UCLouvain

lbir1346

2022

Surface and colloid chemistry

3.00 credits	30.0 h	Q2

Teacher(s)	Dupont Christine (coordinator) ;vander Straeten Aurélien (compensates Dupont Christine) ;
Language :	French
Place of the course	Louvain-la-Neuve
Prerequisites	*The prerequisite(s) for this Teaching Unit (Unité d'enseignement – UE) for the programmes/courses that offer this Teaching Unit are specified at the end of this sheet.*
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
Learning outcomes	**At the end of this learning unit, the student is able to :** 1 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.
Evaluation methods	During the semester: tests on limited parts of the course (25% of final grade). At the end of the semester: written exam (75% of final grade).
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.
Inline resources	website on the Moodle platform
Bibliography	voir site Moodle du cours
Faculty or entity in charge	AGRO

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Learning outcomes
Advanced Master in Brewing Engineering	BRAS2MC	3		
Master [120] in Environmental Bioengineering	BIRE2M	3		
Master [120] in Chemistry	CHIM2M	3		
Master [60] in Chemistry	CHIM2M1	3		
Bachelor in Bioengineering	BIR1BA	3	LCHM1211A	