UCLouvain

lmapr2118

2021

Fluid-fluid separations

5.00 credits	30.0 h + 22.5 h	Q2

Teacher(s)	Luis Alconero Patricia ;Mignon Denis ;
Language :	English
Place of the course	Louvain-la-Neuve
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.
Learning outcomes	**At the end of this learning unit, the student is able to :** **Contribution of the activity to the AA referential :** • AA 2.1 and 2.2 • AA 3.1 • AA 5.3, 5.4, 5.6 1 **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.
Evaluation methods	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). Exercises on Aspen+ done during the course and the laboratory session will be also part of the final evaluation.
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. Two laboratory sessions are also planned (absorption and liquid-liquid extraction).
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.
Inline resources	https://moodleucl.uclouvain.be/course/view.php?id=5563
Bibliography	• Copie des supports de présentation. Ces documents sont disponibles sur Moodle. • Livre de référence : Separation Process Principles, Third Edition, Henley, Seader and Roper, Editeur John Wiley & Sons, 2011, ISBN-13: 978-0470646113.
Other infos	It is highly recommended to have attended a Thermodynamics - Phase equilibria course LMAPR1310 or similar.
Faculty or entity in charge	FYKI

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Chemical and Materials Engineering	KIMA2M	5		
Master [120] in Biomedical Engineering	GBIO2M	5		