

## SUBJECT TEACHING GUIDE

### 1059 - New water sources

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	1059 - New water sources				
Number of ECTS credits allocated	3	Term	Semester based (2)		
Web					
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. INGENIERIAS QUIMICA Y BIOMOLECULAR				
Name of lecturer	MARIA FRESNEDO SAN ROMAN SAN EMETERIO				
E-mail	maria.sanroman@unican.es				
Office	E.T.S. de Ingenieros Industriales y de Telecomunicación. Planta: - 2. DESPACHO DE MARIA FRESNEDO SAN ROMAN SAN EMETERIO (S2012)				
Other lecturers	RAQUEL IBAÑEZ MENDIZABAL GERMAN SANTOS BREGEL				

### 3.1 LEARNING OUTCOMES

- At the end of the course the student will be able to:

- 1) Understand the global water resources situation: water demand and water availability.
- 2) Evaluate and discriminate existing technological alternatives for the development of new water sources with sustainability criteria.

### 4. OBJECTIVES

The overall objective of the course is to provide the student with the tools to know and differentiate between the different technological alternatives for the development of new water sources, taking into account sustainability criteria.

6. SUBJECT PROGRAM	
CONTENTS	
1	Topic 1. Water resources for industrial and urban use: demand and availability.
2	Topic 2. Obtaining reclaimed water: technological alternatives with sustainability criteria.
3	Topic 3: Desalinated water production I: technological alternatives with sustainability criteria.
4	Topic 4: Desalinated water production II: technological alternatives with sustainability criteria.

7. ASSESSMENT METHODS AND CRITERIA				
Description	Type	Final Eval.	Reassessn	%
-Objective Test 1. The exam may be partially replaced or supplemented by tests taken during the course and assessed during the course.	Written exam	No	Yes	70,00
-Objective Test 2. Portfolio of activities developed and/or evidence set out in the classroom practice (PA) or computer laboratory practice (PLO).	Others	No	Yes	30,00
		No	No	0,00
<b>TOTAL</b>				<b>100,00</b>
Observations				
The objective tests are designed to provide a continuous assessment of the student's work during the course and can therefore be adapted to the specific context in which the course takes place.				
Observations for part-time students				
In accordance with article 24 of the UNIVERSITY OF CANTABRIA ASSESSMENT PROCEDURE, specific procedures will be established, in consultation with the student and the course coordinator, to ensure the assessment of the same knowledge and competences to be acquired by full-time students.				

8. BIBLIOGRAPHY AND TEACHING MATERIALS
BASIC
<p>LIBROS:</p> <ul style="list-style-type: none"> <li>- Veera Gnaneswar Gude (Ed). Sustainable Desalination Handbook. Plant Selection, Design and Implementation. Ed. Elsevier (Butterworth-Heinemann), Oxford, United Kingdom, 2018. ISBN: 978-0-12-809240-8.</li> <li>- Escobar, I., Schäfer, A. Sustainable Water for the Future: Water Recycling versus Desalination. 1ª Edition, Ed. Elsevier, Amsterdam, The Netherlands, 2010. ISBN: 9780444531155.</li> <li>- Lazarova V., Cho, K-H., Cornel P. Water Energy. Interactions of water reuse. 1ª Edition, Ed. IWA Publishing, London, United Kingdom, 2012.</li> </ul> <p>MATERIAL COMPLEMENTARIO:</p> <ul style="list-style-type: none"> <li>- Material audiovisual generado por organismos o empresas del sector de interés para el desarrollo de la asignatura (e.g. material generado por AEDyR; empresas de desalación; empresas de equipamiento, etc.).</li> <li>- Bases de datos (industriales, medioambientales, específicas del sector del agua, etc).</li> <li>- Información técnica comercial.</li> </ul>

