

MSE-479

**Introduction to nanomaterials**

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Cursus	Sem.	Type
Bioengineering	MA1, MA3	Obl.
Biomedical technologies minor	H	Opt.
Chimiste	MA1, MA3	Opt.

Language of teaching	English
Credits	2
Session	Winter
Semester	Fall
Exam	During the semester
Workload	60h
Weeks	14
<b>Hours</b>	<b>2 weekly</b>
Courses	2 weekly
<b>Number of positions</b>	

**Summary**

This course is aimed to introducing students with a minimum background in materials science into the physical concepts of the uniqueness of the materials when reduced to the nanometer scale. An overview of nanomaterials on the synthesis, properties, characterization, and applications will be given.

**Content**

1. Introduction: Emergence, Definitions, Challenges
2. Synthesis methods
3. Properties: Optics, Magnetism, Thermal, Electrical, Mechanical
4. Applications
5. Characterization

**Keywords**

nanomaterials, nanosize effects, nanotechnology

**Learning Prerequisites****Recommended courses**

Basic knowledge in chemistry, physics, thermodynamics

**Learning Outcomes**

By the end of the course, the student must be able to:

- Assess / Evaluate the difference between bulk and nanosized materials
- Explain typical synthesis method for nanomaterials
- Assess / Evaluate existing potential application of nanomaterial
- Explain the physical, chemical and thermodynamic behaviour of nanoparticles

**Transversal skills**

- Make an oral presentation.
- Demonstrate the capacity for critical thinking
- Summarize an article or a technical report.

**Teaching methods**

Lectures and presentations from students

### **Expected student activities**

An oral presentation regarding subjects on nanomaterials for biological, energy, or environmental applications, and a written report on a peer-reviewed journal article.

### **Assessment methods**

50% in-class presentation

40% written assignment

10% in-class participation

### **Supervision**

Office hours                      No

Assistants                         No

Forum                                No