School of Agriculture
Course Unit Syllabus

Level of qualification:
Short cycle (TESP)
Study cycle:
Environmental Protection Systems

Course Unit: **223505** – **Sampling Techniques**

Year 1 **Semester 1** **ISCED Code: 712** **ECTS: 3.0**

Tipe of Course Unit: Compulsory **Delivery Mode:** Face-to-face **Language of Instruction:** Portuguese

COURSE COORDINATOR: Anabela Cândida Ramalho Durão

HOURS OF WORK

TOTAL HOURS	Contact Hours								Hours in autonomous work
	Theory	Theory and practice	Practical and laboratory work	Field work	Seminar	Internship	Tutorial guidance	Other	
75		**5**	**25**						**45**

Prerequisites (if applicable): Not applicable

LEARNING OUTCOMES (knowledge, skills and competence)

To identify sampling standards.

To know the sampling equipment.

To apply sampling techniques.

To prepare samples.

To develop sample plans

CONTENTS

Sampling standards for laboratory analysis.

Harvest and sampling techniques.

Material for harvesting and preparation thereof.

Handling, transport and preservation of samples.

Extraction and concentration.

Techniques for collecting and sampling drinking water, surface water, groundwater and waste water.

Techniques of soil sampling and sampling.

Techniques of solid waste collection and sampling.

Techniques of sampling and sampling of gaseous samples.

Development of a quality control plan for sampling

DEMONSTRATION OF THE CONTENTS COHERENCE WITH THE COURSE UNIT'S LEARNING OUTCOMES

this course, students are expected to know the harvest norms, equipment, handling, transport and preservation of samples, as well as harvesting techniques, so the program contents were selected with this objective in mind, theoretical and practical questions for the procedures and types of harvest, thus contributing to the development of skills of the techniques to be applied in the different environmental descriptors (water, wastewater, waste, soil, gaseous).

TEACHING METHODOLOGIES

. Expositive, demonstrative methods (with visualization of videos, field trips (study visit)), participatory methods and group work

with case study.

DEMONSTRATION OF THE COHERENCE BETWEEN THE TEACHING METHODOLOGIES AND THE LEARNING OUTCOMES

.The teaching methodologies adopted: the expository methodology for the fundamental concepts of sampling types, existing norms for the different descriptors (surface waters, swimming pools, drinking water, waste, air and soil); demonstrative methodology with video learning, study visits and collection procedures, verification and identification of equipment; the participative methodology that requires an interactive exhibition with the students and the accomplishment of group work, to the elaboration of a plan of control of quality of sampling, being thus the case study that allows to reach the main objective of this course, to apply techniques taking into account the requirements according to their specificity and current legislation and standards.

EVALUATION METHODS

.1- Continuous assessment - 2 frequencies and group work

Assessment by exam and group work

The final grade will be calculated based on the following equation for continuous assessment:

NF = 0.4 * Mean of PW + 0.6 (F1 + F2) / 2

Or for examination evaluation:

NF = 0.4 * Mean of PW + 0.6 E

Where:

PW- Practical work

F - Frequency

E - Exam

MAIN BIBLIOGRAPHY

ome elements of study will be available on the course e-learning page (Moodle)

E. Rice, R. Baird, A Eaton, L Clesceri. Standard Methods for the examination of water and wastewater, 22nd edtiom, APHA, AWWA, WEF, 2012.

Técnicas de colheita de amostras, Instituto Nacional de Saúde Drº Ricardo Jorge (file:///C:/Users/anap/Downloads/i009046.pdf) • Qualidade do Ar em Espaços Interiores - Um Guia Técnico. APA, Amadora, 2009

Field Sampling Procedures Manual, Department of Environmental Protection, Jerry R. Schoenleber, Technical Editor, New Jersey, 2005 •

Legislation and Standard ISO

Year of implementation: 2016/2017 | Date of approval by the Technical-Scientific Board: