29938 - Technologies for Treatment of Polluted Waters and Gases

Información del Plan Docente

Academic Year	2017/18
Faculty / School	110 - Escuela de Ingeniería y Arquitectura
Degree	435 - Bachelor's Degree in Chemical Engineering
ECTS	6.0
Year	4
Semester	Second semester
Subject Type	Optional
Module	---

1.General information

1.1.Introduction

1.2.Recommendations to take this course

1.3.Context and importance of this course in the degree

1.4.Activities and key dates

2.Learning goals

2.1.Learning goals

2.2.Importance of learning goals

3.Aims of the course and competences

3.1.Aims of the course

3.2.Competences

4.Assessment (1st and 2nd call)

4.1.Assessment tasks (description of tasks, marking system and assessment criteria)

5.Methodology, learning tasks, syllabus and resources

5.1.Methodological overview

The course includes both theory and practice. The methodological approach design for this course is based on the immersion of the student in the topic of environmental pollution, so he/she can gain the knowledge and skills necessary in order to face projects and, in general, any work activities, including environmental considerations in both management and technical tasks.

The class and laboratory materials available for the students can be found at the subject website (Moodle platform):

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http://moodle2.unizar.es/add/

The programmed activities are detailed below.

5.2.Learning tasks

1. Theory lectures (TP1): 30 hours (on-site activity)
2. Exercises and case studies sessions (TP2): 15 hours (on-site activity). Exercises and case studies will be done in order to complement theoretical sessions.
3. Laboratory sessions (TP3): 10 hours (on-site activity).
4. Visits to facilities related to water and air treatment and quality control (TP4): 5 hours (on-side activity).
5. Tutored case studies (TP6): 30 hours (non on-site activity). Guidance, monitoring and evaluation of guided work.
6. Evaluation (TP8): 6 hours (on-site activity).
7. Study (TP7): 54 hours (non on-site activity).
8. Tutorials.

5.3.Syllabus

Theory and practical cases sessions.

Module 1: WATER TREATMENT TECHNOLOGIES (B1)

1.1. Water Quality and Pollution

Legislation. Resources: availability, composition, use and pollution.

1.2. Water Supply Treatmens

Softening, demineralisation, ultrapurification and disinfection processes; drinking water treatment and desalination.

1.3. Wastewater Treatments

Urban and industrial wastewater: characteristics and environmental effects. Flow and load regulation. Wastewater treatment and reclamation [U1] processes for effluent reusing.

Bloque 2: AIR POLLUTION CONTROL (B2)

2.1. Atmosphere and air quatlity.

The atmosphere. Air quality. Deepening on aspects relevant to the main air pollutants. Global warming.

2.2. Air Pollutant Control.

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NO x control strategies, SO 2 minimization, CO 2 capture and storage, pollutant minimization in movile sources.

Laboratory sessions:

CPL1. DRINKING WATER PRODUCTION FROM NATURAL HYDROLOGICAL RESOURCES

CPL2. OPERATIONAL CONTROL OF ACTIVATED SLUDGE PLANT

CPL3. ZARAGOZA HEAT ISLAND

CPL4. ATMOSPHERIC POLLUTION EVALUATION IN EINA SURROUNDINGS

5.4.Course planning and calendar

WEEK	Theory and Exercices TP1 and TP2			Laboratory TP3	Visits TP4	TP6 delivery	Exam TP8
1	Course Presentation	B1	B1				
2	B1	B1	B1				
3	B1	B1	B1			TGB1_1	
4	B1	B1	B1	CPL1		TGB1_2	
5	B1	B1	B1		VISIT	TGB1_3	
6	B1	B1	B1	CPL2		TGB1_4	
7	B1	B1	B1				
8	B1	B2	B2				B1 Exam
9	B2	B2	B2	CPL3			

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10	**B2**	**B2**	**B2**		**VISIT**		
11	**B2**	**B2**	**B2**	**CPL4**		**TGB2_1**	
12	**B2**	**B2**	**B2**			**TGB2_2**	
13	**B2**	**B2**	**B2**			**TGB2_3**	
14	**B2**	**B2**	**B2**			**TGB2_4**	
15	**B2**	**B2**	**B2**				**B2 Exam**

5.5.Bibliography and recommended resources

BB	Ingeniería de aguas residuales : tratamiento, vertido y reutilización / Metcalf and Eddy ; revisado por George Tchobanoglous, Franklin L. Burton ; traducción y revisión técnica, Juan de Dios Trillo Montsoriu, Ian Trillo Fox ; prólogo de Angel Cajigas . - 3a. ed., [reimpr.] Madrid [etc.] : McGraw-Hill, D.L. 2000
BB	Wark, Kenneth. Contaminación del aire : origen y control / Kenneth Wark , Cecil F. Warner . - [Reimp.] México D. F. : Limusa, cop. 2006
BC	Arceivala, Soli J.. Wastewater treatment for pollution control and reuse / Soli J. Arceivala, Shyam R. Asolekar . - 3rd ed., 2nd repr. New Delhi : Tata McGraw-Hill, 2008
BC	Calidad y tratamiento del agua : manual de suministros de agua comunitaria / American Water Works Association Madrid [etc.] : McGraw Hill, D.L. 2002
BC	Design of municipal wastewater treatment plants. Volume I, Planing and configuration of Wastewater treatment plants . - 4th ed. Alexandria, VA (U.S.A.) : Water environment federation ; Reston : American society of civil engineers, cop. 1998
BC	Kohl, A. Gas Purification / Kohl A., Nielsen R . Fifth Edition. Gulf Professional Publishing, 1997.
BC	Seinfeld, John H. : Atmospheric chemistry and physics : from air pollution to climate

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change / John H. Seinfeld, Spyros N. Pandis . - 2nd ed. Hoboken : John Wiley and sons, cop. 2006