

Course Unit	Microbiology	Field of study	-		
Bachelor in	Pharmacy	School	School of Health		
Academic Year	2023/2024	Year of study	1	Level	1-1
Type	Semestral	Semester	2	ECTS credits	5.0
Code	9549-803-1204-00-23				
Workload (hours)	135	Contact hours	T -	TP 30	PL 30
			TC -	S -	E -
			OT 7,5	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) Cristina Sofia Gomes Caleja, Maria Leticia Miranda Fernandes Estevinho, Maria Lurdes Antunes Jorge

Learning outcomes and competences

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

1. Identify the main landmarks in the development of microbiology and appoint the scientists associated with it;
2. Understand the fundamentals of microorganisms' biology and their diversity;
3. Understand the kinetic and the energy of growth and cell death;
4. Understand the effect of environmental factors and anti-microbial agents in microbial growth;
5. Apply the knowledge about the metabolism of microorganisms in the changes they mediate;
6. Understand the basic mechanisms underlying the adaptability proliferation of microorganisms in the human host;
7. Train the students in the use of basic microbiological techniques and prepare them to respond adequately when confronted with real and new problems.

Prerequisites

Before the course unit the learner is expected to be able to:
Not applicable.

Course contents

Lectures: Introduction to Microbiology as a science. The position of microorganisms in the living world. Morphology and structure of bacteria. Morphology and structure of moulds. The virus - distribution and structure. Protozoa Microorganisms. Nutrition and growth. Bacterias with clinical importance. Moulds with clinical importance. Pratical Lessons: Ubiquity and microbial characterization. Pure culture obtention. Microbial morphology. Feces exam. Evaluation of growth. Antibigram.

Course contents (extended version)

1. Lectures Introduction to Microbiology as a science
 - Microbiology as an experimental science
 - The diversity and ubiquity of microorganisms
 - Microbiology's Evolution
2. The position of microorganisms in the living world
 - Living Beings' Classification
 - Classification of microorganisms based on the sources of energy, carbon and electron donors
 - Global description of microorganisms
3. Morphology and structure of bacteria
 - Size, form and arrange of bacterial cells
 - Cellular organization in Prokaryots
4. Morphology and stcture of moulds
 - Systematic study of Moulds
 - Systematic study of yeasts
5. Viruses - structure and distribution
 - Viruses and parasitism
 - Structure and Composition of Viruses
 - Bacterial Viruses
6. Protozoa
 - Generalities in parasitology
 - Urogenital and Intestinal Protozoa
 - Blood and Tissue Protozoa
 - Secondary pathogenic Protozoa
 - Cestoda
 - Trematode
 - Nematodes
7. Microorganisms' growth, nutrition and metabolism
 - Nutrition categories. Anaplerosis pathway
 - Regulation of metabolism. Importance of operons
 - Methods for quantitative assessment of microbial growth
 - Growth in a closed system
 - Environmental factors affecting microbial growth
 - Control of microorganisms
8. Bacterial Genetics : Genetic transfer and recombination Bacteria with clinical importance
9. Moulds with clinical importance
10. Practice Introduction
 - General rules in Microbiology Laboratory
 - Asepsis / methods of sterilization
11. Microorganism Ubiquity
 - Bacteria observation
 - Moulds observation
 - Protozoa observation
12. Microbial Characterization
 - Observation of colonies
13. Isolating Methods and pure culture obtention
14. Microbial morphology
15. Feces exam
16. Growth evaluation
17. Antimicrobial susceptibility testing (AST)

Recommended reading

1. Ferreira, W. F. C. , Sousa. , J. C. F. , Lima, N. (2010). Microbiologia (2ª ed). Lisboa: Ed. Lidel.

Recommended reading

2. Black, J. B. (2012). Microbiology: Principles and Explorations, (8ª ed.). United States : J. Wiley Press
3. Cappuccino, J. , & Sherman, N. (2013). Microbiology: A Laboratory Manual (10ª ed). San Francisco: Benjamin Cummings
4. Madigan, M. T. , Martinko, J. M. , S, D. , Clark, D. P. (2010). Brock Biology of Microorganisms (13ª ed.). San Francisco: Pearson Benjamin-Cummings.
5. Tortola, G. J. , Funke, R. J. , Case, C. L (2012). Microbiologia (11ª ed). Londres: Artemed.

Teaching and learning methods

Lectures - methodology exhibition, using the media. Is encouraged participation of students, with placement of issues and presentation / discussion of cases.
 Practical classes - carrying out practical laboratory with development of one or more reports using the bibliography of specialty (books, papers, etc.).

Assessment methods

1. Regular Students - (Regular) (Final, Supplementary, Special)
2. Student Worker - (Student Worker) (Final, Supplementary, Special)
 - Final Written Exam - 75% (Teorical contents. minimum 8. 5 marks.)
 - Final Written Exam - 25% (Practical contents: no minimum note)

Language of instruction

Portuguese

Electronic validation

Cristina Sofia Gomes Caleja, Maria Leticia Miranda Fernandes Estevinho, Maria Lurdes Antunes Jorge	Isabel Cristina Jornalo Freire Pinto	Ana Maria Nunes Português Galvão	Adília Maria Pires da Silva Fernandes
02-04-2024	17-04-2024	17-04-2024	17-04-2024