



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: -

Type of learning: Classroom-based learning

Languages in which it is taught: Spanish

Lecturer/-s:

271A Mónica Díez Díaz (**Responsible Lecturer**)

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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 The 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

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

MENTION OF DISTINCTION:

According to Article 22 of the Regulations governing the Evaluation and Qualification of UCV Courses, the mention of "Distinction of Honor" may be awarded by the professor responsible for the course to students who have obtained, at least, the qualification of 9 over 10 ("Sobresaliente"). The number of "Distinction of Honor" mentions that may be awarded may not exceed five percent of the number of students included in the same official record, unless this number is lower than 20, in which case only one "Distinction of Honor" may be awarded.

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 | <p>Chapter 1. Introduction to the chemistry of life. Cellular fundamentals. Chemical fundamentals. Genetic Basis. Evolutionary foundations.</p> <p>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.</p> |
| DIDACTIC UNIT II: FLOW OF GENETIC INFORMATION | <p>Chapter 14: Replication, transcription and translation of genetic information.</p> |
| DIDACTIC UNIT III: BIOENERGETICS AND METABOLISM | <p>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.</p> |
| LABORATORY SESSIONS: | <p>3 sessions devoted to "Extraction and characterization of enzymatic activity". 1 session devoted to "DNA extraction from animal tissue".</p> |
| | 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>

Additional 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.



Addendum to the Course Guide of the Subject

Due to the exceptional situation caused by the health crisis of the COVID-19 and taking into account the security measures related to the development of the educational activity in the Higher Education Institution teaching area, the following changes have been made in the guide of the subject to ensure that Students achieve their learning outcomes of the Subject.

Situation 1: Teaching without limited capacity (when the number of enrolled students is lower than the allowed capacity in classroom, according to the security measures taken).

In this case, no changes are made in the guide of the subject.

Situation 2: Teaching with limited capacity (when the number of enrolled students is higher than the allowed capacity in classroom, according to the security measures taken).

In this case, the following changes are made:

1. Educational Activities of Onsite Work:

All the foreseen activities to be developed in the classroom as indicated in this field of the guide of the subject will be made through a simultaneous teaching method combining onsite teaching in the classroom and synchronous online teaching. Students will be able to attend classes onsite or to attend them online through the telematic tools provided by the university (videoconferences). In any case, students who attend classes onsite and who attend them by videoconference will rotate periodically.

In the particular case of this subject, these videoconferences will be made through:

☒ Microsoft Teams

☐ Kaltura



Situation 3: Confinement due to a new State of Alarm.

In this case, the following changes are made:

1. Educational Activities of Onsite Work:

All the foreseen activities to be developed in the classroom as indicated in this field of the guide of the subject, as well as the group and personalized tutoring, will be done with the telematic tools provided by the University, through:

☒ Microsoft Teams

☐ Kaltura

Explanation about the practical sessions:

The practices will be carried out online using the tools considered most appropriate.



2. System for Assessing the Acquisition of the competences and Assessment System

ONSITE WORK

Regarding the Assessment Tools:

☒ The Assessment Tools will not be modified. If onsite assessment is not possible, it will be done online through the UCVnet Campus.

☐ The following changes will be made to adapt the subject's assessment to the online teaching.

| Course guide | | Adaptation | |
|-----------------|----------------------|--------------------------------------|---------------------|
| Assessment tool | Allocated percentage | Description of the suggested changes | Platform to be used |

The other Assessment Tools will not be modified with regards to what is indicated in the Course Guide.

Comments to the Assessment System:

The evaluation will be carried out in the same way as in the regular face-to-face mode.