UNIVERSIDAD DE CASTILLA - LA MANCHA

GUÍA DOCENTE

1. General information

Course: TECHNOLOGIES FOR THE TREATMENT OF GASEOUS EFFLUENT
Code: 57737
Type: ELECTIVE
ECTS credits: 6
Degree: 344 - CHEMICAL ENGINEERING
Academic year: 2021-22
Center: 1 - FACULTY OF SCIENCE AND CHEMICAL TECHNOLOGY
Group(s): 21
Year: 4
Duration: C2
Main language: Spanish
Second language: English
Use of additional languages:
English Friendly: Y
Web site:
Bilingual: N

Lecturer: **Mª JESUS RAMOS MARCOS** - Group(s): **21**

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Lecturer: **JOSE VILLASEÑOR CAMACHO** - Group(s): **21**

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2. Pre-Requisites

Not established

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

Subject included in the optional module Environmental Engineering. It addresses the study of the planning, design and operation of engineering techniques for the purification of polluted air currents. Given that any industrial chemical project must comply with environmental regulations and implement preventive or corrective measures of impact, it happens that this type of technology is of current use in any industrial chemical process that generates contaminated gaseous effluents into the atmosphere. Therefore, his knowledge is necessary when carrying out a complete design of a chemical plant. The techniques of elimination of solid particles, SO2, nitrogen oxides, etc. are studied and the design of industrial smokestacks is studied. Subsequently, practical cases are addressed in which the theoretical knowledge is applied to raise global systems of polluted air purification that emit different types of industries.

4. Degree competences achieved in this course

Course competences

Code	Description
CB02	Apply their knowledge to their job or vocation in a professional manner and show that they have the competences to construct and justify arguments and solve problems within their subject area.
CB05	Have developed the necessary learning abilities to carry on studying autonomously
E35	Capacity for calculation and design, and knowledge on the operation, of industrial waste management systems
G01	Capacity for the direction, of the activities object of the engineering projects described in the competence G1.
G02	Knowledge in basic and technological subjects, which enables them to learn new methods and theories, and give them versatility to adapt to new situations.
G03	Ability to solve problems with initiative, decision making, creativity, critical reasoning and to communicate and transmit knowledge, skills and abilities in the field of Chemical Engineering.
G04	Knowledge for the realization of measurements, calculations, valuations, appraisals, surveys, studies, reports, work plans and other analogous works.
G11	Proficiency in a second foreign language at level B1 of the Common European Framework of Reference for Languages
G16	Capacity for critical thinking and decision making
G17	Synthesis capacity
G18	Capacity for teamwork
G19	Ability to analyze and solve problems
G20	Ability to learn and work autonomously
G21	Ability to apply theoretical knowledge to practice
G22	Creativity and initiative

5. Objectives or Learning Outcomes

Course learning outcomes

Description

To be able to assess the environmental problems associated with the emissions of polluted gases in the industry.

To have the ability to assess the different options to minimize the emission of air pollutants

To have knowledge to design and operate contaminated air purification processes

6. Units / Contents

Unit 1: Air pollution abatement. Concepts.

Unit 2: Particulate removal. Principles.
Unit 3: Particulate removal. Mechanical devices.
Unit 4: Particulate removal. Electrostatic precipitators.
Unit 5: Particulate removal. Fabric filters.
Unit 6: Particulate removal. Scrubbers.
Unit 7: NOx abatement
Unit 8: SO2 abatement.
Unit 9: Volatile Organic Compounds abatement.
Unit 10: Chimneys design.
Unit 11: Greenhouse gases abatement

