UCL Université catholique de Louvain

LMAPR2118

2014-2015

Fluid-fluid separations

5.0 credits	30.0 h + 22.5 h	2q

Teacher(s) :	Luis Alconero Patricia ; Mignon Denis ;
Language :	Français
Place of the course	Louvain-la-Neuve
Inline resources:	> http://icampus.uclouvain.be/claroline/course/index.php?cid=MAPR2118
Main themes :	Unit operations for fluid-fluid separation (distillation, absorption/stripping, liquid-liquid and solid-liquid extraction). Operating principles and methods for the selection, sizing and choice of equipment applicable to these unit operations.
Aims :	Contribution of the activity to the AA referential: -- AA 2.1 and 2.2 -- AA 3.1 -- AA 5.3, 5.4, 5.6 At the end of this course, the student will be able to : -- understand the theoretical bases and practically apply the operating principles, as well as the selection, sizing and equipment choice methods applicable to unit operations for fluid-fluid separation. -- use the ASPEN + process simulator for each of the studied techniques. *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 :	-- Through one collective assignment : presentation slides and report. -- Individually : quality of the expression during the presentation et ability to answer the questions -- Individually during an examination composed of one written part (problems resolution and/or restitution of theoretical developments presented during the course) and one oral part (short questions/answers on other parts of the course material, without preparation).
Teaching methods :	The method of the course consists of 14 lectures by the course teachers, completed by 10 workouts sessions supervised by assistants. Some of the latter are based on 'paper-pencil' computations, the others are based on the use of the ASPEN+ process simulation software.
Content :	The course covers successively the following topics: -- Diffusion theory. Fick's law and Stefan's law. Convective and molecular transfer coefficients. Analogy between heat and mass transfer. -- Continuous and batch distillation of binary and multi-component mixtures. Graphical (McCabe and Thiele) and numerical sizing methods. Simplified ("shortcut") and rigorous methods. Trayed column design (equipment, efficiency and capacity). -- Absorption of one or more components into a liquid, with of without a chemical reaction. Stripping. Packed column hydrodynamics. Different types of packing and absorbers. -- Liquid-liquid extraction. Single stage and multiple stages, with or without reflux. Extractor types and selection criteria. Supercritical extraction. -- Solid-liquid extraction basics (the principles and equipment).
Bibliography :	-- Copy of the presentation slides. These documents are available on iCampus (Site iCampus LMAPR2118). -- Reference book : Separation Process Principles, Third Edition, Henley, Seader and Roper, Editorr John Wiley & mp; Sons, 2011, ISBN-13: 978-0470646113.
Other infos :	It is highly recommended to have attended a Thermodynamics - Phase equilibria course LMAPR1310 or similar.

Cycle and year of study :	> Master [120] in Biomedical Engineering > Master [120] in Chemical and Materials Engineering
Faculty or entity in charge:	FYKI