COURSE DATA

DATA SUBJECT

Code: 45005
Name: Control de procesos en instalaciones ambientales
Cycle: Master's Degree
ECTS Credits: 3
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
2250 - Master's Degree in Environmental Engineering	Escola Tècnica Superior d'Enginyeria	2	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
2250 - Master's Degree in Environmental Engineering	Control de procesos en instalaciones ambientales	ELECTIVES

COORDINATION

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SUMMARY

Process control in environmental facilities is an elective course of 3 credits that is taught in the first semester of the second year of the Master in Environmental Engineering.

The aim of this course is to provide the necessary training related to the control of processes and facilities in the context of Environmental Engineering. This requires some of the knowledge acquired in different subjects taught during the first year of the Master in Environmental Engineering: Water Treatment, Control of air pollution, Assessment of environmental quality, Waste Management and Treatment, Advanced Modeling of Water Treatment, and Monitoring and Processing of Environmental Data. After taking these subjects, students will have the necessary knowledge about the operation and modeling of the different types of environmental facilities, as well as the different environmental quality parameters and monitoring methods. This course will introduce the importance of the control of these facilities for their correct operation in optimal conditions and the necessary skills to be able to design control systems for these facilities will be acquired.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

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

OTHER REQUIREMENTS

COMPETENCES / LEARNING OUTCOMES

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Apply environmental engineering designs to produce solutions that meet specific needs addressing public health, safety and welfare taking account of global, cultural, social, environmental and economic factors.

Conduct appropriate experimentation, analyse and interpret data and use environmental engineering knowledge to draw conclusions.

Develop and apply mathematical models for the simulation, optimisation or control of processes in the field of environmental engineering.

Develop environmental solutions under the principles of circular economy and the sustainable development goals.

Identify, formulate and solve complex environmental engineering problems by applying engineering, scientific and mathematical principles.

Implement measures for preventing pollution and recovering, protecting and improving environmental quality.

Learn and apply new knowledge, using appropriate learning strategies.

Manage and operate treatment and/or purification systems in the field of environmental engineering

Recognise the ethical and professional responsibilities of environmental engineering and make informed judgements considering the impact of engineering solutions in global, economic, environmental and social contexts.

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.

DESCRIPTION OF CONTENTS

1. Instrumentation, automation and monitoring in environmental installations.

Instrumentation, control and automation (ICA) of environmental installations. Sensors, controllers and actuators. Programmable logic controllers (PLC). Supervisory control and data acquisition systems (SCADA). Monitoring techniques and their application to the statistical control of environmental processes.

2. Classical control systems

Control algorithms in environmental installations. On-off control. PID control.

3. Advanced control systems

Artificial intelligence applied to the control of environmental facilities. Control based on fuzzy logic. Control based on neural networks. Model-based control. Genetic algorithms. Other advanced control systems

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	10,00
Theoretical and practical classes	2,00
Seminar	2,00
Computer classroom practice	8,00
Classroom practices	8,00
Total hours	**30,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	15,00
Independent study and work	20,00
Preparation of lessons	0,00
Preparation for assessment activities	0,00
Resolution of case studies	10,00
Total hours	**45,00**

TEACHING METHODOLOGY

- Theoretical activities.

In the theoretical classes the topics will be developed providing a global and integrative vision, analyzing in greater detail the key and more complex integrating, analyzing in greater detail the key and more complex aspects, encouraging, at all times, the student's participation.

- Practical activities.

They complement the theoretical activities with the objective of applying the basic concepts and expanding them with the knowledge and experience acquired during the realization of the proposed works. Learning through problem solving, exercises and case studies through which competences on the different aspects of the subject are acquired.

- Work in the computer classroom.

Learning through activities developed individually or in small groups and carried out in computer classrooms. Resolution of case studies through which competences on the different aspects of the subject are acquired.

- Personal work of the student.

Resolution of practical cases, and autonomous study and work. This task will be carried out individually and tries to promote autonomous work.

- Work in small groups.

Work in small groups (2-4 students), including problem solving outside the classroom. This task complements the individual work and promotes the capacity of integration in work teams.

- Evaluation.

Individual evaluation tests in the classroom with the teacher's presence.

- Use of resources.

The e-learning platform (Virtual Classroom of the University of Valencia) will be used as a support for communication with students. Through it, students will have access to the didactic material used in class, as well as the problems and exercises to be solved.

EVALUATION

To evaluate the students' learning, the objective test methodology will be used, consisting of one or several exams that will consist of both theoretical-practical questions and problems, with a weight in the final grade of 50%. The rest of the grade will be obtained from the evaluation of the practical activities based on the elaboration of papers, reports, case studies and/or oral presentations, with a weight in the final grade of 40%, as well as the continuous evaluation of each student, based on the participation and degree of involvement of the student in the teaching-learning process, taking into account the regular attendance to the scheduled classroom activities and the resolution of questions and problems proposed periodically, with a weight in the final grade of 10%.

The weighted average grade of examinations must be greater than 50 out of 100 to pass the course. The grade for each of the parts (theory and problems) that make up an exam will have to be higher than 50 out of 100 to pass the exam.

The assessment system is independent of the call (1st or 2nd).

The planned activities that the student must carry out outside the classroom attendance will be

coordinated between the different subjects of the master's degree coordinated among the different subjects of the Master and under the supervision of the Academic Coordination Committee 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).

Copying or plagiarism of any activity that is part of the evaluation will result in the impossibility of passing the course, and the student will then be subject to the appropriate disciplinary procedures indicated in the ACTION PROTOCOL FOR FRAUDULENT PRACTICES AT THE UNIVERSITY OF VALENCIA (ACGUV 123/2020).

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