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]	Lectures	CB02 CB05 E35 G01 G02 G03 G04 G11 G16 G17 G18 G19 G20 G21 G22	1.4	35	Y	N	Class attendance (theory and problems)
Computer room practice [ON-SITE]	Practical or hands-on activities	CB02 CB05 E35 G03 G04 G16 G17 G18 G19 G20 G22	0.2	5	Y	Y	Solve problems by PC simulation
Workshops or seminars [ON-SITE]	Project/Problem Based Learning (PBL)	CB02 CB05 E35 G01 G02 G03 G04 G16 G17 G18 G19 G20 G22	0.6	15	Y	Y	Solve problems and real cases in class
Group tutoring sessions [ON-SITE]	Guided or supervised work	CB02 CB05 E35 G01 G03 G04	0.1	2.5	N	-	Group tutorial to solve unclear concepts
Study and Exam Preparation [OFF-SITE]	Self-study	CB02 CB05 E35 G01 G02 G03 G04 G17 G18 G19 G20 G21 G22	3.6	90	N	-	Autonomous work
Final test [ON-SITE]	Assessment tests	CB02 CB05 E35 G01 G02 G03 G04 G11 G16 G17 G18 G19 G20 G21 G22	0.1	2.5	Y	Y	Definitive examination and partial evaluation tests
		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
Theoretical exam	60.00%	60.00%	Test or final exam. Partial progress tests fall within the option of continuous assessment for those students who submit to these tests. They allow to eliminate part of the contents for the final exam.
Assessment of problem solving and/or case studies	25.00%	25.00%	The resolution of problems or practical cases is done in person in the classroom. It requires the delivery of problems or cases resolved in writing, and it is valued only if there is assistance to said face-to-face activity. Those students who did not attend the activity face-to-face on problem solving or case studies, have the option of being evaluated in the extraordinary final written test.
Assessment of activities done in the computer labs	15.00%	15.00%	The realization of activities in a computer classroom is a face-to-face activity. Its assessment implies assistance with use (not mere assistance) which is evaluated on site during the practice. Those students who do not carry out the classroom activity of computer classroom practices use, have the option to be evaluated through practical and oral test on said activity in the extraordinary final call.
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).

Evaluation criteria for the final exam:

Continuous assessment:

The ordinary assessment consists of a final exam in which the student may have eliminated subject matter (theory and problems) in the partial progress tests. The calculation of the final grade will be made according to the evaluation systems described in the three parts. A final grade equal to or greater than 5.00 is required to pass and a minimum of 4.00 in each part.

Non-continuous evaluation:

Evaluation criteria not defined

Specifications for the resit/retake exam:

The extraordinary evaluation consists of a final exam that includes all evaluable activities. The calculation of the final grade will be made according to the evaluation systems described in the three parts. A final grade equal to or greater than 5.00 is required to pass and a minimum of 4.00 in each part.

Specifications for the second resit / retake exam:

The extraordinary evaluation consists of a final exam that includes all evaluable activities. The calculation of the final grade will be made according to the evaluation systems described in the three parts. A final grade equal to or greater than 5.00 is required to pass and a minimum of 4.00 in each part.

9. Assignments, course calendar and important dates

Not related to the syllabus/contents

Hours	hours
Class Attendance (theory) [PRESENCIAL][Lectures]	35
Computer room practice [PRESENCIAL][Practical or hands-on activities]	5
Workshops or seminars [PRESENCIAL][Project/Problem Based Learning (PBL)]	15
Group tutoring sessions [PRESENCIAL][Guided or supervised work]	2.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	90
Final test [PRESENCIAL][Assessment tests]	2.5

Global activity

Activities	hours
Class Attendance (theory) [PRESENCIAL][Lectures]	35
Final test [PRESENCIAL][Assessment tests]	2.5
Computer room practice [PRESENCIAL][Practical or hands-on activities]	5
Workshops or seminars [PRESENCIAL][Project/Problem Based Learning (PBL)]	15
Group tutoring sessions [PRESENCIAL][Guided or supervised work]	2.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	90
Total horas:	150

10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Heinsohn, Robert Jennings	Sources and control of air pollution	Prentice Hall		0-13-624834-9+	1999	
Nevers, Noel de	Ingeniería de control de la contaminación del aire	McGraw-Hill Interamericana		970-10-1682-3	1998	
Parker, Albert	Contaminación del aire por la industria	Reverté		978-84-291-7464-9	2001	
Theodore, Louis	Air pollution control equipment calculations	John Wiley & Sons		978-0-470-20967-7	2008	
Wark, Kenneth	Contaminación del aire : origen y control	Limusa		968-18-1954-3	2004	
	AIR pollution control and design for industry	Marcel Dekker		0-8247-9057-X	1993	
	Air pollution engineering manual	John Wiley		0-471-33333-6	2000	
	Contaminación e ingeniería ambiental	FICYT		84-923131-5-3 (o.c.)	1999	