Summary
This lecture introduces the basic concepts used to describe the atomic or molecular structure of surfaces and interfaces and the underlying thermodynamic concepts. The influence of interfaces on the properties of materials is also discussed.

Content
- Crystallographic representation of surfaces, reconstruction
- Epitaxial growth
- Surface energy
- Solid-liquid interfaces, interfacial energy, work of adhesion
- Solid-solid interfaces, grain boundaries, interfacial energy
- Surface energy, surface states and catalysis
- Electronic properties of surfaces, work function, surface dipoles
- Surface states
- Effect of surfaces in bulk materials properties.

Learning Outcomes
By the end of the course, the student must be able to:
• Analyze a surface reconstruction
• Anticipate the stability of a given interface
• Decide what are the necessary thermodynamics concept to describe an interface
• Anticipate the behaviour of both media close to the interface
• Infer certain processes at the interface

Teaching methods
Ex cathedra et exercises

Assessment methods
The course is evaluated by a written midterm exam, and a written final exam, during the exam session.

Resources
Bibliography
James M. Howe, Interfaces in Materials, Wiley

Ressources en bibliothèque
Notes/Handbook
Detailed lecture slides and interactive Mathematica notebooks will be made available during the course.