



Information about the subject

Degree: Bachelor of Science Degree in Nursing

Faculty: Faculty of Medicine and Health Sciences

Code: 1211104 **Name:** Clinical Biochemistry

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

Module: Common basic training

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

Field of knowledge: Health sciences

Department: Biomedical Sciences

Type of learning: Classroom-based learning

Languages in which it is taught: Spanish

Lecturer/-s:

| | | |
|-------|---|------------------------------|
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Module organization

Common basic training

| Subject Matter | ECTS | Subject | ECTS | Year/semester |
|----------------|-------|--|------|---------------|
| Anatomy | 6,00 | Human and Functional Anatomy | 6,00 | 1/1 |
| Physiology | 12,00 | Human Physiology | 6,00 | 1/2 |
| | | Physiopathology | 6,00 | 2/1 |
| Biochemistry | 6,00 | Clinical Biochemistry | 6,00 | 1/1 |
| Biostatistic | 6,00 | Biostatistics and Research Methodology | 6,00 | 1/2 |
| Psychology | 6,00 | Psychology of Care | 6,00 | 1/1 |
| Pharmacology | 6,00 | Pharmacology | 6,00 | 2/1 |
| Nutrition | 6,00 | Nutrition and Dietetics | 6,00 | 2/1 |
| ICT | 6,00 | ICT | 6,00 | 3/1 |
| English | 6,00 | English | 6,00 | 1/2 |
| Life support | 6,00 | Emergency Care and Life Support | 6,00 | 4/1 |

Recommended knowledge

Pre-requisites: None established



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 That students are able to base nursing interventions on scientific evidence and available means.
- R2 That students are able to promote healthy lifestyles, self-care, supporting the maintenance of preventive and therapeutic behaviors.
- R3 That the students know the health information systems.
- R4 That students understand the molecular and physiological bases of cells and tissues.
- R5 That students know the physiopathological processes and their manifestations and the risk factors that determine the states of health and disease in the different stages of the life cycle.



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 have demonstrated possession and understanding of knowledge in an area of study that is at the core of general secondary education, and is often at a level that, while supported by advanced textbooks, also includes some aspects that involve knowledge from the cutting edge of their field of study. | | | X | |
| CB2 | Students are able to apply their knowledge to their work or vocation in a professional way and possess the skills usually demonstrated by developing and defending arguments and solving problems within their area of study. | | | X | |
| CB3 | Students have the ability to gather and interpret relevant data (usually within their area of study) to make judgments that include reflection on relevant social, scientific or ethical issues. | | X | | |
| CB4 | That students can convey information, ideas, problems and solutions to both specialized and non-specialized audiences. | X | | | |
| CB5 | Students have developed those learning skills necessary to undertake further study with a high degree of autonomy. | | X | | |

| SPECIFIC | | Weighting | | | |
|----------|---|-----------|---|---|---|
| | | 1 | 2 | 3 | 4 |
| 2b | To understand the molecular and physiological basis of cells and tissues. | | | | X |
| 10b | To know pathophysiological processes and their manifestations and the risk factors that determine the health and disease states in the different stages of their vital cycle. | | | X | |



TRANSVERSAL

Weighting

1 2 3 4

| | | | | | |
|---|--|---|---|--|--|
| 6 | To base interventions in nursing on scientific evidence and on the available means. | | X | | |
| 9 | To promote healthy life spans, to promote taking care of each person by themselves and support the maintenance of preventive and therapeutic measures. | X | | | |



Assessment system for the acquisition of competencies and grading system

| Assessed learning outcomes | Granted percentage | Assessment method |
|----------------------------|--------------------|---|
| R1, R2, R3, R4, R5 | 75,00% | Theoretical written exams |
| R1, R2, R3, R4, R5 | 20,00% | Practical tests and works |
| R1, R4 | 5,00% | Submission of the final individual work and oral presentation |

Observations

Assessment

Written final exam: In order to add the rest of the marks, the student must pass the written test. Same for students of subsequent enrolments. This test will have two parts: One part will consist of some shorts questions to solve and second part will consist of multiple-choice questions. The student must achieve 50% of this in order to pass.

Continuous assessment: the student will keep a portfolio of classroom activities, written theory questionnaires etc. These activities will be taken into account. The student must achieve 10% of this in order to average with the final mark.

Grading.

- For those students who do not pass, the grades will be published over 10.
- Students who pass the exam but do not pass any of the remaining assessment tools will be graded 4.5. In the second enrollment, only those projects pending in order to pass the course will need to be submitted.
- For the students of second or successive enrollments it is not obligatory to attend the teaching sessions.

MENTION OF DISTINCTION:

The mention of Distinction will be awarded to students who have achieved a score equal to or greater than 9.5. The number of Distinctions granted will not exceed 5% of students enrolled in a subject in the corresponding academic year unless enrolment is under 20, in which case only one Distinction may be granted.

DEVELOPMENT OF THE SUBJECT IN SECOND AND SUBSEQUENT ENROLMENTS:

There will be a special group for students who are not enrolling for the first time, if they exceed the occupancy limit of the classroom and a lecturer is assigned to that group. The lecturer in charge of this group will conduct 6 follow-up sessions and tutoring of 2 hours each.



Assessment of skills and abilities will be done through the scheduled practice sessions. Assessment of contents and skills will be carried out as set in the official calendar for this course. Continuous assessment grades from the previous academic year will not be saved for subsequent enrolments. The student will need to do all the activities again every time they enroll.

