UCL Université catholique de Louvain

LBIR1319

2012-2013

Surface and colloid chemistry

3.0 credits	30.0 h	2q

Teacher(s) :	Dupont Christine ;
Language :	Français
Place of the course	Louvain-la-Neuve
Prerequisites :	Precursory courses : General physics, General chemistry, Introduction to thermodynamics (concept of free enthalpy)
Main themes :	- Overview of colloidal systems and interfaces - Kinetic theory of colloidal systems: concepts, applications - Surface energy: concepts, applications - Adsorption: concepts, applications - Membrane-related phenomena: concepts, applications - Charged interfaces: physico-chemical models - Interactions between surfaces: concepts, applications
Aims :	Knowledge of: - Concepts allowing the understanding of physico-chemical phenomena typical of dispersed systems (surfaces, colloids, nanometer-scale and supramolecular systems). - Incidence of such concepts on the behaviour of systems at the macroscopic scale. Know-how: - Ability to establish relationships between phenomena occurring at different scales (nano, micro, macro) - Developing curiosity towards the understanding of matter and the link with applications (materials, food, living organisms, soils, environment, chemical industry'). *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 :	Evaluation : Written examination, including one question answered with the support of documents from the course.
Teaching methods :	Support : A written support is provided (book chapter or teacher's notes depending on the part of the course)
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. Thermodynamics in solution: Gibbs-Duhem equation, osmotic pressure. Adsorption from solution: properties of monolayers, adsorption, Gibbs equation, Langmuir isotherm, illustrations. Donnan equilibrium: ion distribution, osmotic pressure, potential, relationship with classical electrochemistry, illustrations. Properties of charged surfaces: origin of charge, physical and chemical models of the double layer, interactions between particles and stability of colloidal systems.
Cycle and year of study :	> Bachelor in Bioengineering > Master [120] in Environmental Bioengineering
Faculty or entity in charge:	AGRO