



Universitat de Lleida

DEGREE CURRICULUM **ENVIRONMENT TECHNOLOGIES AND SUSTAINABILITY**

Coordination: CHEMISANA VILLEGAS, DANIEL

Academic year 2021-22

Subject's general information

Subject name	ENVIRONMENT TECHNOLOGIES AND SUSTAINABILITY			
Code	102338			
Semester	1st Q(SEMESTER) CONTINUED EVALUATION			
Typology	Degree	Course	Character	Modality
	Bachelor's degree in Industrial Organization and Logistics Engineering	2	COMPULSORY	Attendance-based
	Not informed	2	COMPULSORY	Attendance-based
Course number of credits (ECTS)	6			
Type of activity, credits, and groups	Activity type	PRALAB	PRAULA	TEORIA
	Number of credits	0.6	2.4	3
	Number of groups	2	2	1
Coordination	CHEMISANA VILLEGAS, DANIEL			
Department	ENVIRONMENT AND SOIL SCIENCES			
Teaching load distribution between lectures and independent student work	1ECTS = 10h class work face-to-face + 15h of independent student			
Important information on data processing	Consult this link for more information.			
Language	Catalan 95% English 5%			
Distribution of credits	3 credits for the theory in 1GG 2.4 credits for problems in 1GG 0.6 credits for practice in 2 GM			

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
CHEMISANA VILLEGAS, DANIEL	daniel.chemisana@udl.cat	0	
CUADROS DOMENECH, SARA	sara.cuadros@udl.cat	9	

Subject's extra information

The subject belongs to the module of "formation common to the industrial branch"

Learning objectives

- Check the basic rules related to the environment to extract from it the legal requirements applicable to pollution control in industry
- Plan, at a basic level, a strategy of prevention and control of pollution in specific cases in the industry susceptible
- Learn to distinguish which are the essential elements of a complex system, and maintain its modelling only the essential
- Acquire skills to design useful models in the Environmental Sciences
- Derive and present the requirements set forth in the problems
- Construct formal mathematical models to synthesize a problem situation
- Select the most appropriate waste management and / or pollution control facilities sizing and simple effluent treatment

Competences

Basic competences

B01 That students have demonstrated to possess and understand knowledge in an area of study that starts from the base of general secondary education, and is usually found at a level that, although supported by advanced textbooks, also includes some aspects that imply knowledge coming from the vanguard of his/her field of study.

B02 That students know how to apply their knowledge to their work or vocation in a professional manner and possess the skills that are usually demonstrated through the elaboration and defense of arguments and the resolution of problems within their area of study.

B03 That students have the ability to gather and interpret relevant data (usually within their area of study) to make judgments that include a reflection on relevant social, scientific or ethical issues.

B04 That students can transmit information, ideas, problems and solutions to a specialized and non-specialized public.

B05 That students have developed those learning skills necessary to undertake further studies with a high degree of autonomy

General competences

CG3. To synthesize basic and technological subjects, which enable them to learn new methods and theories, and provide them with versatility to adapt to new situations.

CG4. To solve problems with initiative, make decisions, creativity, critical reasoning and to communicate and transmit knowledge, skills and abilities in the field of Industrial Chemical Engineering.

CG6. To implement specifications, regulations and mandatory rules.

CG7. To analyze and assess the social and environmental impact of technical solutions.

CG10. To work in a multilingual and multidisciplinary environment

Specific competences

CE16. To define the basic knowledge and applications of environmental technologies and sustainability.

Transversal competences

CT4. To apply basic knowledge of entrepreneurship and professional environments.

CT5. To apply essential notions of scientific thinking.

