

# UE Nanocomposites



Level  
Baccalauréat  
+5



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:** PAX9NCAD

## Presentation

### Description

This course will provide background on critical issues in synthesis, fabrication, processing, and characterization of material nanocomposites. We will discuss the underlying scientific principles that guide the study of structure-property relationships and will touch on parallel fields of investigation with high relevance to nanocomposites. The course will also cover the incorporation of a variety of nanophases into polymeric matrixes to provide functional materials, the importance of controlling surface energy, methods for achieving dispersion and common techniques for characterizing nanocomposite materials. The influence of the chemical nature of the dispersed (organic or mineral) elements on the different morphologies observed will be described. This lectures will discuss new concepts and knowledge within the field of electrochemical energy storage applications of nanocomposites.

The scope of this class is also to provide basic knowledge about graphene and to show how graphene based materials are being developed for a wide range of applications, notably in the field of energy storage. The basic of graphene structure and properties will be addressed along with the different graphene preparation methodologies. A focus will be made of graphene characterization. Considering that surface functionalization is a key tool to modulate graphene properties, various grafting methods will be presented. An important part of the course will be dedicated to the description of examples of how and why graphene is of interest for Li-ion batteries and supercapacitors applications. To widen the student appreciation of graphene use versatility, other examples of applications will be discussed such as fuel-cells, PV-related applications and others.

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## Course parts

UE Nanocomposites - CMTD

Lectures (CM) & Teaching Unit (UE)

20h

**Period** : Semester 9

## Useful info

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### Place

› Grenoble

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### Campus

› Grenoble - University campus