COURSE DATA

Data Subject	
Code	43814
Name	Environmental management tools
Cycle	Master's degree
ECTS Credits	3.0
Academic year	2022 - 2023

Study (s)

Degree	Center	Acad. year	Period
2227 - Master's Degree in Environmental Engineering	School of Engineering	1	Second term

Subject-matter

Degree	Subject-matter	Character
2227 - Master's Degree in Environmental Engineering	4 - Environmental management	Obligatory

Coordination

Name	Department
ROBLES MARTINEZ, ANGEL	245 - Chemical Engineering

SUMMARY

Instruments of Environmental Management is a compulsory subject of 3.0 ECTS that is taught in the second semester of the first year of the Master's Degree in Environmental Engineering.

In this subject, students are introduced to environmental management tools, with special emphasis on management systems, environmental risk assessment and life cycle analysis (LCA). The knowledge and skills to be developed by students in this subject, are not only essential for graduates, but serve as a basis and link for other subjects taught in the second year, such as Energy Management.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

No restrictions.

COMPETENCES (RD 1393/2007) // LEARNING OUTCOMES (RD 822/2021)

2227 - Master's Degree in Environmental Engineering

- Students should apply acquired knowledge to solve problems in unfamiliar contexts within their field of study, including multidisciplinary scenarios.
- Students should be able to integrate knowledge and address the complexity of making informed judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities associated with the application of their knowledge and judgments.
- Students should communicate conclusions and underlying knowledge clearly and unambiguously to both specialized and non-specialized audiences.
- Students should demonstrate self-directed learning skills for continued academic growth.
- Students should possess and understand foundational knowledge that enables original thinking and research in the field.
- Identify and apply technologies, tools and techniques in the field of environmental engineering.
- Assume with responsibility and ethics the Environmental Engineer role in a professional context.
- Promote and apply the principles of sustainability.
- Adapt to changes, being able to apply the principles of Environmental Engineering to unknown cases and use new and advanced technologies and other relevant developments, with initiative and entrepreneurial spirit.
- Identify, declare and entirely analyze environmental problems.
- Assess the application of measures for the pollution prevention and the recovery, protection and improvement of environmental quality.
- Understand and apply environmental national and international legislation, adapting environmental solutions to these regulations.
- Apply different tools and environmental management systems.
- Evaluate the environmental quality of water from a global point of view, especially when there is a risk to public health.

- Evaluate the environmental quality of the air from a global point of view, especially when there is a risk to public health.
- Evaluate the environmental quality of soils from a global point of view, especially when there is a risk to public health..

LEARNING OUTCOMES (RD 1393/2007) // NO CONTENT (RD 822/2021)

1 Understand what is and what an environmental management system and an integrated management system consists of.

2 Understand what is and what an environmental risk assessment consists of.

3 Be able to perform environmental risk assessment for simple cases.

4 Understand what is and what is a life cycle analysis and ecodesign.

5 Perform calculations and life cycle analysis through the use of specialized software

6 Identify the different elements of a management system based on ISO standards.

7 Identify the different stages in the implementation of a quality management system

8 Know and understand the different eco-labeling systems.

9 Know the different elements and stages involved in ecodesign.

DESCRIPTION OF CONTENTS

1. Introduction to the Environmental Management Tools

Overview of the main environmental problems. Environmental management. Examples of environmental management tools: environmental impact assessment, environmental audits, clean production and best available techniques, eco-labelling, ecological marketing.

2. Evaluation of Environmental Risks

Analysis and evaluation of risks from exposure to substances: basic concepts, applications, methodology. Models for exposure assessment. Models for the evaluation of persistence. Environmental risk characterization. Measures to reduce environmental risk.

3. Methodology of Life Cycle Analysis

Introduction to the evaluation of environmental impacts. Life Cycle Analysis Methodology. Application of characterization methods. Computer tools for Life Cycle Analysis. Selection and application of databases. Environmental footprints. Eco-design. Examples of the application of Life Cycle Analysis to various industrial sectors.

4. Environmental Management Systems (EMS)

EMS Models: ISO14001. EMS implementation: Environmental policies and declarations, environmental aspects, identification of legal and regulatory requirements, monitoring and measurement, environmental management program, responsibilities and authority, communication, training and awareness, SGM audits.
Integration with other management systems in the company, quality and prevention of occupational risks: Integrated management system.

