

SUBJECT TEACHING GUIDE

1051 - Emerging Technologies in Chemical Engineering

Master's Degree in Industrial Engineering

Master's Degree in chemical engineering

Academic year 2024-2025

1. IDENTIFYING DATA					
Degree	Master's Degree in Industrial Engineering Master's Degree in chemical engineering			Type and Year	Optional. Year 2 Optional. Year 1
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Optional Subjects				
Course unit title and code	1051 - Emerging Technologies in Chemical Engineering				
Number of ECTS credits allocated	3	Term	Semester based (2)		
Web					
Language of instruction	English	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. INGENIERIAS QUIMICA Y BIOMOLECULAR				
Name of lecturer	EUGENIO BRINGAS ELIZALDE				
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Office	E.T.S. de Ingenieros Industriales y de Telecomunicación. Planta: - 2. DESPACHO EUGENIO BRINGAS ELIZALDE (S2013)				
Other lecturers	NAZELY DIBAN-IBRAHIM GOMEZ CRISTINA GONZALEZ FERNANDEZ				

3.1 LEARNING OUTCOMES

- 1) To identify potential applications of Chemical Engineering in emerging sectors
- 2) To provide technical alternatives to solve environmental, industrial and social problems
- 3) To apply the fundamentals of Chemical Engineering to solve problems in related areas

4. OBJECTIVES

The aim of the subject is to provide a novel approach through study cases of novel applications and technologies where chemical engineers play a decisive role.

6. SUBJECT PROGRAM	
CONTENTS	
1	UNIT 1. The potential of nanomaterials and microfluidics in the development of emerging technologies in Chemical Engineering Chapter 1. Fundamentals of nanotechnology and microfluidics Chapter 2. Applications of nanomaterials and microfluidics in healthcare applications. Chapter 3. Introduction to molecular simulation as a tool for developing healthcare applications
2	UNIT 2. Contribution of Chemical Engineering to tissue engineering and therapeutic technologies Chapter 1. Introduction to tissue engineering Chapter 2. Scaffolds for cell support Chapter 3. Bioreactors in tissue engineering Chapter 4. Membranes for therapeutic technologies

7. ASSESSMENT METHODS AND CRITERIA				
Description	Type	Final Eval.	Reassessn	%
Written Exam about the contents covered in the theoretical and practical lectures (65%)	Written exam	Yes	Yes	65,00
Development of two case studies related with the topics covered in the subject. Oral presentation of one of the case studies (35%)	Work	Yes	Yes	35,00
TOTAL				100,00
Observations				
In case of interruption of face-to-face learning by health alert activation, the assesment procedure will not be modified and it will be performed using virtual tools.				
Observations for part-time students				
Article 24 from 'Reglamento de los procesos de evaluación en la Universidad de Cantabria'				

8. BIBLIOGRAPHY AND TEACHING MATERIALS
BASIC
Introducción a la nanotecnología / Charles P. Poole, Frank J. Owens. Editorial Reverté, Barcelona (2007) Biomaterials, artificial organs and tissue engineering / edited by Larry L. Hench and Julian R. Jones. Boca Raton: CRC Press.Cambridge: Woodhead (2005) Computational Fluid Dynamics for Engineers Bengt Andersson , Ronnie Andersson, Love Håkansson, Mikael Mortensen, Rahman Sudiyo and Berend Van Wachem CRC Press.Cambridge: UK (2011)