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 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 Exposition of contents by the teacher, analysis of competencies, explanation and demonstration of abilities, skills and knowledge in the classroom.
- M2 Group work sessions supervised by the teacher. Case study, diagnostic analysis, problems, field study, computer room, visits, data search, libraries, network, Internet, etc. Significant construction of knowledge through student interaction and activity.
- M3 Supervised monographic sessions with shared participation.
- M4 Application of interdisciplinary knowledge.
- M5 Activities developed in spaces and with specialized equipment.
- M6 Personalized attention and in small groups. Period of instruction and/or orientation carried out by a tutor with the objective of reviewing and discussing the materials and topics presented in the classes, seminars, readings, completion of assignments, etc.



- M7 Set of oral and/or written tests used in the initial, formative or summative evaluation of the student.
- M8 Student study: Individual preparation of readings, essays, problem solving, seminars, papers, memoirs, etc. To expose or deliver in the theoretical classes, practical classes and/or small group tutorials. Work done on the university platform (www.plataforma.ucv.es).
- M9 Group preparation of readings, essays, problem solving, papers, memoirs, etc. To present or deliver in the theoretical classes, practical classes, seminars and/or small group tutorials. Work done on the university platform (www.plataforma.ucv.es).

IN-CLASS LEARNING ACTIVITIES

| | LEARNING OUTCOMES | HOURS | ECTS |
|----------------------------|--------------------|--------------|-------------|
| Face-to-face class M1 | R1, R2, R3, R4, R5 | 40,00 | 1,60 |
| Practice Classes M2, M3 | R1, R4, R5 | 11,00 | 0,44 |
| Laboratory M2, M5 | R1, R4 | 2,00 | 0,08 |
| Tutorial M6 | R1, R4, R5 | 2,00 | 0,08 |
| Evaluation M7 | R1, R2, R3, R4, R5 | 5,00 | 0,20 |
| TOTAL | | 60,00 | 2,40 |

LEARNING ACTIVITIES OF AUTONOMOUS WORK

| | LEARNING OUTCOMES | HOURS | ECTS |
|---------------------------------|--------------------|--------------|-------------|
| Student's self-employment M8 | R1, R2, R3, R4, R5 | 70,00 | 2,80 |
| Group work M9 | R1, R2, R3, R4, R5 | 20,00 | 0,80 |
| 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: Introduction to cellular and molecular biology. Introduction to Microbiology. | Topic 1-Elemental composition of living beings. Bio elements and biomolecules. Cellular processes. Bioenergetics. Cell metabolism: anabolism/catabolism. Topic 2-Molecular pathology: Brief introduction to microbiology. |
| DIDACTIC UNIT II: Introduction to Structural and Metabolic Biochemistry. | Topic 3. Carbohydrates. Concept and definition. Structure. Biological functions. Classification. Topic 4. Carbohydrates. Catabolism, synthesis and storage of carbohydrates. Topic 5. Lipids. Concept and definition. Structure. Biological functions. Classification. Topic 6: Lipids. Catabolism, synthesis and storage of lipids. Topic 7. Proteins. Concept and definition. Chemical structure and classification of amino acids. Levels of protein structuring. Biological functions. Topic 8: Proteins. Catabolism and synthesis of amino acids. Metabolic use of amino groups: Transamination and deamination. Urea cycle. |



DIDACTIC UNIT III: Introduction to Clinical Biochemistry.

Topic 9. Introduction to Clinical Biochemistry. Phases of the analytical process. Introduction to the concept of markers (laboratory and cancer).

Topic 10. Study of proteins in Clinical Biochemistry: plasmatic proteins and in urine.

Topic 11. Role of the laboratory in haematological diseases. Laboratory and autoimmune diseases.

Topic 12. Alterations in the carbohydrate metabolism. Study of the function of the endocrine pancreas. Diabetes mellitus: metabolic alterations.

Topic 13. Alterations in hepatic function. Serological characterization of hepatitis. Main hepatic markers.

Topic 14. Alterations in lipid metabolism. Cardiovascular markers.

Topic 15. Alterations in respiratory function. Arterial blood gas analysis: Disorders of acid-base balance. Nephro-urological function disturbances.

Topic 16. Laboratory in endocrine-metabolic pathologies. Study of Thyroid and Adrenal Corticosteroid Function.

Topic 17. Disturbances of gastrointestinal function. Biochemistry in bone diseases.

Topic 18. Role of the Laboratory in the Care of Women and the Elderly. Analysis of toxic substances.

DIDACTIC UNIT IV: Practice Module.

Practice 1. Initiation to Concentration Calculations and laboratory management.

Practice 2. Initiation in the handling of laboratory material.

Practice 3. Resolution of calculation of concentrations of biochemical parameters.



Temporary organization of learning:

| Block of content | Number of sessions | Hours |
|---|--------------------|-------|
| DIDACTIC UNIT I: Introduction to cellular and molecular biology. Introduction to Microbiology. | 3,00 | 6,00 |
| DIDACTIC UNIT II: Introduction to Structural and Metabolic Biochemistry. | 11,00 | 22,00 |
| DIDACTIC UNIT III: Introduction to Clinical Biochemistry. | 14,00 | 28,00 |
| DIDACTIC UNIT IV: Practice Module. | 2,00 | 4,00 |

References

Lehninger. Principles of Biochemistry. Cox, M.M. - Nelson, D.L. Macmillan Learning. 8ª Edición, 2021.

Stryer, Lubert; Berg, Jeremy M.; Tymoczko, John L. Biochemistry. Macmillan Learning. 9ª edición. 2019

William B. Coleman, Gregory J. Tsongalis. Molecular pathology: the molecular basis of human disease. 2ª Edición. Academic Press, 2019

Websites:

- **Biorom 2010**, <http://sebbm.es/BioROM/indices/index.html>

- **Jena Library of Biological Macromolecules**: <http://www.fli-leibniz.de/IMAGE.html>

- **Biosfera project**. <http://recursostic.edlínica: de la patología al laboratorio. Ergon. 2008>
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