UCL Université catholique de Louvain

LBIR1319

2013-2014

Surface and colloid chemistry

3.0 credits	30.0 h	2q

Teacher(s) :	Dupont Christine ; Degand Simon (compensates Dupont Christine) ;
Language :	Français
Place of the course	Louvain-la-Neuve
Inline resources:	iCampus
Prerequisites :	General physics, General chemistry, Introduction to thermodynamics
Main themes :	Overview of colloidal systems and interfaces Kinetic theory of colloidal systems: concepts, applications Surface energy: concepts, applications Adsorption: concepts, applications Charged interfaces: physico-chemical models Interactions between surfaces: concepts, applications
Aims :	At the end of the course, the student will be able to: - Rephrase the concepts which allow understanding physico-chemical phenomena involving dispersed systems and interfaces (surfaces, colloids, nanometer-scale and supramolecular systems), and their impact on the behavior of such systems at the macroscale; - Evaluate the consequences of these phenomena, based on realistic numerical values; - Establish links between phenomena occurring at different scales (nano, micro, macro); - Explain phenomena observed in daily life or in typical bioengineering applications (materials, food, living systems, soils and environment, chemical industries, biotechnology) on the basis of concepts developed in the course; - Predict the behavior of simple systems. *The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".*
Evaluation methods :	Written exam, including an open book question
Teaching methods :	Lectures illustrated by experimental observations and mixed with the resolution of numerical exercises.
Content :	Introduction: overview of colloidal systems and interfaces. Kinetic theory of colloidal systems: sedimentation, centrifugation, diffusion, Brownian movement. Surface energy: surface tension, Laplace equation, wetting - capillarity - adhesion - cohesion - dispersion, porosimetry, illustrations. Adsorption from solution: properties of monolayers, adsorption, Gibbs equation, Langmuir isotherm, illustrations. Properties of charged surfaces: origin of charge, physical and chemical models of the double layer, interactions between particles and stability of colloidal systems.
Bibliography :	Syllabus. Illustrations of the lectures available through iCampus.
Cycle and year of study :	> Master [120] in Environmental Bioengineering > Bachelor in Bioengineering
Faculty or entity in charge:	AGRO