UAB
Universitat Autònoma de Barcelona

Separation Processes I

Code: 106052
ECTS Credits: 6

2025/2026

Degree	Type	Year
Chemical Engineering	OB	3

Contact

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Teachers

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Teaching groups languages

You can view this information at the end of this document.

Prerequisites

Having assisted to Termodinàmica Aplicada

Objectives and Contextualisation

The main objective of the subject is that the student learns to select, analyze and design different separation operations controlled by the mass transfer and the heat transmission

The specific objectives of the subject are :

• Understand the different separation operations, their modes of operation and possible applications.

• Understand the physical concepts and fundamentals of each operation studied.

• Use common and illustrative methods of calculation of separation systems

• Design the most common separation equipment

Competences

- Analyse, evaluate, design and operate the systems or processes, equipment and installations used in chemical engineering in accordance with certain requirements, standards and specifications following the principles of sustainable development.
- Develop personal work habits.
- Understand and apply the basic principles on which chemical engineering is founded, and more precisely: balances of matter, energy and thermodynamic momentum, phase equilibrium and kinetic chemical equilibrium of the physical processes of matter, energy and momentum transfer, and kinetics of chemical reactions

Learning Outcomes

1. Analyse, evaluate and design general chemical plant services.
2. Apply and identify basic concepts related with chemical engineering.
3. Apply the scientific and technological basics of balance and transfer of matter and separation operations.
4. Apply the scientific and technological basics of matter transfer to separation operations.
5. Make one's own decisions.
6. Work autonomously.

Content

1.- Introduction. Classification of separation operations. Equilibrium between phases

2.- Flash distillation

2.1.- Binary mixtures. Calculation methods

2.2.- Multi-component mixtures. Calculation methods.

2.3.- Flash distillation equipment.

3.- Rectification

3.1.- Operation in multiple stages.

3.2.- General concepts. Mass and energy balances.

3.3.- Rectification of binary mixtures

3.3.1.- Lewis Method (McCabe-Thiele Method)

3.3.3.- Sorel method

3.4.- Efficiencies of stage and overall efficiency.

3.5.- Correction of multicomponent mixes

3.5.1.- Rapid ("short-cut") methods

3.5.2.-Rigorous methods.

3.6.- Distillation of azeotropic mixtures.

4.- Discontinuous distillation

4.1.- Discontinuous simple distillation

4.2.- Discontinuous rectification. Modes of operation.

5.-Design of columns

5.1.- Design of plate columns.

5.2.- Design of packed columns

6.-Absorption

6.1.- General concepts of absorption and stripping

6.2.- Absorption and strippingof a component

6.3.- Multi-component absorption and stripping

7.- Liquid-liquid extraction of immiscible mixtures

7.1.- Extraction equipment.

7.2.- Application of the methods of McCabe and Kremser.

7.3.- Liquid-liquid extraction of miscible mixtures

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Absorption	12	0.48	4, 3, 2
Batch distillation	12	0.48	4, 3, 2
Binary rectification	12	0.48	4, 3, 2
Equilibrium stages	5	0.2	4, 3, 2
Flash distillation	10	0.4	4, 3, 2
Liquid liquid extraction	14	0.56	4, 3, 2
Multicomponent rectification	18	0.72	1, 4, 3, 2
Packed colums	10	0.4	4, 3, 2
Type: Autonomous			
Exercice	7	0.28	1, 4, 3, 2, 5, 6
Study	28	1.12	4, 2, 5, 6

During the course there will be master classes where the concepts of subject topics will be introduced. In each topic, the examples of calculation or design will be introduced and problems will be given for home work. One exercice will be carried out at home which will be scored.

Communications with students will be carried out via the Moodle Classroom on the Virtual Campus.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Exercise	15	8	0.32	1, 4, 3, 2, 5, 6
Test 1: Flash, binary distillation, multicomponent distillation, discontinuous distillation	45	7	0.28	1, 4, 3, 2, 5, 6
Test 2: Absorption and column design, liquid-liquid extraction	40	7	0.28	4, 2, 5, 6

The evaluation of the course will be based on the submission of a solved exercise (15% of the final grade) and two tests (45% and 40%). To be eligible for the final average in the course, it is a necessary requirement to have submitted the solved exercise and to have scored at least 4 in each of the partial tests.

Students who do not pass the course through continuous assessment will have a resit exam, which will include at least one exercise from each of the two tests (85%).

A student will be considered "not assessable" (NA) if they have not taken part in any of the three assessable components (exercise and two tests).

For each assessment activity, a place, date and time of revision will be indicated in which the student will be able to review the activity with the teacher. If the student does not submit to this review, this activity will not be reviewed later.

Honor enrollments Granting an honorific matriculation qualification is a decision of the faculty responsible for the subject. The regulations of the UAB indicate that MH can only be awarded to students who have obtained a final grade of 9.00 or more. It can be granted up to 5% of MH of the total number of students enrolled.

This course does not provide for a single assessment system.

Notwithstanding other disciplinary measures deemed appropriate, the irregularities committed by the student that can lead to a variation in the rating of an evaluation act will be graded with a zero. Therefore, copying, plagiarizing, cheating, copying, etc. In any of the assessment activities it will imply failing with a zero. Assessment activities qualified in this way and by this procedure will not be recovered.

The use of AI is not allowed.

No alternative assessment system is planned for repeating students.

Bibliography

- Wankat Ph.C. "Separation Process Engineering". 2nd ed. Prentice-Hall (2007)

- Wankat Ph.C. "Separations in Chemical Engineering: Staged Operations". Elsevier, N.Y. (1988).

- King C.J. "Procesos de separación". Reverté, BCN (1980)

- Treybal R.E. "Mass Transfer Operations". McGraw-Hill, N.Y. (1980)

- Coulson J.M. and Richardson J.F. "Chemical Engineering". Pergamon Press (1971)

Software

MS Office

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this link. To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn
(PAUL) Classroom practices	211	Spanish	first semester	morning-mixed
(PAUL) Classroom practices	212	Spanish	first semester	morning-mixed
(SEM) Seminars	211	Catalan/Spanish	first semester	morning-mixed
(SEM) Seminars	212	Catalan/Spanish	first semester	morning-mixed
(TE) Theory	21	Catalan	first semester	morning-mixed