UCLouvain

lmapr2380

2023

Solid-fluid separation

5.00 credits	30.0 h + 22.5 h	Q1

Teacher(s)	Luis Alconero Patricia ;
Language :	English > French-friendly
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.
Learning outcomes	**At the end of this learning unit, the student is able to :** 1 **Contribution of the activity to the AA (Learning outcomes) referential :** • 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 **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 solid-fluid separation.
Evaluation methods	Continuous evaluation throughout the year. You will be evaluated on: - An article to analyze for the crystallization part. - Reports and presentations based on flipped classrooms. - Reports of laboratory sessions. - Quiz (short questions, multiple choice, etc.) on the general concepts learned during the course. The continuous assessment includes assignments, which will result in a single overall grade, communicated at the end of the last assignment. Failure to comply with the methodological instructions defined on moodle, in particular with regard to the use of online resources or collaboration between students, for any work/assignment will result in an overall mark of 0 for the continuous assessment. The use of generative AI such as ChatGPT, Consensus, Perplexity, etc. is tolerated for the search for information or clarification of concepts but its use is prohibited for the elaboration of reports, presentations or any material which is part of the course evaluation by the teacher. The student must declare on their honor that the AIs were not used.
Teaching methods	Lectures, podcasts and flipped classes with the aim of applying the material and practicing on concrete examples. Two laboratory sessions are planned (crystallization and desalination of sea water by reverse osmosis). The lectures will be given in remote (TEAMS) or face-to-face mode. The exercises and the laboratory will be face-to-face.
Content	Content of the course: 1. Characterization of particles in suspension in liquids. Efficiency of separation 2. Filtration, pressure filtration, vacuum filtration, centrifugal filtration 3. Coagulation-flocculation, gravity clarification, hydrocyclones, centrifugal sedimentation 4. Pressure membrane systems: MF, UF, NF, RO 5. Crystal engineering, process of crystal growth and crystallization 6. Membrane crystallization Lab1. Laboratory session on membrane crystallization Lab2. Laboratory session on pressure membrane systems (water desalination)
Inline resources	The course content is available in Moodle.

Bibliography	1. Copie des supports de présentation. Ces documents sont disponibles sur Moodle. 2. Livres de référence : • 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	Learning outcomes
Master [120] in Chemical and Materials Engineering	KIMA2M	5		
Master [120] in Biomedical Engineering	GBIO2M	5		