

**COURSE DATA****Data Subject**

Code	43817
Name	Simulation and advanced design of wastewater treatment plants
Cycle	Master's degree
ECTS Credits	3.0
Academic year	2023 - 2024

Study (s)

Degree	Center	Acad. year	Period
2227 - M.U. en Ingeniería Ambiental	School of Engineering	2	First term
2250 - M.D. in Environmental Engineering	School of Engineering	2	First term

Subject-matter

Degree	Subject-matter	Character
2227 - M.U. en Ingeniería Ambiental	5 - Optatividad para Especialización	Optional
2250 - M.D. in Environmental Engineering	22 - Simulación y diseño avanzado de estaciones depuradoras de aguas residuales	Optional

Coordination

Name	Department
SECO TORRECILLAS, AURORA	245 - Chemical Engineering

SUMMARY

Professors UPV: Enrique Asensi Dasí

The subject intends to provide the student with the necessary knowledge and skills for the design and simulation of residual water treatment installations. The main specific objectives of the subject are:

- To deepen in the application of mathematical models for the design and the simulation of Estacions Puradores d'Aigües Residuals
- Manage the computer science *DESASS (*DEsign *and *Simulation *ofActivated *Sludge *Systems)
- Design of Sewage Treatment Stations for Biological Elimination of Organic Matter and Nutrients, and Biological Digestion of Sludge



The Simulation and Advanced design of wastewater treatment plants course is an optional subject of the intensification block related to the management of wastewater treatment plants. In this subject students will deepen into the application of mathematical models to the design and simulation of wastewater treatment plants and will become familiar with the DESASS computer tool (DEsign and Simulation of Activated Sludge Systems.) This course is based on concepts acquired in the Water treatment and Advanced modelling of water treatment courses that are taught during the first year of the degree.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

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

Other requirements

Some knowledge of the following subjects is recommended:

Water treatment

Advanced modelling of water treatment

OUTCOMES

LEARNING OUTCOMES

- 1 Use the DESASS computer tool.
- 2 Characterize the influent wastewater and understand its importance for the design and simulation of a WWTP
- 3 Know the main design and operation variables of a WWTP as well as its effect on the quality of the effluent
- 4 Evaluate and critically analyze different design and operation alternatives of a WWTP
- 5 Be able to design a treatment scheme that meets the legal requirements of landfill

DESCRIPTION OF CONTENTS

1. Introduction

2. Elimination of organic matter and nitrification

**3. Elimination of organic matter and nitrogen****4. Elimination of organic matter and phosphorus****5. Elimination of organic matter, nitrogen and phosphorus****6. Sedimentation****7. Sludge digestion****8. Design of a complete WWTP****WORKLOAD**

ACTIVITY	Hours	% To be attended
Computer classroom practice	21,00	100
Theory classes	6,00	100
Theoretical and practical classes	3,00	100
Development of individual work	20,00	0
Study and independent work	15,00	0
Preparation of evaluation activities	10,00	0
TOTAL	75,00	

TEACHING METHODOLOGY

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

- Theoretical activities.

Expository development of the subject with the participation of the student in the resolution of specific questions. Realization of individual evaluation questionnaires

- Practical activities.



Learning through problem solving, exercises and case studies through which skills are acquired on the different aspects of the subject.

- Work in the laboratory and/or computer room

Learning by carrying out activities developed individually or in small groups and carried out in laboratories and/or computer rooms.

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

EVALUATION

The evaluation of the students will be made from an exam and academic work. The examination consists of solving a case of biological elimination of nutrients with the DESASS program. The academic work consists in the design of a complete treatment plant so that the required discharge requirements are met. The exam has a weight of 30% and the academic work of 70% on the final grade.

Maximum absence: 20%

Students who do not pass the exam or academic work will be able to recover them at the end of the semester.

To pass the course, it is necessary to obtain an average grade of 5 with a minimum grade of 4 points in each part of the course.

REFERENCES

Basic

- Tratamientos biológicos de aguas residuales (Ferrer Polo, José | Seco Torrecillas, Aurora)
- Tratamientos físicos y químicos de aguas residuales (Ferrer Polo, José | Seco Torrecillas, Aurora | Universidad Politécnica de Valencia Departamento de Ingeniería Hidráulica y Medio Ambiente)
- DESASS: A software tool for designing, simulating and optimising WWTPs (Ferrer, J. | Seco, A. | Serralta, J. | Ribes, J. | Manga, J. | Asensi, E. | Morenilla, J.J. | Llavador, F.)