COURSE DATA

Data Subject	
Code	43823
Name	Hydraulic environmental engineering
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	2	First term

Subject-matter

Degree	Subject-matter	Character
2227 - Master's Degree in Environmental Engineering	7 - Optional subjects of specialisation	Optional

Coordination

Name	Department
SECO TORRECILLAS, MARIA AURORA	245 - Chemical Engineering

SUMMARY

Professors UPV: Enrique Asensi Dasí, Miguel Angel Eguibar Galán and Enric Cardona Borrás

The subject of Hydraulic environmental engineering is an optional three credits course belonging to the specialty of Environmental management in civil engineering.

This subject allows students to acquire the basic knowledge for modelling and integral management of surface and underground water resources. It also deals with the study of the geomorphology of the fluvial corridors, the environmental recovery of natural hydric systems and the environmental hydraulic infrastructures. On the other hand, the course deepens into the application of surface water quality models as a tool for the management of environmental problems related to the discharge of wastewater.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

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

Other requirements

There are no prerequisites. Some knowledge of the following subjects is recommended:
Assessment of the environmental quality
Transport of pollutants in the environment
Analysis and application of the environmental legislation
GIS and remote sensing

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.
- Be able to organize their own work as well as the material and human resources necessary to achieve the objectives stated.
- 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.

- Carry out theoretical analyzes of environmental systems, both natural and artificial, and develop and apply mathematical models for their simulation, optimization or control.
- Design and calculate engineering solutions to environmental problems, comparing and selecting technical alternatives and identifying emerging technologies.
- Understand and apply environmental national and international legislation, adapting environmental solutions to these regulations.
- Apply methodologies for evaluation and correction of environmental impact.
- Apply standard methodologies for the analysis and evaluation of environmental risks.
- 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 soils from a global point of view, especially when there is a risk to public health..
- Be able to characterize the emissions to water, coming from the anthropogenic activity.
- Be able to characterize the emissions to soils, coming from the anthropogenic activity.
- Apply techniques for the analysis and resolution of regional planning problems.

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

1 To know and propose the hydrological models for the evaluation and simulation of the water resources of a basin in quantity and quality.

2 Know and plaster groundwater flow and contamination models.

3 Know and propose the models of the river corridor in its geomorphological, biotic and hydraulic aspects.

4 Know the problem and propose the modeling of static continental water bodies, lakes and reservoirs.

5 Recognize the means for the integral management of watersheds.

6 To propose solutions in infrastructures and management for the environmental problems of the river basins, respecting and enhancing the good geomorphological, physical-chemical and biological state of the water masses.

DESCRIPTION OF CONTENTS

1. Water resources engineering

1. Surface and underground water resources. Interactions and modelling
2. Integrated management of water resources. Pressures and Impacts
3. The environmental flow regime

2. Hydraulic-environmental modelling in rivers and large bodies of water

1. Environmental problems in large bodies of water
2. Environmental hydraulic infrastructures
3. Geomorphology of river corridors

3. Surface water quality models

1. Balances of matter and energy
2. Heavy metals and toxic organic compounds
3. Water column / sediment interactions

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	21,00	100
Classroom practices	7,00	100
Theoretical and practical classes	2,00	100
Development of group work	20,00	0
Study and independent work	10,00	0
Readings supplementary material	5,00	0
Preparing lectures	5,00	0
Preparation of practical classes and problem	5,00	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

o Discussion and problem solving sessions and exercises previously worked by the students

o Programmed tutoring (individualized or in groups)

· Student's personal work.

Description: Realization (outside the classroom) of monographic works, directed bibliographic search, resolution of issues and problems, 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 and problem solving outside the classroom. This task complements the individual work and fosters the capacity for integration in work groups.

· Evaluation.

Description: Realization of individual evaluation questionnaires in the classroom with the presence of the teacher.

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 consists of the accomplishment of three home assignments. Each one of the assignments corresponds to one of the three blocks in which the subject is divided. For each of them a memory must be delivered and an exposition must be performed in the classroom.

The weight of each assignment is one third of the final grade. Failed assignments can be retaken in a final

exam.

To pass the subject it is necessary to obtain an average score of 5 with a minimum score of 4 points in each of the works.

REFERENCES

Basic

- Libro blanco del agua en España (Ministerio de Medio Ambiente)
  Water resources systems planning and management : an introduction to methods, models and applications (Loucks, Daniel P.)
  Wetlands : environmental gradients, boundaries and buffers (Mulamoottil, G.; Warner, B.G.; McBean, E.A.)
  Environmental Fluid Mechanics (Rodi, W.; Uhlmann, M.)
  Wetlan restoration, flood pulsing and disturbance dynamics (Beth Middleton)
  Surface water-quality modeling (Chapra, Steven C)
  Environmental modeling : fate and transport of pollutants in water, air and soil (Schnoor, Jerald L)