Instituto Politécnico de Bragança

Course Unit	Chemical Engineering Process Laboratory			Field of study	Chemical Enginnering Processes
Master in	Chemical Engineering			School	School of Technology and Management
Academic Year	2025/2026	Year of study	1	Level	2-1
ECTS credits	6.0				
Type	Semestral	Semester	2	Code	6362-756-1203-00-25

Workload (hours)	162	Contact hours	T	TP	PL	TC	S	E	OT	O
			-	-	60	-	-	-	-	-

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s): José António Correia Silva

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
1. Apply the conservation principles of mass and energy and the concept of modelling in the analysis of experiments
2. Develop experimental work to analyze separation processes
3. Understand through experimentation process dynamics and control
4. Develop experimental work to analyze chemical reactors
5. Develop proficient oral presentation skills through group project presentations

Prerequisites

Before the course unit the learner is expected to be able to:
Dominate basic concepts about chemical reactors, separation processes and system dynamics

Course contents

Process control and dynamics. Chemical reaction engineering. Advanced separation processes: membranes and adsorption

Course contents (extended version)

1. Process dynamics and control: ON-OFF control; feedback control. Transient behavior of a surge tank
2. Chemical reaction engineering. Tubular reactor. Stirred tanks in series
3. Advanced separation processes: reverse osmosis in membranes; fixed bed adsorption

Recommended reading

1. Octave Levenspiel, Chemical Reaction Engineering, 3rd Edition, John Wiley & Sons, 2019.
2. D. M. Ruthven, Principles of adsorption and adsorption processes, John Wiley & Sons, 1984.
3. D. E. Seborg, T. F. Edgar e D. A. Mellichamp, Process Dynamics and Control, John Wiley & Sons, 4th Edition, 2016.

Teaching and learning methods

Practical laboratory classes (60 hours): Execution of laboratory work. Non-classroom period (92 hours): Planning of experimental activities involving the collection of relevant information from appropriate sources and preparation of preliminary reports. Elaboration of reports after the completion of experimental activities.

Assessment methods

1. Alternative 1 - (Regular, Student Worker) (Final)
   - Laboratory Work - 40%
   - Reports and Guides - 20%
   - Presentations - 40%
2. Alternative 2 - (Regular, Student Worker) (Final, Supplementary, Special)
   - Laboratory Work - 40%
   - Reports and Guides - 20%
   - Final Written Exam - 40%

Language of instruction

English

Electronic validation

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08-03-2026	09-03-2026	09-03-2026	02-04-2026

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