



Information about the subject

Degree: Bachelor of Science Degree in Biotechnology

Faculty: Faculty of Veterinary Medicine and Experimental Sciences

Code: 1101201 **Name:** Biochemistry II

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

Module: Biochemistry and Molecular Biology

Subject Matter: Biochemistry **Type:** Basic Formation

Department: Biotechnology

Type of learning: Classroom-based learning

Languages in which it is taught: Spanish

Lecturer/-s:



Module organization

Biochemistry and Molecular Biology

| Subject Matter | ECTS | Subject | ECTS | Year/semester |
|-------------------------------------|-------|-------------------------------------|------|---------------|
| Biochemistry | 12,00 | Biochemistry I | 6,00 | 1/2 |
| | | Biochemistry II | 6,00 | 2/1 |
| Molecular Genetics | 6,00 | Molecular Genetics | 6,00 | 2/1 |
| Molecular Biology of Microorganisms | 6,00 | Molecular Biology of Microorganisms | 6,00 | 2/2 |
| Enzimology | 6,00 | Enzymology | 6,00 | 3/1 |



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 has understood and assimilated the contents of the subject.
- R2 The student is able to solve problems or case studies related to the subject contents, by using different resources (bibliographic, IT, etc.)
- R3 The student is able to work in a laboratory, carrying out basic operations correctly and taking into account the corresponding safety standards. He/she understands the planning, development and purpose of the experience, and is able to contrast and validate the obtained results.
- R4 The student is able to write an intelligible and organized text on different aspects of the subject.
- R5 The student is able to present and defend his/her work adequately.
- R6 The student seeks bibliographic information from different sources and can analyze it with a critical and constructive spirit.
- R7 The student collaborates with the teacher and his/her peers throughout the learning process; he/she works in a team; treats everyone with respects, is proactive and fulfills the organization rules of the course.



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 | | |
| CB3 | Students are able to collect and interpret relevant data (generally in their field of study) and give opinions that involve reflection on relevant social, scientific or ethical issues. | | | X | |
| CB4 | Students can communicate information, ideas, problems and solutions to a specialized or non-specialized audience. | | 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 |
| CG01 | Capacity to analyze and synthesize. | | | X | |
| SPECIFIC | | Weighting | | | |
| | | 1 | 2 | 3 | 4 |
| CE23 | Knowing how to use laboratory equipment and to carry out basic operations for each discipline including: safety measures, handling, waste disposal and activity register. | | | X | |



| | | | | | |
|------|---|---|--|---|---|
| CE24 | Knowing basic and instrument laboratory techniques in the different areas of biotechnology. | X | | | |
| CE25 | Knowing how to analyze and understand scientific data related to biotechnology. | | | | X |
| CE29 | Contrasting and checking results of biotechnological experimentation. | X | | | |
| CE32 | Knowing how to use different specific operating systems and software packages designed for Biotechnology. | | | X | |

TRANSVERSAL

Weighting

| | | 1 | 2 | 3 | 4 |
|------|---|---|---|---|---|
| CT02 | Capacity to organize and plan. | | | X | |
| CT03 | Mastering Spanish oral and written communication. | | | X | |
| CT05 | Knowing and applying Basic ITC skills related to Biotechnology. | X | | | |
| CT06 | Capacity to manage information (capacity to look for and analyze information coming from different types of sources). | | | X | |
| CT07 | Problem solving. | | | X | |
| CT08 | Decision making | | | X | |
| CT09 | Capacity to work in interdisciplinary and multidisciplinary team. | | | | X |
| CT10 | Interpersonal skills. | | | X | |
| CT11 | Understanding multicultural and diverse environment | | | X | |
| CT12 | Critical and self-critical capacity. | | | X | |
| CT13 | Ethics. | X | | | |
| CT14 | Capacity to learn | | | X | |
| CT15 | Capacity to adapt to new situations | | | X | |



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.
- M7 Set of oral and/or written tests used in initial, formative or additive assessment of the student
- M8 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.



M9 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.

