	<b>SUBJECT DESCRIPTION</b>	MODELO PED.015.02
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Course	Nursing			Academic year		2023/2024	
Subject	Biochemistry/Biophysics			ECTS		2,5	
Type of course	Compulsory						
Year	1st	Semester	1 <sup>st</sup> sem.	Student Workload:			
Professor(s)	Miguel Pedro Januário Pessanha Ana Carina Marques dos Santos			Total	124	Contact	T 52 TP 24 PL 6
Group Coordinator	Miguel Pedro Januário Pessanha						

### Planned SD



## 1. LEARNING OBJECTIVES

Recognize biomolecules, their main properties and functions, to understand the chemistry of life. Apply knowledge inherent to cell metabolism in understanding the functioning of tissues, organs and systems. Identify the application of fluid dynamics and osmotic phenomena in blood circulation and frame the respiratory function in a physical perspective: the properties of gases and surface phenomena. Recognize the physical bases of movement and balance in the human body. The knowledge acquired is fundamental for the progression in the course and for the exercise of professional life, enabling them to make judgments and solve problems in clinical practice. During this course, theoretical-practical and laboratory exercises are used, in order to integrate and relate the knowledge of biochemistry and biophysics with human physiology and anatomy. At all stages, it is intended that the student develops the capacity for autonomous learning, communication skills and critical sense, observation skills and acquire habits of valuing collaborative work.

## 2. PROGRAMME

### Part I - Biochemistry

- Overview of Biochemistry.
- Biomolecules and cellular environment.
- Amino acids.
- Proteins.
- Enzymes. Enzyme kinetics. Ways of regulating enzymatic activity. Reversible and irreversible inhibitors. Regulation Enzymes.
- Glucids.
- Lipids.
- Nucleic acids.
- Introduction to metabolism and bioenergetics.
- Glucid metabolism.

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- Lipid metabolism.
- Metabolism of nitrogen compounds.
- Integration of metabolism.

## Part II - Biophysics

- Fluids: Fundamental properties. Fundamental Law of Hydrostatics. Moving fluids.
- Physiology of Movement - Balance and stability. Basic concepts of classical mechanics. Skeletal Muscles. Levers. Analysis of forces at the level of joints.

## 3. COHERENCE BETWEEN PROGRAMME AND OBJECTIVES

The syllabus is consistent with the objectives of the course:

- 1. Acquisition of knowledge:** know and relate the interface of Physics and Chemistry with Biology and Medicine.
- 2. Acquisition of skills:** the knowledge of biochemistry and biophysics is related and integrated in the study of the human body; knowledge of biochemistry and biophysics was applied to understand and support nursing care and solve problems in clinical practice.
- 3. Demonstration of personal attitudes and qualities:** respect for teachers and colleagues; good interpersonal relationship; communication and information sharing; care in handling laboratory materials; classroom behavior and respect for laboratory materials.
- 4. Responsibility and interest in autonomous learning:** show interest in continuous research in technical and specialty textbooks and in international evidence-based medicine databases.

## 4. MAIN BIBLIOGRAPHY

### Bioquímica:

- Nelson, D. L., Cox, M. M. (2019) *Lehninger – Princípios de Bioquímica*, 7ª edição. Artmed.



### Biofísica:

- Gomes, L. R. (2012) *Biofísica para Ciências da Saúde*. Edições UFP.
- Davidovits, P. (2001) *Physics in Biology and Medicine*, 2ª edição. Harcourt Academic Press.

## 5. COMPLEMENTAR BIBLIOGRAPHY

- Campbell, M. K., Farrell, S. O. (2015) *Biochemistry*, 8<sup>th</sup> edition. Cengage Learning.
- Berg, J. M., Tymoczko, J. L., Gatto, G. J., Stryer, L. (2019) *Biochemistry*, 9<sup>th</sup> edition. W.H. Freeman.



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- Lieberman, M., Peet, A. (2018) *Mark's Basic Medical Biochemistry: A clinical approach*, 5<sup>th</sup> edition. Lippincott Williams & Wilkins.
- Voet, D., Voet, J. G. (2013) *Bioquímica*, 4<sup>a</sup> edição. Artmed.

## 6. TEACHING METHODOLOGIES (INCLUDING EVALUATION)

In theoretical classes, masterly exposition of the syllabus is used, proceeding to the systematization of the most relevant and current aspects, and in theoretical-practical classes, interactive discussion with students is privileged, being carried out practical application exercises, in order to allow the application of theoretical knowledge in an integrated way. This theoretical training is completed with the student passing through the laboratory of practical classes, where he can prove the most relevant aspects of theoretical teaching.

The evaluation can be done in two ways:

### Continuous evaluation

The approval of the UC is obtained with a final grade of at least ten, on a scale from zero to twenty (0-20), according to the regulation of attendance and evaluation of this School.

Continuous assessment consists of two written tests (assessment frequencies) (42.5% + 42.5%) on theoretical and theoretical-practical foundations and a questionnaire (5%) and a report (10%) on the protocols developed in practical laboratory classes.


### Final assessment

Consists of a written test (exam), which takes place at the end of the school year, at the times provided for this purpose. The evaluation result is expressed on a scale from zero to twenty values (0-20).

The result of the final assessment is obtained considering exclusively the assessment of the exam, not including the assessment of practical laboratory classes.

## 7. COHERENCE BETWEEN TEACHING METHODOLOGIES AND OBJECTIVES

Teaching methodologies are consistent with the objectives of the course. Theoretical classes with an expository methodology, which are always intended to be participatory, are the first approach to content in which students are encouraged to ask questions and reasoning based on prior knowledge they have and acquire throughout the semester. Problem solving, discussion of clinical cases and analysis of

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experimental protocols in Laboratory Practice classes, underlining the precepts of Evidence-Based Practice, allow: (i) know and relate the interface of physics and chemistry with biology and medicine; (ii) develop scientific reasoning skills; (iii) knowledge integration; (iv) encourage critical thinking; (v) develop the capacity for communication and autonomous learning; (vi) develop observation skills and collaborative work and demonstrate respect for teachers and colleagues.

The gradual and sustained consolidation of knowledge according to a continuing learning model improves the perception of the impact of CU on professional practice.

## 8. ATTENDANCE

Approval in this curricular unity (continuous assessment of final examination) requires the participation and attendance, with mandatory attendance of at least 75% of theoretical-practical and 100 % of laboratory classes.

Date: 03/10/2023



Signature of Teacher and Coordinator