UAB
Universitat Autònoma de Barcelona

Basic Experimentation in Chemical Engineering

Code: 106054
ECTS Credits: 6

2025/2026

Degree	Type	Year
Chemical Engineering	OB	1

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Teaching groups languages

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

Prerequisites

Having studied the subject of Chemical Engineering Fundamentals. Understanding Catalan, since the lab-guides are written in Catalan.

Objectives and Contextualisation

The objectives of the course are:

- Reach a minimum level of knowledge of basic concepts in the field of TIC that will include the writing of reports, bibliographic search and the use of MS Word and Excel.
- Experimental verification of different basic aspects of chemical engineering. These aspects include: the heat energy and matter balance and the experimental determination of the transport properties of diffusivity of a component and viscosity.

Competences

- 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.
- Communication
- Demonstrate basic knowledge of the use and programming of computers, and apply the applicable IT resources to chemical engineering.
- Develop personal attitude.
- Develop personal work habits.
- Develop thinking habits.
- Observe ethics and professionalism.
- Students must be capable of applying their knowledge to their work or vocation in a professional way and they should have building arguments and problem resolution skills within their area of study.
- 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.
- Students must have and understand knowledge of an area of study built on the basis of general secondary education, and while it relies on some advanced textbooks it also includes some aspects coming from the forefront of its field of study.
- 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. Apply matter and energy balances to continuous and discontinuous systems.
2. Apply scientific method to perform macroscopic balances of matter, energy and momentum.
3. Communicate efficiently, orally and in writing, knowledge, results and skills, both professionally and to non-expert audiences.
4. Design experiments.
5. Develop critical thinking and reasoning
6. Develop independent learning strategies.
7. Develop scientific thinking.
8. 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.
9. Manage available time and resources. Work in an organised manner.
10. Perform a critical analysis of experimental results and of the overall work done.
11. Prevent and solve problems.
12. Respect diversity in ideas, people and situations.
13. 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.
14. Students must have and understand knowledge of an area of study built on the basis of general secondary education, and while it relies on some advanced textbooks it also includes some aspects coming from the forefront of its field of study.
15. Use spreadsheets and numerical programming environments to solve chemical engineering problems.
16. Work autonomously.
17. Work cooperatively.

Content

The contents of the subject are divided into two different parts, each corresponding to 3 ECTS: Basic Practices in Computer Science and Laboratory Practices in Bases in Chemical Engineering

Basic practices in computer science

- Microsoft Excel: Application to Engineering Problems:
    - Working environment. Basic operations and formulas.
    - Built-in functions in Excel.
    - Graphical representations and regressions.
    - Logical programming statements.
    - Vectors and matrices.
    - Numerical integration and differentiation.
    - MS Excel tools and add-ins. The "Solver".
- Formatting a technical/scientific document - MS Word.
- Information search and bibliographic referencing.

Laboratory practices of Bases in Chemical Engineering

They will take place within the last 7 weeks of the second semester. It consists of 5 practices that will be carried out in the laboratory.

- Basic chemical laboratory techniques.
- Heat energy balance.
- Material balance of a component.
- Determination of the diffusivity of a component.
- Determination of viscosity.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Use of software tools	8	0.32	15
Type: Supervised			
Realización de las pràcticas	69	2.76	1, 5, 10, 9, 8, 12, 17
Type: Autonomous			
Elaboración de informes y resolución de problemas	69	2.76	1, 2, 3, 7, 5, 10, 9, 14, 13, 15

The methodology of the subject is based on carrying out the aforementioned practicals in the computer room or laboratory. The basic computer science practices will be preceded by a brief theoretical session, and new content will also be provided through the Virtual Campus. To carry out the laboratory practices, students will have a script for each practice, which must be read and prepared before the start of each session.

Depending on the number of students, the academic calendar, the capacity of the computer room, and the number of experimental installations, students will be divided into different shifts and groups of 2 students (if possible). For the computer science practicals, these will be conducted in the morning, while for the laboratory practicals, there will be both morning and afternoon shifts. The student groups do not have to be the same for the computer science practicals and the laboratory practicals.

A preliminary presentation session will be held at the start of the laboratory practicals.

Laboratory Practicals in Chemical Engineering

As this is a primarily hands-on learning experience, attendance at the laboratory sessions is mandatory. Attendance at the introductory session of the Laboratory Practices in Chemical Engineering is also compulsory.

It is important to have the practicals prepared before entering the laboratory. Students will know in advance which practical they need to do on each occasion, and they will have the necessary information on the Virtual Campus, allowing them to come prepared. Each student must have a laboratory notebook of at least A5 size, in which they will prepare the practical before entering the laboratory on the day of each practical. If not, they will have to leave the laboratory to read and prepare the practical.

Prior to the start of the practicals, in a mandatory session for all students enrolled in the course, the operation of the laboratory, the practical schedule, and the use of the notebook will be explained.

General Safety Rules in the Laboratory

On the first day of practical work in the laboratory, not the course presentation day, students must submit to the professors the signed document generated upon passing the "Laboratory Safety" test. The test is available on the Virtual Campus. It is mandatory to wear a lab coat, have note-taking material, and have previously studied the guide of the practical to be performed, in addition to following the safety rules mentioned on the Virtual Campus.

Students must wear their lab coats in order to participate in laboratory sessions.

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
Actitud al laboratori	7.5%	0	0	3, 8, 11, 17
Attendance and submission of activities	5	0	0	9
Informatics Activities	5	0	0	10, 9, 15
Informatics Exams	40%	2	0.08	6, 9, 16, 15
Informes Laboratorio	35%	0	0	1, 2, 3, 7, 6, 5, 4, 10, 9, 8, 14, 13, 12, 16, 15
Lab Exam	7.5%	2	0.08	14, 13

Process and Scheduled Assessment Activities

The evaluation of the two parts of the course is independent, and a minimum grade of 5 in each part is required to average them.

