


5.00 credits

30.0 h + 22.5 h

Q2

Teacher(s)	Luis Alconero Patricia ;Mignon Denis ;
Language :	English > French-friendly
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	<p>At the end of this learning unit, the student is able to :</p> <p>Contribution of the activity to the AA referential :</p> <ul style="list-style-type: none"> • AA 2.1 and 2.2 • AA 3.1 • AA 5.3, 5.4, 5.6 <p>1</p> <p>At the end of this course, the student will be able to :</p> <ul style="list-style-type: none"> • 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	<p>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).</p> <p>Exercises on Aspen+ done during the course and the laboratory session will be also part of the final evaluation.</p> <p>Unless specified otherwise during the course, the assignment(s) count for 20% of the final mark, the oral part of the examination for 40% and the written part of the examination for 40%.</p> <p>The part taught by each teacher normally counts for a half of the total mark, unless specified otherwise during the course. However, if a deep deficiency ($\leq 8/20$) is found for one part of the course, the total mark will represent a failure at the examination and be reduced to 8/20 as a maximum.</p>
Teaching methods	<p>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.</p> <p>Two laboratory sessions are also planned (absorption and liquid-liquid extraction).</p>
Content	<p>The course covers successively the following topics:</p> <ul style="list-style-type: none"> • Diffusion theory. Fick'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 or 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	<ul style="list-style-type: none"> • 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		