Information about the subject

Degree: Bachelor of Degree in Marine Sciences

Faculty: Faculty of Veterinary Medicine and Experimental Sciences

Code: 271103 **Name:** Biochemistry

Credits: 6,00 **ECTS Year:** 1 **Semester:** 2

Module: Fundamental Science

Subject Matter: Biology **Type:** Basic Formation

Field of knowledge: Sciences

Department: Basic and Cross-disciplinary Sciences

Type of learning: Classroom-based learning

Languages in which it is taught: Spanish

Lecturer/-s:

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Module organization

Fundamental Science

Subject Matter	ECTS	Subject	ECTS	Year/semester
Physics	12,00	Fluid Mechanics	6,00	1/2
		Physics	6,00	1/1
Mathematics	6,00	Mathematics	6,00	1/1
Chemistry	12,00	Chemistry	6,00	1/1
		Chemistry of Aqueous Solutions	6,00	1/2
Biology	12,00	Biochemistry	6,00	1/2
		Biology	6,00	1/1
Geology	6,00	Geology	6,00	1/2

Recommended knowledge

Chemistry and Biology Knowledge recommended.

Learning outcomes

At the end of the course, the student must be able to prove that he/she has acquired the following learning outcomes:

R1 The student knows the main disciplines integrating the life sciences, their foundations, and fields of work.

R2 The student uses different working techniques in the laboratory, understanding the planning, development and purpose of the experiment.

R3 The student seeks bibliographical information from different sources and can analyse it with a critical and constructive spirit.

R4 The student is able to produce documents on biology and can work in teams.

R5 The student is able to draft an intelligible and well-organized text on different aspects of biological sciences.

R6 The student knows the different types and functions of biomolecules.

R7 El student knows how to identify the metabolic pathways and how to integrate them.

R8 The student knows the transmission of genetic information.

Competencies

Depending on the learning outcomes, the competencies to which the subject contributes are (please score from 1 to 4, being 4 the highest score):

BASIC		Weighting			
		1	2	3	4
CB1	Students acquire and understand knowledge in their field of study based on general secondary education but usually reaching a level that, although supported on advanced text books, also includes aspects involving state-of-the-art knowledge specific to their area.				x
CB2	Students are able to apply knowledge to their work in a professional way and have the competences enabling them to state and defend views and opinions as well as perform problem-solving tasks in their field of study.		x		
CB5	Students develop the necessary learning skills to undertake further studies with a high level of autonomy.			x	

GENERAL		Weighting			
		1	2	3	4
CG1	Capacity to analyze and synthesize				x
CG2	Capacity to organize and plan			x	
CG3	Mastering Spanish oral and written communication				x
CG5	Knowing and applying Basic ITC skills related to marine science	x			
CG6	Capacity to manage information (capacity to look for and analyze information coming from different types of sources)			x	
CG7	Decision making		x		
CG8	Capacity to work in interdisciplinary and multidisciplinary team			x	
CG9	Interpersonal skills		x		

CG10	Critical and self-critical capacity		x		
CG11	Capacity to learn				x
CG12	Capacity to adapt to new situations		x		
CG13	Capacity to produce new ideas (creativity)	x			
CG16	Capacity to apply theoretical knowledge				x

SPECIFIC		Weighting			
		1	2	3	4
CE8	Identifying and analyzing new problems and proposing solution strategies		x		
CE9	Knowing how to carry out experiments and measurements both in the laboratory and during sample collection		x		
CE11	Knowing how to do fieldwork and laboratory experiments in a safe and responsible way, promoting teamwork			x	

Assessment system for the acquisition of competencies and grading system

Assessed learning outcomes	Granted percentage	Assessment method
R1, R2, R4, R5	50,00%	Written test with theoretical and practical questions
R2, R3, R5	25,00%	Delivery of guided assignments, whose objectives and contents will be proposed by the teacher
R1, R2, R4, R5	15,00%	Laboratory test
R3, R4, R5	10,00%	Oral presentation

Observations

According to the general evaluation and qualification regulations, the preferred evaluation system will be by means of continuous evaluation and will be implemented with questionnaires and exercises at the end of each block of content, so that the student has support during the semester to prepare for the final exam. This subject cannot be assessed by means of a single assessment.

Each of the parts must be passed with at least 5/10 to pass the course. Attendance to the practicals is compulsory.

The use of tools based on artificial intelligence (AI) is subject to the teacher's criteria, who may establish specific limits or conditions depending on the training or assessment activity.

MENTION OF DISTINCTION:
In accordance with the regulations governing the assessment and grading of subjects in force at UCV, the distinction of "Matrícula de Honor" (Honours with Distinction) may be awarded to students who have achieved a grade of 9.0 or higher. The number of "Matrículas de Honor" (Honours with Distinction) may not exceed five percent of the students enrolled in the group for the corresponding academic year, unless the number of enrolled students is fewer than 20, in which case a single "Matrícula de Honor" (Honours with 9 Distinction) may be awarded. Exceptionally, these distinctions may be assigned globally across different groups of the same subject. Nevertheless, the total number of distinctions awarded will be the same as if they were assigned by group, but they may be distributed among all students based on a common criterion, regardless of the group to which they belong. The criteria for awarding "Matrícula de Honor" (Honours with Distinction) will be determined according to the guidelines stipulated by the professor responsible for the course, as detailed in the "Observations" section of the evaluation system in the course guide.

