

Course Unit	Environmental Quality Laboratory I	Field of study	Environmental Protection Technologies
Master in	Environmental Technology	School	School of Agriculture
Academic Year	2023/2024	Year of study	1
Type	Semestral	Semester	1
Level	2-1	ECTS credits	6.0
Code	1076-809-1103-00-23		
Workload (hours)	162	Contact hours	T - TP - PL - TC - S - E - OT - O -

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) Ermelinda Lopes Pereira, Luís Avelino Guimarães Dias

Learning outcomes and competences

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

1. Know the various types of water and current legislation
2. Know the methods of sampling and preservation of samples for physico-chemical and microbiological analysis.
3. Know the main physical-chemical, microbiological and biological parameters to the water characterization and their determination

Prerequisites

Before the course unit the learner is expected to be able to:
Have basic knowledge of chemistry and microbiology

Course contents

Physical-chemical analysis of water; Microbiological analysis of water; Biomonitoring of water quality. Legislation

Course contents (extended version)

1. Part A
 - Basic Concepts: Solution concentrations; Unities
 - Solutions: Preparation. Standardization
 - Sampling: Sampling points; Sampling techniques; Sampling frequency and Samples preservation
 - Analysis: Physical-Chemical parameters
2. Part B
 - Assessment of the status of surface water bodies based on the Water Framework Directive.
 - Biological hazards in water; Reference pathogens and emerging microorganisms in water environment.
 - Microbial monitoring; Sampling. Indicator organisms. Methods of detection of indicator organisms.
 - Bacteriological analysis: Count of heterotrophic, coliforms, E. coli, . . .
 - Virological analysis: Methods for the detection of Enteroviruses and bacteriophages in water samples
 - Protozoa: Characteristics; Cryptosporidium/Giardia detection methods in water samples
 - Legislation applied for different types of water

Recommended reading

1. Standard Methods for the Examination of Water and Wastewater; 16ª edition; APHA, AWWA, WPCF; Washington, 2005
2. WHO (2017). Guidelines for drinking-water quality: fourth edition incorporating the first addendum ISBN 978-92-4-154995-0
3. Normas ISO (6222; 9308-1; 9308-2; 6461/2; ; 7899-2; 17043)
4. Vogel, Jeffery, Basset, Mendham, Denney - Análise Química Quantitativa, 4ª e 5ª edições, Editora Guanabara Koogan S. A. , Rio de Janeiro,
5. Guidelines for drinking-water quality: 4th edition incorporating the 1st addendum. World Health Organization, 2017

Teaching and learning methods

Explanation of the theoretical subjects in theoretical and/or practical/ theoretical lectures, and their application in proposed laboratory work and carried out by students. Bibliographic check.

Assessment methods

1. Assessment 1 - (Regular) (Final)
 - Intermediate Written Test - 35% (Part A - Assessment of theoretical and practical contents.)
 - Laboratory Work - 15% (Part A - Evaluation of laboratory work reports.)
 - Intermediate Written Test - 35% (Part B - Assessment of theoretical and practical contents.)
 - Laboratory Work - 15% (Part B - Evaluation of laboratory work reports.)
2. Assessment 2 - (Student Worker) (Final, Supplementary, Special)
 - Final Written Exam - 100% (Part A + Part B - Assessment of theoretical and practical contents.)

Language of instruction

Portuguese

Electronic validation

Ermelinda Lopes Pereira, Luís Avelino Guimarães Dias	Amílcar Manuel Lopes António	Manuel Joaquim Sabença Feliciano	Maria Sameiro Ferreira Patrício
01-02-2024	01-02-2024	01-02-2024	01-02-2024