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	14,00	100
Classroom practices	8,00	100
Theoretical and practical classes	3,00	100
Other activities	3,00	100
Seminars	2,00	100
Development of group work	15,00	0
Preparation of evaluation activities	10,00	0
Preparing lectures	10,00	0
Preparation of practical classes and problem	10,00	0
TOTAL	**75,00**	

TEACHING METHODOLOGY

The training activities will be developed according to the following distribution:

Theoretical activities

Description: In the theoretical classes the topics will be developed providing a global and integrating vision, analyzing in greater detail the key aspects and of greater complexity, promoting, at all times, the participation of the student.

Practical activities.

Description: They complement the theoretical activities in order to apply the basic concepts and expand them with the knowledge and experience that they acquire during the realization of the proposed works. They comprise the following types of face-to-face activities:
- Classes of problems and questions in the classroom
- Discussion and problem solving sessions and exercises previously worked by the students
- Realization of individual evaluation questionnaires in the classroom with the presence of the teacher.

Personal work of the student.

Description: Realization (outside the classroom) of monographic works, directed bibliographic search, issues and problems, case studies, as well as the preparation of classes and exams (study). This task will be carried out individually and tries to promote autonomous work.

Work in small groups.

Description: Realization, by small groups of students (2-4) of work, issues, problems and case studies outside the classroom. This task complements the individual work and fosters the capacity for integration in work groups.

The e-learning platform (Virtual Classroom of the Universitat de València and / or PoliformaT of the Polytechnic University of Valencia) will be used as a communication support with the students. Through it you will have access to the didactic material used in class, as well as the problems and exercises to solve.

EVALUATION

The evaluation of the subject will be carried out as follows:

- A single final exam: 30% of the global mark.

- 70% of the reports of the works of the practical cases of 1) environmental risk assessment (25%), 2) life cycle analysis (35%) and 3) environmental management systems (10%).

To pass the subject, a minimum grade must be obtained in each of the works carried out and in the 4.5 exam.

The planned activities that the student must carry out outside the face-to-face attendance will be coordinated between the different subjects of the master and under the supervision of the Academic Coordination Commission of the Master.

In any case, the evaluation system will be governed by the provisions of the Reglament de Avaluació i Qualificació de la Universitat de València per a títols de Grau i Màster (http://links.uv.es/7S40pjF).

REFERENCES

Basic

- Guía para la implantación y el desarrollo de un sistema de gestión medioambiental, A. Rodriguez (Generalitat de Cataluña, Dept. Medi Ambient).

- Cómo implantar un sistema de gestión ambiental según la norma ISO 14001:2004, J.Granero Castro, M. Ferrando Sánchez (Fundación Confemetal, 2007)

- Toxicología Ambiental. Evaluación de Riesgos y Restauración Ambiental, Carlos E. Peña, Dean E. Carter, Felix Ayala-Fierro (University of Arizona). (Disponible en http://binational.pharmacy.arizona.edu/documents/toxamb.pdf y en http://superfund.pharmacy.arizona.edu/toxamb/).

-Llibre Didàctic dAnàlisi del Cicle de Vida (ACV). Rita Puig. Xarxa Temàtica Catalana dACV.

-Manual Práctico de Ecodiseño. Operativa de Implantación en 7 pasos, (IHOBE S.A, 2000). Disponible en: http://www.ihobe.es/

-Ecodiseño. Ingeniería del ciclo de vida para el desarrollo de productos sostenibles. Salvador Capuz Rizo y Tomás Gómez Navarro. (Universidad Politécnica de Valencia, 2002)

-Análisis del Ciclo de Vida: Aspectos Metodológicos y Casos Prácticos. Gabriela Clemente, Neus Sanjuán y José Luis Vivancos. (Universidad Politécnica de Valencia, 2005)

- Ecodiseño y Ecoproductos. Joan Rieradevall y Joan Vinyets (Rubes, 1999) Análisis de ciclo de vida. Pere Fullana y Rita Puig. (Rubes 1997)

-Identificación y evaluación de riesgos ambientales. COEPA. Disponible en http://coepa.net/guias/identificacion-y-evaluacion-de-riesgos-ambientales/