

Experimentation in Chemical Engineering I

Code: 102396
ECTS Credits: 4

Degree	Type	Year	Semester
2500897 Chemical Engineering	OB	2	2

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

Contact

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Use of Languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: No

Teachers

José Luis Montesinos Seguí
Gregorio Alvaro Campos
David Juan Fernandez Verdejo
Jordi Guílera Sala
Julio Octavio Pérez Cañestro
Marina Guillen Montalban

Prerequisites

Having studied the subject of Balances in Chemical Engineering. It is recommended to be studying the subjects of Chemical Kinetics and Fluid Circulation.

Understand Catalan, since the lab-guides are written in Catalan.

Objectives and Contextualisation

The main objective of this course is the experimental verification of some basic aspects regarding chemical engineering. These aspects are explained in other subjects of the Degree. These aspects include:

- Mass, energy and heat balances.
- Experimental determination of transport properties: thermal conductivity, diffusivity and viscosity.

In addition, being one of the first lab-courses, special emphasis will be done on writing the reports regarding the experimental work.

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.
- Develop personal attitude.
- Develop personal work habits.
- Develop thinking habits.
- Observe ethics and professionalism.
- 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. Critically evaluate the work done.
3. Develop critical thinking and reasoning
4. Develop curiosity and creativity.
5. Develop systemic thinking.
6. Maintain a proactive and dynamic attitude with regard to ones own professional career, personal growth and continuing education. Have the will to overcome difficulties.
7. Manage available time and resources. Work in an organised manner.
8. Operate common equipment used in the chemical industry.
9. Perform a critical analysis of experimental results and of the overall work done.
10. Perform experiments.
11. Respect diversity in ideas, people and situations.
12. Use measurement elements to determine properties of solids and fluids.
13. Work cooperatively.
14. Work in complex or uncertain surroundings and with limited resources.

Content

The contents of the course are divided into 6 practices that students must do at the laboratory.

- p.1.- heat energy balance.
- p.2.- mechanical energy balance.
- p.3.- mass balance.
- p.4.- conductivity and thermal diffusivity determination.
- p.5.- diffusivity of one component determination.
- p.6.- viscosity determination.

Methodology

The methodology of the course is based on the development at the laboratory of the 6 practices mentioned above. To carry out the practices, the student will have a lab-guide for each practice that must be read and prepared before the start of each practice.

The total number of sessions per student will be 20, distributed as follows:

- First session: This session is of compulsory attendance and common to all students. In this session, the presentation and explanation of course and the laboratory practices will be made. The formation of the groups and the lab-period distribution will be made prior to this session through the Virtual Campus.
- 18 sessions distributed in groups of 3 sessions for the realization of each of the 6 practices.

- Last session: dedicated to possible contingencies.

Being an eminently practical learning, attendance at laboratory sessions is mandatory. The non-attendance will be penalized according to what is explained in the evaluation section.

Depending on the number of students, the academic calendar and the number of experimental set-ups, the students will be divided into lab-period, up to a maximum of 3, and each lab-period into different work groups, up to a maximum of 12.

Safety lab-rules

It is mandatory to wear a lab coat, note-taking material and the practice guides previously studied. Contact lenses can not be used.

The general safety rules in the laboratory can be found in the Virtual Campus. The first day of practical work in the laboratory, not the day of course presentation, the document, signed, should be delivered to teachers. The document is generated when the base test of "Safety in the laboratories" is passed. The test is in the Virtual Campus.

Attendance to the lab-period in the laboratory will be made alternately in periods of 6 working days: 6 days the lab-period 1, 6 the 2 and 6 the 3; then turns the lab-period 1 6 days, 6 days the 2 and 6 days the 3, and finally 6 days the turn 1, 6 the 2 and 6 the 3.

The dates of lab-practices and the delivery of the reports for each lab-period will be published in 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.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Presentation and operation of practices and the practice laboratory	2	0.08	6
Type: Supervised			
Practices	67	2.68	1, 5, 4, 3, 10, 9, 7, 8, 11, 13, 14, 12
Type: Autonomous			
Final exam preparation	3	0.12	1, 2, 5, 3, 9, 7
Reprots preparation	26	1.04	2, 4, 6, 11, 13

Assessment

Evaluation process and activities

Attendance to the practical sessions is mandatory to pass the course. In addition, evaluation activities include:

- Presentation of reports for each practice: you have to present all the reports and have 60% of the note of the reports to pass the course.

- Attitude: each day of non-attendance, when unexcused, deducts 0.3 points from the 1.5 of the laboratory grade and when it is excused, 0.1. The laboratory grade, in addition to the assistance, also takes into account the attitude towards the subject (behavior in the laboratory, punctuality, read the practice before the session, plagiarism, ...).
- An optional final exam, to which only students with 60% of the report grade and 60% of the attitude score in the laboratory can attend. The minimum score of this exam to score positively must be 4 out of 10.

The final grade will be calculated as 15% attitude at the laboratory, 15% final exam and 70% reports. The maximum grade for those students who do not take the optional global exam will be 8.5 out of 10.

Evaluation activities schedule

At the end of each period of 6 working days of practices, and within the established period, each group of students must submit a report for each of the practices carried out. At the beginning of the subject, the corresponding reports delivery dates will be informed.

The final optional exam will be done in the exam period of the Degree according to the calendar marked by the coordination.

Recovery process

As it is an eminently practical subject, no system for recovering a practice or a suspended report is foreseen. However, if the grade resulting from the average of the reports is equal to or greater than 5 but less than 6.0 out of 10 and the attitude score in the laboratory equal to or greater than 60%, this part of the subject may be retaken in an exam. which will include all the contents worked on in this part of the subject. You will have to get a grade equal to or higher than 5 out of 10 to be able to average the reports.

Procedure for reviewing the qualifications

The returning date of the corrected reports will be informed in a timely manner, so that students can to review the correction and improve the aspects that are necessary for the following reports.

Plagiarism and other irregularities

Without prejudice to other disciplinary measures, and in accordance with current academic regulations, any irregularities committed by the student that could lead to a variation of the score of an evaluation act will be scored with a zero. Therefore, copying or allowing to copy a practice or any other evaluation activity will imply a zero (0) in the attitude note and, therefore, suspend the course having a mark of 3 over 10. In addition, the student will not be able to continue with the practices in the current course.

Repeaters

Students who failed the course due to copying, have to repeat the course as if they were doing it for the first time.

The rest of the repeating students have two possibilities:

- Complete the whole course as a new enrolled student.
- To form a group with another repeating student and to repeat only the reports of those practices that, in the previous year, were rated with a score of less than 6. They will not have to go to the laboratory and, to make the reports, they will have to use the own-data the previous year (18-19). Repeaters will also need to present the final exam. To pass the subject, students must obtain at least 6 out of 10 from each one of the reports they make and a minimum of 5 out of 10 from the final exam. In this case, the final qualification will be calculated as: 70% average of the note of all the reports and 30% the mark of the exam. In any case, using this option, a student can obtain the Honor qualification.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Attitude at the laboratory	15%	0	0	1, 5, 4, 3, 10, 9, 7, 6, 8, 11, 13, 14, 12
Final exam	15 %	2	0.08	1, 5, 3, 9, 7
Reports	70 %	0	0	1, 2, 5, 3, 9, 7, 13

Bibliography

The bibliography will be the one indicated in the practice scripts.

Software

MS Word, MS Excel