UAB
Universitat Autònoma de Barcelona

Experimentation in Chemical Engineering I

Code: 106055
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

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Prerequisites

To have completed the subjects of: Statistics; Maths; Bases of Experimentation in Chemical Engineering; Basics of Chemical Engineering; Computer Applications; Differential Equations and Vector Calculus; Chemical Kinetics; Circulation of Fluids; Heat Transmission and Thermotechnics; Applied Thermodynamics; Control, Instrumentation and Automation; Separation Operations; reactors

Objectives and Contextualisation

Topply the scientific method to systems in which chemical and physical transformations take place both on a microscopic and macroscopic scale. Design experiments.
To write reports of experimental work carried out in the laboratory, effectively communicating in written form, the knowledge, the results and their analysis and the conclusions related to the field of the chemical laboratory and chemical engineering.
To familiarize yourself with experimental techniques and setups. Analyze, evaluate, design and operate systems or processes, equipment and facilities of chemical engineering according to certain requirements, standards and specifications under the principles of sustainable development.
To consolidate theoretical foundations acquired in previously studied subjects. Understand and apply the basic principles on which chemical engineering is based, and more specifically: material, energy and momentum balances; equilibrium between phases and chemical equilibrium; kinetics of the processes of transfer of matter, energy and amount of movement, and kinetics of the chemical reaction. Put into practice the fundamental laws of thermodynamics.
To demonstrate an understanding of the main concepts of chemical engineering process control. Apply in the field of chemical engineering the scientific and technological foundations of automation and control methods.

To acquire, process, treat and correlate experimental data using the appropriate tools. Critically analyze the results. Apply the concepts of rounding error, sensitivity analysis, significant figures and error propagation. Gather and interpret relevant data to make judgments that include a reflection on prominent issues of a social, scientific or ethical nature. Carry out a critical analysis of the experimental results and the global work carried out.
To assume the values of responsibility and professional ethics typical of chemical engineering.
To develop critical thinking and reasoning
To work autonomously.
To prevent and solve teamwork problems respecting the diversity and plurality of ideas, people and situations.
To maintain a proactive and dynamic attitude regarding the development of one's own professional career, personal growth and continuous training. Have a spirit of improvement.

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.
- Apply scientific method to systems in which chemical, physical or biological transformations are produced both on a microscopic and macroscopic scale.
- Assume the values of professional responsibility and ethics required in chemical engineering.
- Demonstrate understanding of the main concepts for controlling chemical engineering processes.
- Develop personal attitude.
- Develop personal work habits.
- Develop thinking habits.
- Observe ethics and professionalism.
- Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.
- 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
- Work in a team.

Learning Outcomes

1. Analyse, evaluate, design and implement homogenous reactors.
2. Apply the scientific and technological basics of automatisms and control methods to the field of chemical engineering.
3. Design experiments.
4. Develop critical thinking and reasoning
5. Maintain a proactive and dynamic attitude with regard to one's own professional career, personal growth and continuing education. Have the will to overcome difficulties.
6. Perform a critical analysis of experimental results and of the overall work done.
7. Practice the fundamental laws of thermodynamics.
8. Prevent and solve problems.
9. Respect diversity in ideas, people and situations.
10. Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.
11. Work autonomously.
12. Work cooperatively.

Content

A) Laboratory sessions (directed activity)
3-hour sessions, in laboratory Q6/0006. The presentation of the subject will take place on the first school day of the second semester and attendance is compulsory.
In these sessions, the following practices are carried out:
1.- Reactors.
2.- Determination of residence time in reactors.
3.- Feedback and cascade control.
4.- Control valves.
5.- Rectification.
6.- Heat exchangers.
7.- Heat transmission by convection and conductivity.
8.- Chemical kinetics.
B) Practice reports (independent activity)
Elaboration of reports from the data obtained in the laboratory, analysis and discussion of the data obtained and comparison with the appropriate bibliography, calculation of the propagation of errors and/or sensitivity analysis. Elaboration of detailed calculation examples. Proposal of experiments

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Carrying out the experiments and consolidatidation of working habits in the laboratory and in handling the equipment	84	3.36	1, 2, 4, 3, 6, 5, 7, 8, 10, 9, 12, 11
Presentation of the lab experiments to be done and their operation. Distribution of groups and shifts.	3	0.12	4, 8, 11
Type: Supervised			
Completion of the exam	3	0.12	1, 2, 4, 6, 5, 7, 11
Type: Autonomous			
Preparation of reports o the experimental work carried out at the lab	50	2	4, 3, 6, 5, 8, 10, 9, 12, 11
Preparation of the global exam	10	0.4	4, 3, 6, 5, 10, 11

It is a compulsory subject due to its completely practical nature of experimentation in the laboratory.

Depending on the number of students, the academic calendar and the number of experimental facilities, they will be divided into shifts, and each shift will be divided into work teams of 2 to 3 people maximum.

It is mandatory to wear a lab coat, safety glasses, note-taking equipment and to have read and understood the practice scripts.