The schedule of assessment activities for the Informatics section will be provided on the first day of the course and published on the Virtual Campus.

The schedule for submitting laboratory reports will be given before the lab sessions begin.

The dates for midterm lab exams and course recovery exams will be determined by the Degree Coordination.

Informatics Fundamentals Practicals

Assessment will be based on different exercises that must be submitted at the end of the session. To pass this part of the course, a grade of 5.0 out of 10 or higher is required on average across the various continuous assessment activities.

Chemical Engineering Fundamentals Laboratory Practicals

Attendance at all laboratory sessions is mandatory to pass the course. Additionally, the assessment activities include:

- Presentation of reports for each practical: All reports must be submitted, and a minimum average of 5.0 out of 10 in the report grades is required to pass the course. The schedule for report submission will be notified before the start of the laboratory practicals. Late submission will result in a penalty on the grade.
- Attitude in the laboratory: The laboratory grade, besides attendance, also considers the attitude towards the course (responsibility and behavior in the laboratory, punctuality, having read the practical in advance, use of the laboratory notebook, response to questions asked by the faculty in the laboratory, etc.). A minimum grade of 5 is required to pass the course.
- Written exam: It will include questions on concepts, calculations, graph interpretation, etc., related to the practicals done in the laboratory. A minimum grade of 4 is required to average with the rest of the grades and pass the course.

The final grade for this part of the course will be calculated as: 15% laboratory attitude, 15% exam, and 70% reports.

Grades

A student will be considered Not Evaluated when one of the following situations occurs:

- The percentage of completion of the Computer Science Fundamentals Practicals assessment activities is less than 67%.
- The percentage of completion of the Chemical Engineering Laboratory Fundamentals Practicals assessment activities is less than 67%.
- Attendance at laboratory practical sessions is less than 8 days, with or without justification.

The Honor Roll (MH) grade can be awarded starting from an average grade of 9.0 out of 10. The total number of MHs will never exceed 5% of the total enrolled students. To obtain the MH, a minimum grade of 8.5 in each course activity is required.

If the average grade of the two parts of the course (Computer Science or Laboratory) is 5 out of 10 or higher, but one of the parts has a grade below 5, the final grade for the course will correspond to the lowest grade.

Recovery Process

The recovery process is independent for each part of the course.

Computer Science Fundamentals Practicals

If the average grade of the exercises is less than 5.0 out of 10, this part of the course can be recovered in an exam that includes all the covered content and will replace the exercise grades. To participate in the recovery, the student must have been previously assessed in a set of activities whose weight equals at least two-thirds of the total grade for this part of the course.

The recovery exam will be conducted according to the schedule set by the coordination.

Chemical Engineering FundamentalsLaboratory Practicals

Only the exam is eligible for recovery, and a minimum grade of 4 on the recovery exam is required to pass the course. To be eligible for the recovery exam, the report grades must be equal to or higher than 5. If the exam

grade is below 4, but the calculated overall grade is 5 or higher, the recorded grade for the laboratory partwill be the recovery exam grade.

The recovery exam will be conducted according to the schedule set by the coordination.

Grade Review Procedure

Students will have the opportunity to request a review of the various activities and reports submitted within 24 hours after the grade is published by contacting the instructor who graded the work to schedule a review, or by following the instructions provided for the reviews.

Artificial Intelligence Tools

The use of Artificial Intelligence tools is not allowed in this course for any assessment activity (exams, assignments, lab reports, etc.). If their use is permitted in a specific case, it will be clearly indicated.

Student Irregularities, Cheating, and Plagiarism

Without prejudice to other disciplinary measures deemed appropriate and in accordance with current academic regulations, any irregularity committed by the student that may alter the grade of an assessment activity-such as the use of unauthorized documents, materials, or devices-will result in a grade of zero.

A piece of work, activity, or exam will be considered "copied" when it reproduces all or a significant part of another student's work. It will be considered "plagiarized" when a portion of a text from another author is presented as one's own without citing the sources, regardless of whether the original sources are in print or digital format.

Reports and assessment activities must be original. Copying a practice or part of it will result in a zero for that report or activity, whether it is an individual or group submission (in the latter case, all group members will receive a 0). Copying includes the presence of identical paragraphs to those in other reports or their reinterpretation. Using another group's report as a model will also be considered copying.

In this course, the use of Artificial Intelligence (AI) technologies is not permitted at any stage. Any work that includes AI-generated content will be considered a breach of academic integrity and may result in a partial or full penalty on the grade of the activity, or more serious sanctions in severe cases.

This course does not provide a single assessment system.

Bibliography

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- Steven C. Chapra & Raymond P. Canale Métodos numéricos para ingenieros. Ed. (2003) McGrwHill. ISBN: 970-10-3965-3
- CRC Handbook of Chemistry and Physics John R. Rumble, ed, 100th Edition CRC Press/Taylor & Francis, Boca Raton, FL.
- Tosun "Modeling in Transport Phenomena. A Conceptual Approach", 2nd ed., Elsevier, 2007.
- C.J. Geankoplis, "Transport Processes and Separation Process Principles", 4th ed., Prentice Hall, 2003.
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- M.L. Sheely "Glycerol viscosity table" Industrial and Engineering Chemistry, 24(9), 1932, 1060-1064.

Software

MS Word and MS Excel

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	second semester	morning-mixed
(PLAB) Practical laboratories	212	Catalan	second semester	morning-mixed
(PLAB) Practical laboratories	213	Catalan	second semester	morning-mixed
(PLAB) Practical laboratories	214	Catalan	second semester	morning-mixed
(TE) Theory	21	Catalan	second semester	morning-mixed