Subject contents

1. Environment

Atmosphere and climate

Natural cycles: water, carbon, nitrogen and phosphorous

Fluxes of matter and energy in ecosystems

Production, consumption and use of energy

2. Wastes

Types of waste

Treatment technologies

Final treatments

3. Pollution

Water pollution

Air pollution

Soil/groundwater pollution

Thermal pollution

Noise pollution

Light pollution

4. Environmental impacts

Types of environmental impacts considered

Environmental impacts of industrial activities

Economic growth and the environment

Environmental costs

Global Climate Change – Phenomena

Natural hazards (risks)

Energy Sources: non-renewable, renewable

Renewable Energy Sources Technologies

Life Cycle Assessment (LCA)

5. Sustainable development

Strategies for sustainable development

Environmental Sustainability

The role of renewable energy sources

Economic Sustainability

Sustainable Agriculture

Environmental regulations

Methodology

The development of the subject is based on four actions:

1) Master classes

Exposure of the concepts , principles and relations of each topic

Approach examples illustrating the application

2) Problem resolution classes

Discussion and resolution of problems and applications related to the concepts of each topic

The proposed problems are basically those of the subject collection of problems

3) Lab

Practical demonstration of the concepts reached

4) Work

Group work and oral presentation

The teaching format will be mixed (face-to-face and online) except the practices that will only be face-to-face. In case of new confinements or regrowths, all the activities would become online.

Development plan

Week	Methodology	Topic	Lecture hours	Autonomous work hours
1	Master class	Topic 1. Environment Topic 2. Wastes	4	6
2	Master class Problems	Topic 3. Water pollution	4	6
3	Master class Problems	Topic 3. Water pollution	4	6
4	Master class Problems	Topic 3. Water pollution	4	6
5	Master class Problems	Topic 4. Environmental impacts Topic 5. Sustainable development	4	6
6	Master class Problems	Topic 3. Noise pollution	4	6
7	Master class Problems	Topic 3. Air pollution and other types of pollution	4	6
8	Master class Problems	Topic 3. Air pollution and other types of pollution	4	6
9		Evaluation. Written exam, topics 1-3 (water poll.)		
10	Master class Problems Practice	Topic 3. Noise pollution. Practice about noise pollution.	4	6
11	Master class Problems Practice	Topic 4. Environmental impacts. Practice about LCA.	4	6
12	Master class Problems Practice	Topic 3. Light pollution. Practice about light pollution.	4	6
13	Problems	Exercises related with the topics	4	6
14	Group work	Presentations of the works of the students	4	6
15	Group work	Presentations of the works of the students	4	6
16		Evaluation. Written exam, topics 3 (except water poll.)		
17		- 5		
18		Tutoring period		
19		Recovery exams		

Evaluation

Exams:

1st part (25%), it will take place in the regular dates.

2nd part (35%), will take place in the regular dates.

Recovery (60%), will take place in the regular dates.

Laboratory (15%), Experiments complementary to the topics. You need to have approved practices to pass the subject.

Group work (25%). It will be held in groups of up to 4 people and will be delivered / expose at the end of the course.

The exams will be face-to-face. In case of new confinements, they may be replaced by online exams.

Bibliography

Arya,S. Pal. "Air Pollution, Meteorology and Dispersion". Oxford U.Press. 1999

Callow,P. "Handbook of Environmental Risk Assessment and Management". Oxford: Blackwell Science. 1997

Guyot,G. "Physics of the Environment and Climate". Wiley. 1998

Harte,J. "Consider a spherical cow". University Science Books. 1998

Harte,J. "Consider a cylindrical cow". University Science Books. 2001

Masters,G.M. "Environmental Engineering and Science" Prentice Hall. 1998.

TurcotteD.L. and Schubert G. "Geodynamics" Cambridge.2002.

KIELY. "Ingeniería Ambiental". McGraw-Hill.

HERNANDEZ, A. "Depuración de aguas residuales". CICCIP.Madrid.1994.

TCHOBANOUGLOUS. "Gestión integral de residuos sólidos".McGraw-Hill.

RAU,J.G.,WOOTEN,D.C. "Environmental Impact Analysis Handbook".

DEGREMONT. "Manual técnico del agua".

STERN, A.C. "Air Pollution". AcademicPress.8º Vol. 1986.

RECUERO,M. "Ingeniería Acústica". UPM.1991.ISBN:84-404-8493-3.

"Legislación Ambiental de Catalunya". Vol.: 3. Generalitat deCatalunya. Departament de Medi Ambient.

MOPU. "Evaluaciones de Impacto ambiental". Dirección General delMedio Ambiente. 1984.