UNIVERSIDAD DE CASTILLA - LA MANCHA

GUÍA DOCENTE

1. General information

Course: EMERGING TECHNOLOGIES IN ENERGY AND ENVIRONMENT
Code: 310752
Type: CORE COURSE
ECTS credits: 6
Degree: 2336 - MASTER DEGREE PROGRAM IN CHEMICAL ENGINEERING
Academic year: 2021-22
Center: 1 - FACULTY OF SCIENCE AND CHEMICAL TECHNOLOGY
Group(s): 20
Year: 2
Duration: First semester
Main language: Spanish
Second language: English
Use of additional languages:
English Friendly: Y
Web site:
Bilingual: N

Lecturer: **PABLO CAÑIZARES CAÑIZARES** - Group(s): **20**

Building/Office	Department	Phone number	Email	Office hours
Edifico Enrique Costa / Despacho 9	INGENIERÍA QUÍMICA	3412	pablo.canizares@uclm.es	

Lecturer: **ANTONIO DE LUCAS CONSUEGRA** - Group(s): **20**

Building/Office	Department	Phone number	Email	Office hours
Enrique Costa Novella/Despacho 7	INGENIERÍA QUÍMICA	+34926295217	antonio.lconsuegra@uclm.es	

2. Pre-Requisites

Not established

3. Justification in the curriculum, relation to other subjects and to the profession

Not established

4. Degree competences achieved in this course

Course competences

Code	Description
CB06	To possess and understand knowledge that provides a basis or opportunity to be original in the development and/or application of ideas, often in a research context
CB10	To possess the learning skills to continue studying in a largely self-directed or autonomous manner.
E10	To adapt to structural changes in society caused by factors or phenomena of an economic, energy or natural nature, in order to solve the resulting problems and provide technological solutions with a high commitment to sustainability.
E13	To learn about the particularities of the energy and environmental industries, their evolution and new developments.
E14	To direct and manage environmental and/or energy activities.
G01	To have adequate knowledge to apply the scientific method and the principles of engineering and economics, to formulate and solve complex problems in processes, equipment, facilities and services, in which matter undergoes changes in its composition, state or energy content, characteristic of the chemical industry and other related sectors including the pharmaceutical, biotechnological, materials, energy, food or environmental sectors.
G09	To communicate and discuss proposals and conclusions in multilingual forums, specialized and non-specialized, in a clear and unambiguous way
MC1	To have acquired advanced knowledge and demonstrated an understanding of the theoretical and practical aspects and of the working methodology in the field of Chemical Engineering with a depth that reaches the forefront of knowledge
MC2	To be able, through arguments or procedures developed and supported by themselves, to apply their knowledge, understanding and problem-solving skills in complex or professional and specialized work environments that require the use of creative or innovative ideas
MC3	To have the ability to collect and interpret data and information on which to base their conclusions including, where necessary and relevant, reflection on social, scientific or ethical issues in the field of chemical engineering
MC4	To be able to deal with complex situations or those that require the development of new solutions in the academic, work or professional field of study of Chemical Engineering
MC5	To know how to communicate to all types of audiences (specialized or not) in a clear and precise way, knowledge, methodologies, ideas, problems and solutions in the field of the study of Chemical Engineering
MC6	To be able to identify their own training needs in the field of study of Chemical Engineering and work or professional environment and to organize their own learning with a high degree of autonomy in all kinds of contexts (structured or unstructured).

5. Objectives or Learning Outcomes

Course learning outcomes

Description

To have decision-making skills in natural disaster management.

To acquire knowledge about new energy and environmental technologies that will contribute to a sustainable development of today's society.

To know how to analyse the energy problem and propose possible solutions.

To acquire knowledge in H2 technology: production, transport, storage and fuel cells.

To acquire knowledge of nuclear technology and the management of its waste.

To acquire knowledge on new techniques to reduce CO2 emissions.

To acquire knowledge about emerging technologies in energy: concentrated solar energy (thermosolar), batteries, energy use from different types of waste (biomass) and biofuels.

