Summary
Acquire an understanding of interfacial phenomena, micro-heterogeneous colloidal solution systems and dynamic electrochemistry.

Content
1. Thermodynamics of interfaces
Interfacial tension and surface thermodynamic functions, Laplace pressure, spreading and wetting, contact angle (Young-Dupré equation), capillary ascension, vapor pressure of curved interfaces (Kelvin equation).

2. Colloids/Micelles

3. Solid/gas and solid/solution adsorptions

4. Electrokinetic phenomena
Zeta potential, electro-osmosis and electrophoresis, streaming and sedimentation potentials.

5. Interfaces
Stability of colloids according to the DLVO model. Membrane potential, Goldman's equation.

6. Dynamic electrochemistry
Redox potentials, Nernst equation, mass transport, chronoamperometry, voltammetry, Butler-Volmer equation, three-electrode measurements

Keywords
Surface tension.
Micelles.
Adsorption.
Isotherms.
Electrokinetic phenomena
Colloidal stability
Membrane potential
Dynamic electrochemistry

Learning Prerequisites
Recommended courses
Learning Outcomes
By the end of the course, the student must be able to:
• Formulate the thermodynamic definition of the surface tension
• Derive the equations related to the surface tension (Young-Laplace, Kelvin, etc.)
• Establish Gibb's adsorption equation
• Discuss the properties of surfactant solutions
• Derive the expressions of the adsorption isotherms
• Derive the equations relative to the electrokinetic phenomena
• Discuss the stability of colloids according to the DLVO model
• Formulate models and methods in dynamic electrochemistry

Transversal skills
• Use a work methodology appropriate to the task.
• Assess one's own level of skill acquisition, and plan their on-going learning goals.

Teaching methods
Lectures and exercises.

Expected student activities
Reading the lecture notes and solving the exercises

Assessment methods
Written examination

Supervision
Office hours No
Assistants Yes
Forum No

Resources
Bibliography
Handouts and exercises.