

Course Unit	Water Pollution and Supply Water Treatment		Field of study	Environmental Management	
Bachelor in	Environmental Engineering		School	School of Agriculture	
Academic Year	2024/2025	Year of study	2	Level	1-2
Type	Semestral	Semester	2	ECTS credits	6.0
Workload (hours)		162	Contact hours	T - TP - PL - TC - S - E - OT - O -	
Code: 9099-833-2204-00-24					

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s) Amílcar António Teiga Teixeira

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:

1. To know the water characteristics and the main types of water pollution
To understand the urban water cycle and the quality standards of natural waters and water for human consumption.
2. To learn methods of water quality monitoring and assessment
To know the main systems for capturing surface and underground water.
3. To know the unit operations and processes in the water treatment for human and industrial consumption.
To understand the concepts of dimension, operating and maintenance of water treatment plants.
4. To valorise treatment and final destination of by-products
To develop water safety plans.
To know the national and international legislation on water management for consumption.

Prerequisites

Before the course unit the learner is expected to be able to:
Basic knowledge in physics, chemistry, and microbiology.

Course contents

Water characteristics. Main types of pollution and control. Monitoring and assessment of water quality. Urban water cycle. Quality standards for natural waters and for human consumption. Surface and underground water collection systems. Treatment row of water treatment plants (ETA). Operations and units. ETA operation and maintenance. Management of ETA by-products. Water security plans. National and international legislation and water management policies

Course contents (extended version)

1. Water Characteristics. Main types of water pollution
Biological, organic and inorganic contaminants
2. Monitoring of water quality. Evaluation of physical, chemical and microbiological parameters
3. Water urban cycle. Control of water pollution
4. Quality standards for natural waters and drinking water.
5. Intake systems of surface and groundwaters.
6. Water treatment. Treatment scheme of water treatment plants (WTP).
7. Operations and units (I). Screening, coagulation / flocculation, sedimentation.
8. Operations and units (II). filtration, aeration, adsorption, ion exchange and disinfection.
9. Operation and maintenance of WTP. WTP subproducts management.
10. Water security plans.
11. National and international legislation and management water policies.

Recommended reading

1. Alves C. (2010). Tratamento de Águas de Abastecimento. 3ª Ed, Publindústria, Edições Técnicas, Porto.
2. Drost R.L., Gehr R.L. (2018). Theory and Practice of Water and Wastewater Treatment. 2nd Edition, Wiley.
3. Law E.A. (2001). Aquatic Pollution. An Introductory Text. 3rd ed. John Wiley & Sons, Inc. New York
4. Hendricks D.W. (2018). Water treatment unit processes: physical and chemical. CRC press.
5. Spellman F.R. (2017). The drinking water handbook. CRC Press.

Teaching and learning methods

Lessons 1) Lectures: sessions will use audiovisual media resources. Theoretical-Practical: a) performing exercises; b) Laboratory – identification, treatment and analysis of water; 3) Carrying out study visits to ETAs. 2) Tutorial – practical works started during lectures; Research and group works (seminar); library research (B-on).

Assessment methods

1. Alternative 1 - (Regular) (Final, Supplementary, Special)
 - Practical Work - 30% (2 group works)
 - Final Written Exam - 70%
2. alternativa 2 - (Student Worker) (Final, Supplementary, Special)
 - Practical Work - 30% (non-presential works)
 - Practical exam)
 - Final Written Exam - 70%

Language of instruction

Portuguese, with additional English support for foreign students.

Electronic validation			
Amílcar António Teiga Teixeira	Manuel Joaquim Sabença Feliciano	Artur Jorge de Jesus Gonçalves	José Paulo Mendes Guerra Marques Cortez
18-12-2024	26-12-2024	04-01-2025	05-01-2025

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