Learning activities

The following methodologies will be used so that the students can achieve the learning outcomes of the subject:

M1 Teacher presentation of contents, analysis of competences, explanation and in-class display of skills, abilities and knowledge.

M2 Group work sessions supervised by the professor. Case studies, diagnostic tests, problems, field work, computer room, visits, data search, libraries, on-line, Internet, etc. Meaningful construction of knowledge through interaction and student activity.

M3 Activities carried out in spaces with specialized equipment.

M4 Supervised monographic sessions with shared participation.

M5 Application of multidisciplinary knowledge.

M6 Personalized and small group attention. Period of instruction and/or guidance carried out by a tutor to review and discuss materials and topics presented in classes, seminars, readings, papers, etc.

M8 Set of oral and/or written tests used in initial, formative or additive assessment of the student.

M9 Group preparation of readings, essays, problem-solving, seminars, papers, reports, etc. to be presented or submitted in theoretical , practical and/or small-group tutoring sessions. Work done on the university e-learning platform (www.plataforma.ucv.es)

M10 Student's study: Individual preparation of readings, essays, problem-solving, seminars, papers, reports, etc. to be presented or submitted in theoretical, practical and/or small-group tutoring sessions. Work done on the university e-learning platform (www.plataforma.ucv.es).

IN-CLASS LEARNING ACTIVITIES

	LEARNING OUTCOMES	HOURS	ECTS
ON-CAMPUS CLASS M1	R1, R2, R4	38,00	1,52
PRACTICAL CLASSES M2	R2, R4	4,00	0,16
LABORATORY M3	R2, R4	8,00	0,32
SEMINAR M4	R3, R4, R5	3,00	0,12
GROUP PRESENTATION OF ASSIGNMENTS M5	R3, R4, R5	3,00	0,12
TUTORIAL M6	R3, R4, R5	2,00	0,08
ASSESSMENT M8	R1, R2, R3, R4, R5	2,00	0,08
TOTAL		**60,00**	**2,40**

LEARNING ACTIVITIES OF AUTONOMOUS WORK

	LEARNING OUTCOMES	HOURS	ECTS
GROUP WORK M9	R1, R2, R3, R4, R5	20,00	0,80
INDEPENDENT WORK M10	R1, R2, R3, R4, R5	70,00	2,80
TOTAL		**90,00**	**3,60**

Description of the contents

Description of the necessary contents to acquire the learning outcomes.

Theoretical contents:

Content block	Contents
DIDACTIC UNIT I: STRUCTURE OF BIOMOLECULES AND CATALYSIS	Chapter 1. Introduction to the chemistry of life. Cellular fundamentals. Chemical fundamentals. Genetic Basis. Evolutionary foundations. Chapter 2. Water.Chapter 3. Carbohydrates. Structure. Classification. Functions.Chapter 4. Lipids. Structure. Classification. Functions.Chapter 5. Amino acids, peptides and proteins. Structure. Properties. Classification. Functions. Separation and purification methods. Methods of quantification.Chapter 6. Nucleotides and nucleic acids.Chapter 7. Enzymes. Enzyme kinetics. Mechanisms. Regulatory enzymes.Chapter 8. Vitamins and coenzymes.Chapter 9. Biological membranes and transport.
DIDACTIC UNIT II: FLOW OF GENETIC INFORMATION	Chapter 14: Replication, transcription and translation of genetic information.
DIDACTIC UNIT III: BIOENERGETICS AND METABOLISM	Chapter 10. Principles of cellular bioenergetics. ATP.Chapter 11. Catabolism and production of phosphate bond energy.Chapter 12. Biosynthesis and utilization of phosphate bond energy.Chapter 13. Hormonal regulation. Structure and function of hormones.
LABORATORY SESSIONS:	3 sessions devoted to “Extraction and characterization of enzymatic activity”. 1 session devoted to “DNA extraction from animal tissue”. SEMINAR

Organization of the practical activities:

	Content	Place	Hours
PR1.	Extraction and characterization of enzymatic activity	Laboratory	6,00
PR2.	DNA extraction from animal tissue	Laboratory	2,00
PR3.	Problem resolution	Lecture room	4,00

Temporary organization of learning:

Block of content	Number of sessions	Hours
DIDACTIC UNIT I: STRUCTURE OF BIOMOLECULES AND CATALYSIS	18,00	36,00
DIDACTIC UNIT II: FLOW OF GENETIC INFORMATION	4,00	8,00
DIDACTIC UNIT III: BIOENERGETICS AND METABOLISM	4,00	8,00
LABORATORY SESSIONS:	4,00	8,00

References

Books:

- Lehninger, A., Nelson, D. y Cox, M. Principios de Bioquímica. Editorial Omega, 2014.

Basic web resources:

- BioROM: http://www.biorom.uma.es/indices/index.html
- Lehninger, Principios de Bioquímica on-line:
http://bcs.whfreeman.com/lehninger5e/default.asp?s=&n=&i=&v=&o=&ns=0&uid=0&rau=0
-Scitable: http://www.nature.com/scitable

Aditional books:

- Stryer L. et al. Bioquímica. Editorial Reverté, S.A., Barcelona, 2013.
- Stryer L. et al. Bioquímica Curso Básico. Editorial Reverté, S.A., Barcelona, 2014.
- Alberts, B., et al. Biología Molecular de la Célula. Editorial Omega, 2016.
- Matthews, C.K., et al. Bioquímica. Editorial Addison-Wesley. 2013.