	SUBJECT DESCRIPTION	MODELO PED.013.02
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Course	Energy and Environment				Academic year	2021/2022		
Subject	Environmental Biochemistry				ECTS	5.5		
Type of course	Compulsory							
Year	1 st	Semester	1 st semester		Student Workload:			
Professor(s)	Pedro Miguel dos Santos Melo Rodrigues				Total	154	Contact	60
Area Coordinator	Rui António Pitarma S. Cunha Ferreira							

Planned SD

1. LEARNING OBJECTIVES

Knowing molecular composition and the major organelles of the cell. Understanding the biochemical process and relating them with the environment and the factors of pollution. Understanding the role of enzymes in organic matter decomposition, mineralization and release of inorganic nutrients and other complex reactions that maintain soil fertility and collaborate in maintaining ecosystems. The goal of this course is to provide students with an integrated view of the various features of the enzymes in different ecosystems, as well as their intervention in the treatment of pollution and restoring the natural environment.

2. PROGRAMME

1. *Biochemistry and the environment.*
2. *Carbohydrates: Biochemical aspects.*
3. *Amino acids and proteins: Biochemical aspects.*
4. *Enzymes and coenzymes: Biochemical aspects.*
5. *Lipids: Biochemical aspects.*
6. *Nucleic acids: Biochemical aspects.*
7. *Nitrogen and nitrogen compounds in the environment.*
8. *Alcohols in biological systems.*
9. *Hormones in biological systems.*
10. *Aldehydes, ketones, organic acids and esters in biological systems.*
11. *Ethers and secondary metabolites in biological systems.*

- 12. *Vitamins in biological systems.*
- 13. *The cell and its constituent components.*
- 14. *Energetics in biological systems.*
- 15. *Regulation of biochemical reactions in biological systems.*
- 17. *Microorganisms: general characteristics and properties.*
- 18. *Microbial growth: measurement and kinetics.*
- 19. *Biochemistry and polluting phenomena.*

3. COHERENCE BETWEEN PROGRAMME AND OBJECTIVES

The course contents are consistent with the goals of the course:

- 1. *Acquisition of knowledge about biomolecules and their interaction with the environment, biogeochemical cycles and pollution phenomena.*
- 2. *Acquisition of skills that enable the understanding of the relation between the biomolecules and the metabolic processes involved in cellular activity and environmental aspects.*
- 3. *Demonstration of personal qualities, like responsibility and interest in autonomous learning.*


4. MAIN BIBLIOGRAPHY


Neelima Rajvaidya, Dilip K. Markandey, A. P. H.; Environmental Biochemistry, Publishing Corporation, 2005. ISBN: 81-7648-789-9

David L. Nelson, Michael M. Cox, W. H. Freeman;Lehninger, Principles of biochemistry, 5º edition, Freeman, 2008. ISBN: 978-0-7167-7108-1

Michael T. Madigan, John M. Martinko, Paul V. Dunlap, David P. Clarck;Brock & Biology of Microorganisms, 12º edition, Pearson Education, Inc., 2009. ISBN: 0-321-53615-0

Jeremy M. Berg, John L. Tymoczko, Lubert Stryer;Biochemistry, 6ª edition, W. H. Freeman, 2006. ISBN: 0-7167-8724-5

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Geoffrey Zubay, Perry A. Frey, Geoffrey L. Zubay, Richard R. Burgess, Raymond L. Blakley, James W. Bodley; Biochemistry, fourth edition, William C. Brown Pub., 1998. ISBN: 978-0697219008

Joanne M. Willey, Linda M. Sherwood, Christopher J. Woolverton; Prescott, Harley, and Klein's Microbiology, 7^o edition, McGraw Hill, 2008. ISBN: 978-007-126727-4

5. TEACHING METHODOLOGIES (INCLUDING EVALUATION)

The lectures involve the exposing of the programmatic content with PowerPoint slides. In the practical classes, exercises will be solved. In laboratory classes, students will be divided in groups to carry out the proposed tests.

The evaluation of the course unit will take place in three different moments: frequency, exam and/or appeal exam. In the evaluation by frequency, the laboratory reports represent 40% and the frequency 60% of the final grade. In the exam and/or in the appeal exam, on a date to be scheduled by the board of ESTG, the student must obtain a grade equal or higher than 10/20.

6. COHERENCE BETWEEN TEACHING METHODOLOGIES AND OBJECTIVES


The methodology associated with the resolution of theoretical and practical exercises in class and the realization of laboratory classes, will allow the student to:

- 1. Knowing and identifying the major groups of biomolecules and their properties.*
- 2. Linking molecules and metabolic processes of the cell, and the inter relationship occurring in the cell metabolism, in particular microorganism and pollution phenomena.*
- 3. Developing communication skills, a critical spirit and independent learning.*
- 4. Developing the ability to work collaboratively.*

7. ATTENDANCE

This course has only optional attendance, therefore, attendance at classes is optional.

8. CONTACTS AND OFFICE HOURS

	SUBJECT DESCRIPTION	MODELO PED.013.02
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Email: prodrigues@ipg.pt

Office: Laboratory (Labmia)

Opening hours: Tuesday (14:30 - 16:30) and Wednesday (08:30 - 10:30)

Date: October 7, 2021

Signature:



Rui Pitarma, Area Coordinator

Signature:



Pedro Rodrigues, Professor