29925 - Separation Operations

Información del Plan Docente

Academic Year	2017/18
Faculty / School	110 - Escuela de Ingeniería y Arquitectura
Degree	435 - Bachelor's Degree in Chemical Engineering 330 - Complementos de formación Máster/Doctorado
ECTS	6.0
Year	XX
Semester	Half-yearly
Subject Type	ENG/Complementos de Formación, Compulsory
Module	---

1.General information

1.1.Introduction

1.2.Recommendations to take this course

1.3.Context and importance of this course in the degree

1.4.Activities and key dates

2.Learning goals

2.1.Learning goals

2.2.Importance of learning goals

3.Aims of the course and competences

3.1.Aims of the course

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3.2.Competences

4.Assessment (1st and 2nd call)

4.1.Assessment tasks (description of tasks, marking system and assessment criteria)

5.Methodology, learning tasks, syllabus and resources

5.1.Methodological overview

The learning process that is designed for this course is based on the following:

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The learning process will take place at several levels: lectures, problem solving classes and tutoring works, increasing the level of student participation. In the lectures, the theoretical bases and some model problems are presented. The problem solving classes are the effective complement of lectures to verify the compression of matter and help to develop in students a more engineering view, the students will solve the problems proposed by the teacher with some guidelines. Finally, tutoring works will be a complement.

5.2.Learning tasks

The program to achieve the expected results includes the following activities:

Lectures (40 h) where the theory of the various subjects that have been proposed will be presented and also model problems will be solved on the blackboard.

Problem solving classes (20 h). Exercises supervised by the professor will be solved by the students. Problems will be related to the theoretical part explained in lectures.

Tutoring works in groups (27 hours). Groups of three components will be formed and along the semester five activities will be proposed to be supervised by the teachers. Deliverables will be corrected and evaluated, so there is a feedback to the student.

Individual study (60 hours). It is strongly recommended that students perform individual study continuously along the semester,

Final Evaluation (3 h). A global test will be performed where the theoretical and practical knowledge acquired by the student will be evaluated.

5.3.Syllabus

The program has next topics:

1. Introduction to Separation Processes

2. Contact between phases

3. Distillation

4. Absorption

5. Liquid-liquid extraction

6. Leaching

7. Adsorption

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8. Membrane processes

5.4.Course planning and calendar

Lectures and solving problems classes are given according to schedule established by EINA. Each teacher informs about schedule for tutoring.

Groups of 3 peoples will solve four problems or practical cases proposed by the teacher. In addition to these four problems, each group will propose and solve a problem that will be corrected by another group. These activities will involve a total of 5 deliverables, distributed throughout the semester.

The following table shows an approximate schedule of topics in terms of hours of lectures and problem solving classes. It also indicates approximately when students would be proposed the deliverables and the time that must be dedicated to these activities and their personal work. It indicated when approximately tutored sessions should take place.

Topic	Lectures + Problem solving classes	Deliverables (Del.) and Tutoring (T)	Individual study
1. Introduction	2 h + 0 h		2 h
2. Contact between phases	6 h + 3 h	Del. 1 (4 h), T1	9 h
3. Distillation	12 h + 6 h	Del. 2 (11 h), T2	18 h
4. Absorption	5 h + 3 h		8 h
5. Liquid-liquid extraction	5 h + 3 h	Del. 3 (4 h)	8 h
6. Leaching	4 h + 3 h	Del. 4 (4 h), T3	7 h
7. Adsorption	3 h + 1 h		4 h
8. Membrane processes	3 h + 1 h	Del. 5 (4 h), T4	4 h
Total	40 h + 20 h	27 h	60 h

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5.5.Bibliography and recommended resources

BB	McCabe, Warren L.. Operaciones unitarias en ingeniería química / Warren L. McCabe, Julian C. Smith, Peter Harriott ; revisor técnico René Huerta Cevallos ; [traductor, Alejandro Carlos Piombo Herrera] . - 7ª ed. México D. F. : McGraw-Hill Interamericana, cop. 2007
BB	Seader, J. D.. Separation process principles / J. D. Seader, Ernest J. Henley . - 2nd ed. Hoboken, NJ : John Wiley & Sons, cop. 2006
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BB	Treybal, Robert E.. Operaciones de transferencia de masa / Robert E. Treybal ; tradución Amelia García Rodríguez, revisión técnica Francisco José Lozano . - 2a ed. [reimp.] México [etc] : McGraw-Hill, 1994
BC	Benítez, Jaime. Principles and modern applications of mass transfer operations / Jaime Benítez New York : Wiley-Interscience, cop. 2002
BC	Henley, Ernest J.. Operaciones de separación por etapas de equilibrio en ingeniería química / Ernest J. Henley, J.D. Seader ; [versión española por Fidel Mato Vázquez y Rafael Bartolomé Mato Chaín] . - [1ª ed., reimpr.] México : Reverté Ediciones, cop. 2000 (reimpr.)
BC	Martínez de la Cuesta, Pedro José. Operaciones de separación en ingeniería química : métodos de cálculo / Pedro J. Martínez de la Cuesta, Eloísa Rus Martínez Madrid [etc.] : Pearson Prentice Hall, D. L. 2004
BC	Seader, J. D.. Separation process principles / J. D. Seader, Ernest J. Henley . - 2nd ed. Hoboken, NJ : John Wiley & Sons, cop. 2006