UAB
Universitat Autònoma de Barcelona

Water Science and Technology

Code: 106766
ECTS Credits: 6

2025/2026

Degree	Type	Year
Environmental Sciences	OB	3

Contact

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Teachers

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Teaching groups languages

You can view this information at the end of this document.

Prerequisites

It is recommended to have completed the course Environmental Engineering.

Objectives and Contextualisation

The course is an introduction to the treatment and management of urban wastewater and drinking water. At the end of the course, students will be able to understand the operation and to design the main elements of a water treatment plant.

Learning Outcomes

1. CM33 (Competence) Undertake a general assessment of the social, economic and environmental impact on industrial activities and facilities.
2. CM34 (Competence) Undertake partial environmental projects in the field of technology within a team.
3. CM35 (Competence) Predict, using environmental engineering concepts, the potential environmental impact of new technological solutions or products.
4. KM43 (Knowledge) Recognise the main concepts and technologies related to water management in natural environments or those modified by human activity.
5. KM44 (Knowledge) Recognise the systems, equipment and facilities of environmental engineering and the associated industrial processes.

6. SM42 (Skill) Assess the analysis and synthesis strategies related to the environmental implications of industrial processes.
7. SM43 (Skill) Extract relevant information from engineering or technological projects related to environmental issues.

Content

This course is structured into two blocks:

BLOCK 1. Design of Biological Wastewater Treatment Systems

1.1. Introduction

1.2. Design of Biological Wastewater Treatment Systems

1.2.1. Introduction
1.2.2. Characteristics of Wastewater
1.2.3. Objectives and Components of a Typical WWTP
1.2.4. Pretreatment Systems
1.2.5. Sedimentation
1.2.6. Biological Treatment of Wastewater
1.2.7. Aeration in Biological Reactors
1.2.8. Operation of Activated Sludge Systems
1.2.9. Sludge Line of a WWTP

BLOCK 2. Design Criteria and Equipments of Drinking Water Plants

2.1. Introduction
2.2. Coagulation-Flocculation
2.3. Sand Filters
2.4. Disinfection
2.5. Adsorption
2.6. Membrane Treatments

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Problems classes	14	0.56	
Seminars	6	0.24	
Theory classes	28	1.12	
Type: Supervised			
Work group	18	0.72	
Type: Autonomous			
Study	78	3.12	

Theory classes: Theoretical presentation of the subject's scientific-technical content, which will be accompanied by examples of application of the theoretical concepts.

Problem classes: Solving problems corresponding to the subject. Discussion with the students about the solution strategies and their execution.

Seminars: Theoretical presentation and subsequent discussion with a professional in the field of water management and treatment on topics directly related to the subject matter.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Delivery of a work group	20%	0	0	CM34, CM35, KM43, KM44, SM42, SM43
First exam	40%	3	0.12	CM33, CM34, CM35, KM43, KM44, SM42, SM43
Second exam	40%	3	0.12	CM33, CM34, CM35, KM43, KM44, SM42, SM43

The subject consists of the following evaluation activities:

- Two partial exams including theory and exercices (40% each exam)

- Delivery of a group work that consists of the design of the main units of a sewage treatment plant (20%).

The non-participation in any of the evaluation activities will be assessed with a zero.

For a student to pass the subject through continuous assessment it is necessary to obtain a minimum weighted grade of 5 in the global of the subject. To be able to make a weighted average between the delivery of group work and the grade of the partial tests, a minimum average grade of 4 out of 10 of the partial tests will be required with a minimum mark of 2 for each of the partial tests.

If grade 5 is not achevieved globally, the student may undergo a recovery exam that will account to 80% of the final mark. In order to be able to take the make-up exam, students must have participated in assessment activities throughout the course that are equivalent to 2/3 of the final grade. In this case, the delivered work group mark remains unchanged.

For each evaluation activity, a place, date and time of revision will be set. There will not be further revision opportunities for students not attending the revision.

Following UAB regulations, students with a grade of 9.0 or higher in a subject may be qualified by an Honors degree. The number of Honors degrees awarded to students cannot be higher than 5% of the total number of students enrolled in a subject.

A student will be considered non-evaluable (NA) if he/she has neither delivered the work group nor undertaken some of the partial exams or the recovery exam.

Without prejudice to other disciplinary measures, and in accordance with current academic regulations, any irregularities committed by the student that could lead to a variation of the score of an evaluation act will be marked with a zero. Therefore, copying or allowing to copy in an evaluation activity will imply a zero (0).

Students coursing the subject for a second or third year must undergo the above listed evaluation activities.

Unique assessment

Students who have accepted the single assessment modality must take a final synthesis test on the date marked in the exam calendar as the second exam. This test will consist of a theory part and a problem part that will account to 80% of the final mark. To be able to make a weighted average between the group work and the test, a minimum average grade of 4 out of 10 is required for the test. *If the final grade does not reach 5, the student has another chance to pass the subject by means of the recovery exam.*

Bibliography

Biological Wastewater treatment: Principles, modelling and Design, Guanghao Chen, Mark C.M. van Loosdrecht, George A. Ekama, Damir Brdjanovic (Eds). IWA Publishing. DOI: https://doi.org/10.2166/9781789060362

Biological Wastewater Treatment: Examples and Exercises, Carlos M. Lopez-Vazquez, Damir Brdjanovic, Eveline I.P. Volcke, Mark C.M. van Loosdrecht, Di Wu and Guanghao Chen (Eds). DOI: https://doi.org/10.2166/9781789062304

N.P. Cheremisinoff. Handbook of Water and Wastewater Treatment Technologies. Butterworth-Heinemann. Boston. 2002

J.C. Crittenden, R.R. Trussell, D.W. Hand, K.J. Howe, G. Tchobanoglous. Water treatment: principles and design. John Wiley & Sons. Hoboken. 2005

Metcalf & Eddy, Inc. Wastewater Engineering: Treatment and Reuse.McGraw-Hill Inc. Editions. Boston. 2003.

Software

No specific software is required.

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this link. To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn
(PAUL) Classroom practices	1	Catalan	second semester	morning-mixed
(PAUL) Classroom practices	2	Catalan	second semester	morning-mixed
(SEM) Seminars	1	Catalan	second semester	morning-mixed
(SEM) Seminars	2	Catalan	second semester	morning-mixed

(SEM) Seminars	3	Catalan	second semester	morning-mixed
(SEM) Seminars	4	Catalan	second semester	morning-mixed
(TE) Theory	1	Catalan	second semester	morning-mixed