


Due to the COVID-19 crisis, the information below is subject to change, in particular that concerning the teaching mode (presential, distance or in a comodal or hybrid format).

5 credits	30.0 h + 22.5 h	Q1
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Teacher(s)	Leysens Tom ;Luis Alconero Patricia ;
Language :	English
Place of the course	Louvain-la-Neuve
Main themes	Crystallization/precipitation techniques Other fluid-solid separation techniques (decantation, centrifugation, filtration including membrane filtration). Operating principles and methods for the selection, sizing and choice of equipment applicable to these unit operations.
Aims	<p>Contribution of the activity to the AA (Learning outcomes) referential :</p> <ul style="list-style-type: none"> • LO 1 : 1.1 • LO 2 : 2.1, 2.2, 2.3 • LO 3 : 3.1 • LO 4 : 4.1, 4.2 • LO 5 : 5.1, 5.2, 5.3, 5.4, 5.6 <p>At the end of this course, the student will be able to :</p> <p>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 solid-fluid separation.</p> <p>-----</p> <p><i>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".</i></p>
Evaluation methods	<p>Due to the COVID-19 crisis, the information in this section is particularly likely to change.</p> <p>Examen écrit (50%)/ normally on campus -- possible that the examen switches to an online mode depending on sanitary conditions.</p> <p>Flipped classroom + laboratoires (50%)</p>
Teaching methods	<p>Due to the COVID-19 crisis, the information in this section is particularly likely to change.</p> <p>1. Crystallization : In 4 lectures of 2 hours by the course teachers.</p> <p>2. Other fluid-solid separation techniques : In 11 lectures of 2 hours by the course teachers. Lectures and flipped classrooms will be organised to address the application of techniques and exercises.</p> <p>3. Two laboratory sessions are planned. Most of the lecture will be in online mode (TEAMS) The exercices and laboratory will be presential, if possible.</p>
Content	<p>1. Crystal engineering, process of crystal growth and crystallization (Tom L.)</p> <p>2. Membrane crystallization (Patricia L.)</p> <p>3. Characterization of particles in suspension in liquids. Efficiency of separation (Patricia L.)</p> <p>4. Coagulation-flocculation, gravity clarification, hydrocyclones, centrifugal sedimentation (Patricia L.)</p> <p>5. Filtration, pressure filtration, vacuum filtration, centrifugal filtration (Patricia L.)</p> <p>6. Pressure membrane systems: MF, UF, NF, RO (Patricia L.)</p> <p>Lab1. Laboratory session on membrane crystallization</p> <p>Lab2. Laboratory session on pressure membrane systems (water desalination)</p>
Inline resources	https://moodleucl.uclouvain.be/course/view.php?id=5863

Bibliography	<p>1. Copie des supports de présentation. Ces documents sont disponibles sur Moodle.</p> <p>2. Livres de référence :</p> <ul style="list-style-type: none"> • Separation Process Principles, Third Edition, Henley, Seader and Roper, Editor John Wiley & Sons, 2011, ISBN-13: 978-0470646113.. • Solid-Liquid Filtration and Separation Technology, Second Edition, A. Rushton, A. Ward, R. Holdich, Editor Wiley VCH, 2000, ISBN-13 978-3527296040 • Solid/ Liquid Separation: Principles of Industrial Filtration, 1st Edition, S. Tarleton, R. Wakeman, Editor Elsevier Science, 2005, ISBN-13 978-1856174190 • Fundamental Modeling of Membrane Systems: Membrane and Process Performance, 1st Edition, P. Luis, Editor Elsevier, 2018. ISBN- 9780128134832
Other infos	It is highly recommended to have attended Thermodynamics - Phase equilibrium course [LMAPR 1310] or similar
Faculty or entity in charge	FYKI

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