UCL Université catholique de Louvain

LMAPR2643

2010-2011

Treatment of liquid effluents

4.0 credits	30.0 h + 7.5 h	1q

Teacher(s) :	Duvivier Léon ; Agathos Spyridon ;
Language :	Anglais
Place of the course	Louvain-la-Neuve
Main themes :	The course covers the physical and chemical characterisation of aqueous effluents that are polluted by heavy metals, inorganic compounds and/or organic substances. One half of the course is devoted to "inorganic" aqueous effluents. In the first part are studied the main treatment techniques of these effluents by physical or chemical approaches. The other half of the course is devoted to "organic" aqueous effluents. It covers essentially the main techniques of biological treatment of liquid effluents.
Aims :	Treatment of aqueous industrial effluents in view of their clean elimination or discharge and of their valorisation via recycling of the useful substances contained therein. *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 :	A. Treatment techniques of aqueous effluents by physical or chemical approaches. 1. demineralisation by ion exchange 2. purification by membrane techniques (ultrafiltration, microfiltration, reverse osmosis, (reversible) electrodialysis, electro-assisted de-ionisation) 3. purification processes using precipitation (decarbonatation, hydroxides, sulfides) 4. advanced oxidation techniques. B. Biological treatment of liquid effluents. 1. Introduction into the problems exerted by aqueous industrial effluents and caracterisation of the various technological options in existence for their tyreatment and safe discharge. 2. Overview of biological treatments. Definitions, useful terms. The role of micro-organisms in cleanup processes. Metabolic and energetic classification of the main groups of micro-organisms involved in the treatment of wastewater. 3. Microbial treatment and bio-oxidation of organic polluting substances (substrates). Kinetics of substrate-limited microbial growth. Application of kinetic models to biological treatment sequences of effluents. Relations useful in the design and quantitative analysis of biotreatment processes. 4. Aerobic treatment processes using microbial growth in suspension. Activated sludge treatment plants. Aerated lagoons and oxidation ditches. Aerobic treatment processes using attached microbial growth. Trickling filters. 5. Anaerobic treatment processes using suspended and attached microbial growth. The principles and techniques developed in the course are largely illustrated by means of concrete cases of effluents. An important place is given also to particular problems affecting the water used in the feed of industrial processes.
Other infos :	Nil
Cycle and year of study :	> Master [120] in Chemical and Materials Engineering > Master [120] in Chemistry and Bio-industries > Master [120] in Environmental Bioengineering > Master [120] in Environmental Science and Management > Master [120] in Civil Engineering
Faculty or entity in charge:	FYKI