

COURSE DESCRIPTION

COURSE DETAILS

Title (of the course): **GESTIÓN MEDIOAMBIENTAL EN LA INDUSTRIA ALIMENTARIA**

Code: 102238

Degree/Master: **GRADO DE CIENCIA Y TECNOLOGÍA DE LOS ALIMENTOS**

Year: 3

Name of the module to which it belongs: **GESTIÓN Y CALIDAD EN LA INDUSTRIA ALIMENTARIA**

Field: **GESTIÓN Y CALIDAD EN LA INDUSTRIA ALIMENTARIA**

Character: **OBLIGATORIA**

Duration: **FIRST TERM**

ECTS Credits: 6

Classroom hours: 60

Face-to-face classroom percentage: 40%

Study hours: 90

Online platform: www.uco.es/moodle

LECTURER INFORMATION

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Department: **QUÍMICA INORGÁNICA E INGENIERÍA QUÍMICA**

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PREREQUISITES AND RECOMMENDATIONS

Prerequisites established in the study plan

None.

Recommendations

It is recommended that the students have previously taken the subjects included in the Common Basic Training Modules; especially Chemistry and Fundamentals of Chemical Engineering.

One section of the subject Environmental Management in the Agrifood Industry, specifically the section related to 'Treatment of wastewater in the agrifood industry' (theory and practice) is taught in English optionally for a medium-sized group, according to the Plan for the Development of the Multilingualism of the University of Córdoba 2014-2017 (https://www.uco.es/poling/pdf/Plan_Fomento_Plurilinguismo_UCO_14_17.pdf). In parallel, two additional medium-sized groups (taught in Spanish) will undertake all contents of the above mentioned subject.

Students enrolled in the group/section about 'Treatment of wastewater in the agrifood industry' to be taught in English, must certify a minimum B1 English level. Methodology and evaluation of this section will follow the same general criteria as the subject Environmental Management in the Agrifood Industry. Additionally, an annex to the guidelines will be provided through Moodle, where more detailed explanation of this group is provided.

INTENDED LEARNING OUTCOMES

- | | |
|------|---|
| CB3 | Students must possess the capacity to gather and interpret relevant information (usually in their field of study) in order to give opinions which include a reflection about relevant topics which are social, scientific or ethic in nature. |
| CB4 | Students must transmit information, ideas, problems and answers to both specialised and not specialised publics. |
| CE9 | To develop protocols of environmental management and food industries quality control. |
| CT12 | Ability for the information management. |



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CT13	Ability to adapt to new situations.
CT14	Sensitivity to environmental and social issues.
CT15	To be able to design and process projects
CT3	Ability to work as a team.
CT5	Ability to take decisions.
CU1	To accredit the use and proficiency of a foreign language.
CU2	To know and improve the user level in the field of ICT.
CU3	To increase the habits of an active searching for employment and the capacity of entrepreneurship.

OBJECTIVES

This subject is supposed to be an introduction to the basic principles of the management and physical, chemical and biological treatments of different types of waste, including municipal and industrial streams, especially derived from industrial processes.

Specific objectives:

1. To know the fundamentals of environmental management in the food industry.
2. To know the legislation applicable to wastewater treatment, waste and emissions to the atmosphere.
3. To know the fundamentals of the procedures to manage, treat and remove waste derived from the food industry.
4. To know the different types of physical, chemical and biological treatments of wastewaters derived from the agri-food industry, as well as the main parameters used to evaluate its composition.
5. To know the technologies available to minimise and monitor the gaseous emissions from the food industry.

CONTENT

1. Theory contents

The environmental management in the food industry. Environmental Authorisation. Emission register. Environmental management systems (ISO 14001 and others). Other environmental tools.

Characterization of organic wastewater and evaluation of physical, chemical and biological treatments for the purification of wastewater derived from the agri-food industry.

Fundamentals of the procedures to manage, treat and remove waste derived from the food industry.

Technologies to minimise and monitor gaseous emissions from the food industry.

Legislation related to water, solid waste and atmospheric emissions.

2. Practical contents

Several practical lessons about wastewater characterisation will be carried out at laboratory scale, as well as classroom seminars and case studies, in order to develop the following capacities:

-Capacity to organise, to plan, to analyse and to make decisions related to managing different types of wastes and emissions derived from the food industry.

METHODOLOGY

Methodological adaptations for part-time students and students with disabilities and special educational needs

Part-time students will agree with the teacher the methodology and evaluation criteria to pass the subject.