It is extremely important to follow the safety rules.

On the first day of work in the laboratory, the document must be brought in accordance with the safety rules, once the information related to "Safety in teaching laboratories" available in the subject's moodle has been read.

15 minutes of a session in each shift will be reserved, within the calendar established by the center/degree, for students to complete surveys to evaluate the performance of the teaching staff and to evaluate the subject.

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
Attitude in the laboratory. Attendance, organization and time management. Cleaning and care of the work area, punctuality, following of safety regulations. (It will be calculated as: 50% peer assessment and 50% professors assessment).	20%	0	0	5, 8, 9, 12, 11
Final examination	30%	0	0	4, 5, 10, 11
Reports of performed experiments (in group)	50%	0	0	1, 2, 4, 3, 6, 5, 7, 8, 10, 9, 12, 11

Attendance at laboratory sessions is mandatory to pass the subject. Each missed session deducts 1 point out of 10 from the laboratory attitude grade. Fractions of lateness will also be taken into account. Only those absences listed in the regulations of the School of Engineering will be treated as justified absences.

To pass the subject, in addition to attending the laboratory, it is necessary to have a minimum of 5/10 of the overall report grade and a 4/10 of the final exam grade. The final grade will be obtained by weighting each assessment activity according to the established percentages. This sum must be equal to 5.0 to pass. The final exam is mandatory. Students who do not obtain these minimums will have a final grade lower than 4. It should be noted that the final exam is non-retrievable, therefore failing it with a grade lower than that indicated above means not being able to pass the subject.

The dates of the practices, submission of reports, continuous assessment and the exam will be published on Moodle and may be subject to changes in programming for reasons of adaptation to possible incidents. Information will always be provided on Moodle about these possible changes since this is the platform for exchanging information between teachers and students. The schedule of the assessment activities will be given on the first day of the subject and will be made public on the subject's Moodle. The following schedule is expected:
- Compulsory attendance at the practice sessions: from week 1 to week 15. This includes mandatory attendance at the information session that takes place on the first day of the semester.
- Final exam of the subject.

For each assessment activity, a place, date and time of review will be indicated in which the student will be able to review the activity with the teaching staff. In this context, complaints may be made about the grade of the activity, which will be evaluated by the professor responsible for the subject. If the student does not attend this review, this activity will not be reviewed later.

Plagiarism or copying are considered examples of not having achieved the following learning outcomes: A) Assume and respect the role of the various members of the team, as well as the different levels of dependency

of the team; B) Maintain a proactive and dynamic attitude with respect to the development of one's own professional career, personal growth and continuing education and C) Have a spirit of improvement.

Without prejudice to other disciplinary measures that may be deemed appropriate, irregularities committed by the student that may lead to a variation in the grade of an assessment act will be graded with a zero. Therefore, copying, plagiarism, cheating, allowing copying, etc. in any of the assessment activities will imply failing it with a zero. Assessment activities graded in this way and by this procedure will not be retaken. If it is necessary to pass any of these assessment activities to pass the subject, this subject will be directly failed, with no opportunity to retake it in the same course. The student's final grade will be less than 4.

Reports must be submitted electronically via Moodle, on the date stipulated in the calendar that will be published on Moodle. The accepted electronic format is pdf, with a maximum size of 15 Mb. Each day of delay in submitting the report will be penalized with 1 point out of 10 up to a maximum of 6 working days, at which point the report's grade will be 0. A guide will be published on Moodle with the format that reports must follow, which must be followed rigorously. Failure to follow these format guidelines for the preparation of reports will be penalized with 1 point out of 10. Additionally, a guide to the sections that must be included in the report and the style for preparing these sections will be made available to them.

Honors. Awarding an honors grade is the decision of the professor responsible for the subject. UAB regulations indicate that MHs mayonly be granted to students who have obtained a final grade equal to or greater than 9.00. Up to 5% of MHs of the total number of students enrolled may be granted. In the event that there are more students with a final grade greater than 9 than the percentage or fraction stipulated above, honors will be granted to the students with the highest final grades. Students will be considered non-assessable (NA) if they have not attended the practical laboratory sessions.

Any case of plagiarism, copying or any irregularity in any evaluation activity will be qualified with a 0.0 and the pertinent regulatory measures will be applied.

There is no cap treatment for repeating students.

This subject does not foresee the single evaluation system.

The use of AI is permitted to improve the writing and style of reports. However, generating original content with AI is strictly prohibited. If AI tools are used, their use must be explicitly declared and their purpose clearly identified within the report.

Bibliography

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Software

MS Excel y MS Word
Matlab
Polymath
Labview
Taylor-made software for control of equipments

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
(PLAB) Practical laboratories	211	Catalan/Spanish	second semester	morning-mixed
(PLAB) Practical laboratories	212	Catalan/Spanish	second semester	morning-mixed
(PLAB) Practical laboratories	213	Catalan/Spanish	second semester	morning-mixed