School of Agriculture
Course Unit Syllabus

Level of qualification:
Short cycle (TESP)
Study cycle:
Technology and Food Inovation

Course Unit: – **Microbiology**

Year 1 **Semester 1** **ISCED Code:** **ECTS: 5.0**

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

COURSE COORDINATOR: Olga Maria Reis Pacheco de Amaral

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	
125	**30**	**0**	**45**	**0**	**0**	**0**	**0**	**0**	**50**

Prerequisites (if applicable): Not applicable

LEARNING OUTCOMES (knowledge, skills and competence)

Acquisition of basic knowledge about the morphology, physiology, metabolism, genetics, growth and control of microorganisms, as well as in microbial ecology. Differentiation and characterization of different microbial groups.

Importance of beneficial and harmful microorganisms in nature.

Work rules in Microbiology Laboratory. Preparation of the material and the culture media. Laboratory techniques of observation, isolation, identification and study of microorganisms.

CONTENTS

1. Evolution of Microbiology.
2. Microbial taxonomy.
3. Reproduction and growth of microorganisms.
4. Prokaryotic microorganisms: Bacteria.
5. Eukaryotic microorganisms: fungi, algae and protozoa.
6. Virus.
7. Microbial metabolism for energy producer: fermentation, respiration and photosynthesis.
8. Environmental Microbiology.
9. Introduction to laboratory work in microbiology.
10. Material used in the microbiology laboratory: preparation and handling; sterilization methods.
11. Culture media.
12. Microscopy. Microscopic examination: examination fresh and stained preparations.
13. Technique of observation, inoculation, isolation and quantification of microorganisms.

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

This course aims to prepare students with the knowledge and skills necessary for understanding the role of microorganisms, emphasizing its importance in conservation and food production. To this purpose the topics covered include a description of the various groups of organisms in terms of their morphological, biochemical and cultural characteristics. Examples are given of the action of microorganisms, either beneficial or harmful roles. This course has a strong laboratory component that is intended for students to become able to work in a microbiology laboratory, including general tasks such as preparation and sterilization of

equipment and media, working in aseptic conditions, recognition of different types of microorganisms, techniques for the isolation and identification of microorganisms and quantifying total microorganisms in single samples.

TEACHING METHODOLOGIES

The lectures will be predominantly expository with audiovisual media. The practical classes take place in the Microbiology Laboratory with the support of a Laboratory Guide. All techniques are preceded by a previous demonstration.

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

In the theoretical component, although classes are predominantly expository, it is intended that students engage in a constructive way. Whenever possible it resorts to practical examples and applied to the course creating discussion groups. The classes are taught in Microbiology Laboratory so that students can train and acquire the specific techniques of microbiology. Students should read the protocol previously practical class and at the beginning of the lesson will be a demonstration of the techniques and wherever possible the students work individually. The topics covered in the lectures are concerned with the issues developed in practical classes.

EVALUATION METHODS

It is required to handle 75% of practical classes. The final score is the result of the arithmetic average of two components: practical and theoretical notes. The practice note is calculated by a practice test and the skills and theoretical note is the final exam grade.

MAIN BIBLIOGRAPHY

Pelczar Jr, M.J.; Chan, E.C.S. & Krieg, N.R. (1993). Microbiology. Concepts and Applications. Mc Graw Hill.

Tortora, G. J., Funke, B. R., Case, C. L. (1993). Microbiology. 5 th ed. The Benjamin / Cummings Publishing Company.

Stanier, R. Y., Adelberg, E. A., Ingraham, J. L. (1985). Microbiologia. Ed. Reverté.

Ferreira, W. F. C., Sousa, J. C. (2010). Microbiologia. Ed. Lidel.

Ferreira, W. F. C., Sousa, J. C. (1998). Microbiologia, Vol. 1. Ed. Lidel

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