



1. General information

Course: FOOD WASTE CHARACTERIZATION AND MANAGEMENT IN THE FOOD INDUSTRY

Code: 58337

Type: ELECTIVE

ECTS credits: 6

Degree: 383 - UNDERGRADUATE DEGREE PROGRAMME IN FOOD SCIENCE AND TECHNOLOGY

Academic year: 2023-24

Center: 1 - FACULTY OF SCIENCE AND CHEMICAL TECHNOLOGY

Group(s): 22

Year: 4

Duration: C2

Main language: Spanish

Second language: English

Use of additional languages:

English Friendly: Y

Web site:

Bilingual: N

Lecturer: PABLO CAÑIZARES CAÑIZARES - Group(s): 22				
Building/Office	Department	Phone number	Email	Office hours
Edificio Enrique Costa / Despacho 9	INGENIERÍA QUÍMICA	3412	pablo.canizares@uclm.es	Wednesday, Thursday and Friday: 12:30 to 13:30 h
Lecturer: CARMEN MARIA FERNANDEZ MARCHANTE - Group(s): 22				
Building/Office	Department	Phone number	Email	Office hours
Enrique Costa Novella/Despacho 14	INGENIERÍA QUÍMICA	6351	carmenm.fmarchante@uclm.es	Monday, Wednesday and Thursday: 12:30 a 13:30 h
Lecturer: CELIA GÓMEZ SACEDON - Group(s): 22				
Building/Office	Department	Phone number	Email	Office hours
ETSIA: 304	INGENIERÍA QUÍMICA		Celia.GSacedon@uclm.es	
Lecturer: JOSE ANTONIO MURILLO PULGARIN - Group(s): 22				
Building/Office	Department	Phone number	Email	Office hours
Edificio San Alberto Magno	Q. ANALÍTICA Y TGIA. ALIMENTOS	3441	joseantonio.murillo@uclm.es	Monday, Tuesday and Wednesday from 4:00 p.m. to 6:00 p.m.

2. Pre-Requisites

Not established

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

The subject provides the basic knowledge to know the problematic associated with environmental pollution generated by the food industries. This subject identifies the main polluting sources, the basic principles of environmental management to be applied, and the fundamentals of wastewater treatment technologies, solid waste and gaseous emissions.

4. Degree competences achieved in this course

Course competences	
Code	Description
E06	To know and be able to handle the techniques and procedures of food analysis
E18	To acquire knowledge on food legislation and normalization. To counsel legally, scientifically and technologically the food industry and consumers.
E20	To manage sub-products and residues of the food industry according to an effective environmental management
G01	To develop the aptitude to gather and interpret information and data to issue critical judgments that include a reflection on relevant topics of social, scientific or ethical nature.
G07	To possess ability of organization and planning, initiative, entrepreneurship and aptitude to be employed in teamworks. To possess capacity of resolution of specific problems of the professional area and to develop the critical reasoning and decision making.
G09	To develop the motivation for quality, the capacity to adapt to new situations and the creativity.

5. Objectives or Learning Outcomes

Course learning outcomes	
Description	
To acquire skills for the laboratory work, being capable of applying analytical processes that include the planning of the sampling, its treatment and the determination of parameters that concern the residues of the food processing industry.	
To know the legislation on spillage considering the composition and the quantities / flows of the same ones.	
To know the problematics associated with the environmental pollution generated by the food processing industries, identifying the principal pollutant sources, the basic of environmental management that have to be applied, and the fundamentals of the technologies of treatment of waste water, solid residues or gaseous emission.	
To qualify the student to approach an analytical problem, to seek and to select the most relevant bibliography, to synthesize it extracting its more important parts,	

and to expose it and to explain it public.

To qualify the student to select the analytical method most adapted to solve a problem in agreement with the characteristics of the analite and of the sample.

To qualify the student in order to be sensitive by the ethical exercise of the profession, taking into account the social responsibility of his reports and his repercussion in the decisions making.

6. Units / Contents

Unit 1: Wastewater discharge legislation and regulations

Unit 2: Taking and conserving water samples

Unit 3: Characterization of wastewater. Physical-Chemical and Biological parameters

Unit 4: Flow and pollutant load

Unit 5: Unid operations in water treatment

Unit 6: Waste characterization

Unit 7: Environmental problems of waste. Waste regulations

Unit 8: Waste Treatment Technology

Unit 9: Determination of atmospheric pollutants

Unit 10: Air pollution. General concepts. Legislation and regulations

Unit 11: Air pollution treatment technologies

Unit 12: Laboratory Practices: Environmental Analysis

Unit 13: Laboratory Practices:Environmental Technology

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]	Combination of methods	E06 E18 E20 G01 G07 G09	1.12	28	Y	N	
Class Attendance (practical) [ON-SITE]	Practical or hands-on activities	E06 G01 G07	0.8	20	Y	Y	
Progress test [ON-SITE]	Combination of methods	E06 E18 E20 G01 G07 G09	0.16	4	Y	N	
Study and Exam Preparation [OFF-SITE]	Combination of methods	E06 E18 E20 G01 G07 G09	3.6	90	Y	N	
Problem solving and/or case studies [ON-SITE]	Combination of methods	E20 G01 G07 G09	0.32	8	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
Progress Tests	60.00%	60.00%	Performance of progress tests consisting of multiple-choice and/or short-answer questions.
Assessment of problem solving and/or case studies	20.00%	20.00%	Study of a type of agri-food industry, in which the management and treatment of waste is studied, as well as the chemical analysis of the different processes involved in this type of industry.
Practicum and practical activities reports assessment	20.00%	20.00%	Preparation of memory of practices, discussion of results and conclusions.
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 formative activities will be evaluated as indicated in the table above, being necessary a grade higher or equal to 4 out of 10 in each activity and an overall grade higher or equal to 5 out of 10.

Non-continuous evaluation:

Students who have not passed the course through continuous evaluation, will take a final test with a weight of 60% of the grade, maintaining the percentages of 20% for practical activities and problem solving or cases.

Specifications for the resit/retake exam:

Students who have not passed the subject by continuous evaluation will take a final test weighing 60% of the grade, keeping the percentages of 20% for practical activities and the resolution of problems or cases.

9. Assignments, course calendar and important dates

Not related to the syllabus/contents	
Hours	hours

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Gilbert M. Master ; Wendell P. Ela	Introduction to Environmental Engineering and Science	Pearson			2014	
DEGREMONT	Manual Técnico del Agua.	Mensajero			2016	
Lagreda, M.D.; Buckingham, P. L. y Evans, J.C	Gestión de residuos tóxicos. Tratamiento, eliminación y recuperación de suelo	McGraw-Hill			1996	
Metcalf and Eddy	Ingeniería de Aguas Residuales. Tratamiento, vertido y reutilización	McGraw-Hill			2002	
Parker, A	Contaminación del aire por la industria	Reverté			2001	
Ramalho, R.S	Tratamiento de Aguas Residuales	Reverté			2003	
Rodier J.	Análisis de aguas	Omega			2011	
S.E. Manahan	Introducción a la Química ambiental	Reverté			2007	
Tchobanoglous, G., Theisen, H., Vigil, S.	Gestión integral de residuos sólidos.	McGraw-Hill			1994	
Vicente Conesa Fernández-Vitoria	Auditorías Medioambientales. Guía Metodológica.	Mundi-Prensa			1997	
Wark, K. y Warner, C	Contaminación del aire: origen y control.	Limusa			2000	
	Metodos normalizados para el análisis de aguas potables y residuales	Diaz Santos SA			1992	