent deformation due to sliding of the microstructure, damage mechanics and fracture mechanics are oriented towards the modelling of decohesion and failure of cohesive materials. This course is two fold.

1. **Damage mechanics** is based on continuum mechanics taking into account a progressive degradation of the material stiffness without permanent strain. Starting from thermodynamic principles, the damage theory is derived and applied to some examples.
2. **Fracture mechanics** is based on the presence of a crack and propagation criteria are proposed to estimate the direction, the length and the stability of the crack propagation. Around the crack, the material behaviour can be considered as linear elastic to yield the Linear Elastic Fracture Mechanics approach based on stress intensity factor or strain energy release rate. In most of engineering materials, the fracture process zone (FPZ) around the crack tip cannot be neglected and fictitious crack models are derived.


Informations non contractuelles.
Dernière mise à jour le 11 janvier 2024

The course is illustrated with some numerical examples showing the relative pros and cons of both approaches depending on the type of material, the size of the structure and the quantities of interest.

## Heures d'enseignement

| | | |
|---|---|---|
| UE Mechanics of damage and rupture - CM | CM | 20h |

**Période :** Semestre 9

# Infos pratiques

## Lieu(x) ville

Grenoble

## Campus

Grenoble - Domaine universitaire



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