IN-CLASS LEARNING ACTIVITIES

| | LEARNING OUTCOMES | HOURS | ECTS |
|---|----------------------------|--------------|-------------|
| ON-CAMPUS CLASS M1 | R1, R2, R4, R5, R6, R7 | 40,00 | 1,60 |
| PRACTICAL CLASSES M2 | R1, R2, R3, R4, R5, R6 | 2,00 | 0,08 |
| LABORATORY M3 | R4, R5, R6 | 8,00 | 0,32 |
| SEMINAR M4 | R2, R3, R5, R6 | 3,00 | 0,12 |
| GROUP PRESENTATION OF ASSIGNMENTS M5 | R1, R2, R3, R5, R6, R7 | 3,00 | 0,12 |
| TUTORIAL M6 | R2, R3, R5, R6 | 2,00 | 0,08 |
| ASSESSMENT M7 | R1, R2, R3, R4, R5, R6, R7 | 2,00 | 0,08 |
| TOTAL | | 60,00 | 2,40 |

LEARNING ACTIVITIES OF AUTONOMOUS WORK

| | LEARNING OUTCOMES | HOURS | ECTS |
|----------------------------------|----------------------------|--------------|-------------|
| AUTONOMOUS GROUP WORK M8 | R1, R2, R3, R4, R5, R6, R7 | 18,00 | 0,72 |
| AUTONOMOUS INDIVIDUAL WORK M9 | R1, R2, R3, R4, R5, R6, R7 | 72,00 | 2,88 |
| 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 1 GENERALITIES OF BIOENERGY | 1. Membrane and Transport Potential 2. Introduction and organization of metabolism 3. Electronic transport chains and ATP synthesis 4. Photosynthesis |
| DIDACTIC UNIT 2 CELLULAR METABOLISM | 5. Acetyl-CoA and the citric acid cycle 6. Carbohydrate metabolism 7. Lipid metabolism 8. Metabolism of nitrogen compounds. |
| DIDACTIC UNIT 3 COORDINATION AND INTEGRATION OF METABOLISM | 9. Hormonal regulation 10. Tissue biochemistry 11. Metabolic adaptations 12. Molecular bases of inherited metabolic diseases Nutrigenomics |
| DIDACTIC UNIT 4- LAB PRACTICES | Membrane potential Light reactions of photosynthesis Glucose transport across the plasma membrane. Study of the effect of inhibitors / uncouplers of the electron transport chain Carbohydrate metabolism Lipase type I activity Nutrigenomics |



Organization of the practical activities:

| | Content | Place | Hours |
|------|--|------------|-------|
| PR1. | Membrane potential | Computer | 2,00 |
| PR2. | Light reactions of photosynthesis | Laboratory | 2,00 |
| PR3. | Glucose transport across the plasma membrane. Study of the effect of inhibitors / uncouplers of the electron transport chain | Laboratory | 2,00 |
| PR4. | Carbohydrate metabolism | Laboratory | 2,00 |
| PR5. | Lipase type I activity | Laboratory | 2,00 |
| PR6. | Nutrigenomics | Computer | 2,00 |

Temporary organization of learning:

| Block of content | Number of sessions | Hours |
|--|--------------------|-------|
| DIDACTIC UNIT 1 GENERALITIES OF BIOENERGY | 8,00 | 16,00 |
| DIDACTIC UNIT 2 CELLULAR METABOLISM | 8,00 | 16,00 |
| DIDACTIC UNIT 3 COORDINATION AND INTEGRATION OF METABOLISM | 8,00 | 16,00 |
| DIDACTIC UNIT 4- LAB PRACTICES | 6,00 | 12,00 |



References

·Stryer L. et al. Bioquímica. (Traducción de la 7ª edición, 2012). Editorial Reverté, S.A.Barcelona.·Lehninger, A., Nelson, D. y Cox, M. Principios de Bioquímica. Editorial Omega, 6º edición 2014.·Alberts, B., et al. Biología Molecular de la Célula. (Traducción de Molecular Biology of the Cell).Editorial Omega,6º Edición 2016.·Matthews, C.K., et al. Bioquímica. (4ª edición, 2013). Editorial Addison-Wesley.·Devlin, T.M. Bioquímica.. México, DF. 4a ed. Reverté S.A. 2015.·Lehninger, Albert L. Bioquímica: Las bases moleculares de la estructura y función celular. Barcelona, España. 2a ed. Omega, 2002.·Metzler "Biochemistry" 3 ed. 2003 ElsevierHarper, Bioquímica Ilustrada 28 ed. 2009 Ed Mc Graw Hill Lange