

## SUBJECT TEACHING GUIDE

### G787 - Advanced Separation Processes

#### Degree in Chemical Engineering

Academic year 2023-2024

1. IDENTIFYING DATA			
Degree	Degree in Chemical Engineering	Type and Year	Optional. Year 4
Faculty	School of Industrial Engineering and Telecommunications		
Discipline	Subject Area: Option A: Fundamental Chemical Engineering Subject Area: Option D: European Project Semester Optional Module		
Course unit title and code	G787 - Advanced Separation Processes		
Number of ECTS credits allocated	6	Term	Semester based (2)
Web			
Language of instruction	English	Mode of delivery	Face-to-face

Department	DPTO. INGENIERIAS QUIMICA Y BIOMOLECULAR
Name of lecturer	EUGENIO BRINGAS ELIZALDE
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Other lecturers	INMACULADA ORTIZ URIBE PEDRO MANUEL GOMEZ RODRIGUEZ MARTA RUMAYOR VILLAMIL GABRIEL ZARCA LAGO

### 3.1 LEARNING OUTCOMES

- Be able to know the fundamentals and applications of rate-controlled separation processes:
  - Membrane-based separation processes
  - Solid-fluid separation processes

#### 4. OBJECTIVES

#### 6. COURSE ORGANIZATION

CONTENTS	
1	1. UNIT 1: Introduction to advanced separation processes 1.1. Introduction 1.2. Definition and classification of advanced separation processes
2	UNIT 2: Case studies of environmental and industrial applications 2.1. Energy sector: CO <sub>2</sub> capture from flue gases 2.2. Water treatment: Tertiary wastewater treatment 2.3. Food industry: Dairy products processing 2.4. Pharmaceutical industry: Purification of active ingredients and solvent recovery
3	3. UNIT 3. Fluid-solid separation processes  3.1. Adsorption. Fundamentals, design and applications.  3.2. Ion Exchange. Fundamentals, design and applications.

#### 7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Partial Exams	Written exam	No	Yes	45,00
Portfolio	Others	No	No	10,00
Presentation Practical Sessions	Oral Exam	No	Yes	45,00
TOTAL				100,00
Observations				
<p>Continuous assessment procedure is based on the execution of tests 1 (22,5%) and 2 (22,5%) to evaluate the theoretical contents, a power point presentation to evaluate the practical sessions (45%) and the delivery of a portfolio (10%). The portfolio's content will be also evaluated in tests.</p> <p>The student who do not follow the continuous evaluation procedure will have the option of performing a final exam in the date scheduled by the ETSIIyT (minimum mark 5.0).</p>				
Observations for part-time students				
Article 24 from Reglamento de los Procesos de Evaluación en la Universidad de Cantabria will be applied				

#### 8. BIBLIOGRAPHY AND TEACHING MATERIALS

##### BASIC

- WANKAT, P.C., Rate-Controlled Separations, 1996, Blackie Academic & Professional.
- SEADER, J.D., HENLEY, E.J. Separation Process Principles. 2006. 2nd Wiley & Sons.
- CUSSLER, E.L., Diffusion. Mass Transfer in Fluid Systems. 2009. 3rd Ed. Cambridge University Press.
- DRIOLI, E., CRISCUOLI, A., CURCIO, E., Membrane Contactors: Fundamentals, Applications and Potentialities. 2006. Elsevier.
- COULSON, J.M. RICHARDSON, J.F. Chemical Engineering (Particle Technology and Separation Processes). 2002. Oxford; Butterworth Heinemann, 2002