6. Units / Contents

Unit 1:
Unit 2:
Unit 3:
Unit 4:
Unit 5:
Unit 6:
Unit 7:
Unit 8:

7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	Description
Class Attendance (theory) [ON-SITE]		CB06 CB10 E10 E13 E14 G01 MC1 MC2 MC6	1.4	35	N	-	
Workshops or seminars [ON-SITE]	Guided or supervised work	E13 G01 G09 MC1 MC2 MC3 MC4 MC5	0.6	15	Y	Y	
Study and Exam Preparation [OFF-SITE]	Combination of methods	CB06 CB10 E13 G01 MC1 MC2 MC3 MC6	3.6	90	N	-	
Other on-site activities [ON-SITE]	Combination of methods	CB10 E13 E14 MC2 MC3	0.32	8	N	-	
Progress test [ON-SITE]	Combination of methods	CB06 CB10 E10 E13 E14 G01 MC1 MC2 MC6	0.08	2	Y	Y	
		Total:	**6**	**150**			
		Total credits of in-class work: 2.4					**Total class time hours: 60**
		Total credits of out of class work: 3.6					**Total hours of out of class work: 90**

As: Assessable training activity
Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

8. Evaluation criteria and Grading System

Evaluation System	Continuous assessment	Non-continuous evaluation*	Description
Final test	0.00%	60.00%	
Progress Tests	60.00%	0.00%	
Oral presentations assessment	20.00%	20.00%	
Theoretical papers assessment	20.00%	20.00%	
Total:	**100.00%**	**100.00%**	

According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject , an ordinary and an extraordinary one (evaluating 100% of the competences).

9. Assignments, course calendar and important dates

Not related to the syllabus/contents

Hours	hours
Class Attendance (theory) [PRESENCIAL][]	35
Workshops or seminars [PRESENCIAL][Guided or supervised work]	15
Study and Exam Preparation [AUTÓNOMA][Combination of methods]	90
Other on-site activities [PRESENCIAL][Combination of methods]	8
Progress test [PRESENCIAL][Combination of methods]	2

Global activity

Activities	hours
Other on-site activities [PRESENCIAL][Combination of methods]	8
Progress test [PRESENCIAL][Combination of methods]	2
Class Attendance (theory) [PRESENCIAL][]	35
Study and Exam Preparation [AUTÓNOMA][Combination of methods]	90
Workshops or seminars [PRESENCIAL][Guided or supervised work]	15
Total horas:	150

10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Mario Díaz (coordinador)	Ecuaciones y cálculo para el tratamiento de aguas	Paraninfo Universidad World Scientific	Madrid	978-84-283-4152-3	2018	

Ahmed F. Zobaa	HANDBOOK OF RENEWABLE ENERGY TECHNOLOGY	Publishing Co. Pte. Ltd			2011
Antonio Madrid	Guía completa de las energías renovables	A. Madrid Vicente Ediciones	Madrid	978-84-96709-77-5	2012
Bruce E. Logan	Microbial fuell cells	Wiley			2008
C. Comninellis, G. Chen	Electrochemistry for the environment	Springer			2010
J. J. García Badell	Cálculo de la Energía Solar	Bellisco	Madrid	84-95279-72-X	2003
Krishna R. Reddy, Claudio Cameselle	Electrochemical remediation techonologies for polluted soils, sediments and groundwater	Wiley			2009
Linares Hurtado José Ignacio	El hidrógeno y la energía	Asociación Nacional de Ingenieros del ICAI	Madrid	978-84-932772-9-1	
M. Ibañez; J.R. Rosell; J.I. Rosell	Tecnología Solar	Mundi Prensa	Madrid	84-8476-199-1	2004
Varios	Tecnologías de tratamiento de aguas para su reutilización	COSOLIDER-TRAGUA			2012
	Fuel Cell Handbook	Parsons, Inc. Science Applications International Corporation			2000