Face-to-face activities

Activity	Large group	Medium group	Total
Assessment activities	6	-	6
Case study	-	6	6
Group work (cooperative)	-	2	2
Lab practice	-	6	6
Lectures	30	-	30
Seminar	-	10	10

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Total hours:	<i>36</i>	<i>24</i>	<i>60</i>
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Off-site activities

Activity	Total
Activities	15
Exercises	10
Group work	12
Information search	8
Self-study	45
Total hours:	90

WORK MATERIALS FOR STUDENTS

Case studies
Placement booklet
Exercises and activities

EVALUATION

Intended learning outcomes	Tools				
	Attendance sheets	Case studies	Final exam	Group work	Placement reports
CB3		X	X	X	X
CB4		X	X	X	X
CE9	X	X	X	X	
CT12	X	X	X	X	
CT13		X		X	
CT14	X	X	X	X	
CT15		X		X	X
CT3		X		X	X
CT5		X		X	
CU1		X		X	
CU2	X	X		X	X
CU3	X			X	
Total (100%)	10%	10%	40%	30%	10%
Minimum grade.(*)	6	4	4	5	5

(*) Minimum grade necessary to pass the course

General clarifications on instruments for evaluation:

The mark obtained by those students not reaching the minimum qualification in all the evaluation tools required to pass the subject will be 4.0 (fail).

Clarifications on the methodology for part-time students and students with disabilities and special educational needs:

Part-time students will agree with the teachers the methodology and evaluation criteria to pass the subject.

COURSE DESCRIPTION

Qualifying criteria for obtaining honors: *Podrá optar a Matrícula de Honor el alumnado con una nota final superior a 9,5, debiendo superar para ello una prueba específica.*

BIBLIOGRAPHY

1. Basic Bibliography:

- A. Hernández Lehmann. "Manual de diseño de estaciones depuradoras de aguas residuales". Colegio de Ingenieros de Caminos, Canales y Puertos. Madrid (1997).
- A. Hernández Muñoz. "Depuración de aguas residuales". Servicio de Publicaciones de la Escuela de Ingenieros de Caminos. Madrid (1990).
- A. Parker. "Contaminación del aire por la industria" Editorial Reverté. Barcelona (1983).
- American Water Works Association. Research Foundation. "Tratamiento del agua por procesos de membrana. Principios, procesos y aplicaciones". Ed. McGraw-Hill (1998).
- APHA-AWWA-WPCF. "Standard Methods for the examination of Water and Wastewater". Versión española: Métodos normalizados para el análisis de aguas potables y residuales. Ediciones Díaz de Santos. Madrid (1992)
- C. Leslie Grady, G.T. Daigger y H.C. Lim. "Biological Wastewater Treatment". Marcel Dekker, Inc. New York (1999).
- D.M. Elsom. "Atmospheric Pollution. A Global Problem" Editorial Blackwell. Oxford. U.K. (1992).
- G. Kiely. "Ingeniería Ambiental. Fundamentos, entornos, tecnologías y sistemas de gestión" Editorial McGraw-Hill. Madrid (1999).
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- J.L. Bueno, H. Sastre y A.G. Lavin. "Contaminación e Ingeniería Ambiental". F.I.C.Y.T. (1997). V Tomos: I. Principios generales y actividades contaminantes; II. Contaminación atmosférica; III. Contaminación de las aguas; IV. Degradación del suelo y tratamiento de residuos; V. Gestión de la contaminación.
- K. Wark y C.F. Warner. "Contaminación del aire. Origen y control" Editorial Limusa. México (1994).
- Liu y Lipták. "Air pollution" Lewis Publisher (2000).
- M. Seoanez Calvo. "Ecología Industrial: Ingeniería Medioambiental aplicada a la industria y a la empresa". Ed. Mundi-Prensa (1995).
- M.D. LaGrega, P.L. Buckingham y J.C. Evans. "Gestión de Residuos Tóxicos. Tratamiento, Eliminación y Recuperación de Suelos". Ed. McGraw-Hill (1996).
- Metcalf y Eddy. "Ingeniería de Aguas Residuales. Tratamiento, vertido y reutilización". McGraw-Hill. Madrid. (1995).
- N. Nevers. "Ingeniería de control de la contaminación del aire" Editorial McGraw-Hill. Madrid (1997).
- N.L. Nemerow y A. Dasgupta. "Tratamiento de vertidos Industriales y Peligrosos". Ed. Diaz de Santos (1998).
- P. Nicolas y Cheremisinoff; "Handbook of Hazardous Chemical Properties". Butterworth-Heinemann (2000).
- R.H. Perry. "Manual del Ingeniero Químico" Editorial McGraw-Hill. Madrid (2001).
- R.S. Ramalho. "Tratamiento de aguas residuales". Ed. Reverté. Barcelona (1991).

2. Further reading:

None.

COORDINATION CRITERIA

- Common evaluation criteria
- Joint activities: lectures, seminars, visits ...
- Tasks deadlines

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SCHEDULE

Period	Activity					
	Assessment activities	Case study	Group work (cooperative)	Lab practice	Lectures	Seminar
1# Fortnight	0	0	0	0	3	2
2# Fortnight	0	0	0	0	4	2
3# Fortnight	0	2	0	2	4	0
4# Fortnight	0	0	0	2	4	0
5# Fortnight	0	2	0	2	4	0
6# Fortnight	0	0	0	0	4	2
7# Fortnight	0	2	0	0	4	2
8# Fortnight	6	0	2	0	3	2
Total hours:	6	6	2	6	30	10

The methodological strategies and the evaluation system contemplated in this Course Description will be adapted according to the needs presented by students with disabilities and special educational needs in the cases that are required.