UCL Université catholique de Louvain

LMAPR1400

2010-2011

Applied Kinetics

5.0 credits	30.0 h + 30.0 h	2q

Teacher(s) :	De Wilde Juray ; Bailly Christian ;
Language :	Français
Place of the course	Louvain-la-Neuve
Main themes :	The course is divided in two parts. The first part (2.5 ECTS) is devoted to the basic elements of chemical and physical kinetics, their interdependence as well as their relationship with thermodynamics. The second part (2.5 ECTS) derives the rate equations for complex reactions (in parallel, in series, reversible and heterogeneous) and explains how they are incorporated in the ideal reactors models.
Aims :	The main objective of the course is to familiarize the students with the kinetics of physical and chemical transformations. Knowing the rates of these transformations is of prime importance for modelling and design of chemical processes. The identification of rate laws in typical cases is described and the meaning of the different parameters on a molecular level is pointed out. *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".*
Content :	Content : Part 1 : - Basics of chemical kinetics : formal kinetics ; experimental methods for kinetic analysis ; physical and thermodynamical basis (1 ECTS) - Important examples of homogeneous and heterogeneous reactions : chain radical reactions ; enzymatic catalysis ; surface catalysis (0,5 ECTS) - Kinetics of physical phenomena : phase transformation by nucleation and growth (Avrami) ; diffusion of heat and matter (Fick's et Fourier's laws) (1 ECTS) Part 2 : - Formal kinetics of complex reactions: in parallel, in series, and reversible reactions. Derivation of the rate equations and experimental methods of acquisition. - Kinetics of heterogeneous reactions and properties of industrial catalysts. Derivation of the different rates following the adsorption models. - The use of rate equations in the basic ideal reactors equations (batch, plug flow and CSTR) Methods : Ex-cathedra courses and exercises.
Other infos :	Not applicable
Cycle and year of study :	> Bachelor in Engineering
Faculty or entity in charge:	FYKI