




# UE Soft Matter II : statistical physics aspects; polymers

 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:* To introduce the basic thermodynamics concepts to address the equilibrium and evolution properties of nano-scale systems.

### Objectives

*Content:* The course will start from a thermodynamic view of materials, justified by microscopic models. It will explore the rich physics and physical-chemistry that governs the formation of complex nanostructured materials, from metallic alloys to polymers and other self-organized soft matter systems. The extension to biological systems will provide examples in which these notions can be extended to non-equilibrium situations.

- Equilibrium and non-equilibrium effects in materials and nanomaterials
- Thermodynamics and phase diagrams
- Thermodynamics of heterogeneous systems and interfaces
- Heat and mass transport in condensed systems
- Dynamics of phase transitions: nucleation and growth, spinodal decomposition
- Notions on numerical models: particle based models, PDEs
- Elements of stochastic thermodynamics



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## Course parts

CMTD	Lectures (CM) & Teaching Unit (UE)	24h
TP	Practical work (TP)	4h

## Useful info

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### Campus

› [Grenoble - University campus](#)