

COURSE DESCRIPTION

COURSE DETAILS

Title (of the course): **BIOQUÍMICA**

Code: 102210

Degree/Master: **GRADO DE CIENCIA Y TECNOLOGÍA DE LOS ALIMENTOS** Year: 1

Name of the module to which it belongs: FORMACIÓN BÁSICA COMÚN

Field: BIOQUÍMICA

Character: BASICA

Duration: SECOND TERM

ECTS Credits: 6.0

Classroom hours: 60

Face-to-face classroom percentage: 40.0%

Study hours: 90

Online platform: <http://moodle.uco.es/m2324/>

LECTURER INFORMATION

Name: LÓPEZ LOZANO, FRANCISCO ANTONIO (Coordinator)

Department: BIOQUÍMICA Y BIOLOGÍA MOLECULAR

Area: BIOQUÍMICA Y BIOLOGÍA MOLECULAR

Office location: Edificio Severo Ochoa, planta 1, ala Este, C6E130

E-Mail: b72lolof@uco.es

Phone: 957211075

URL web: <http://www.uco.es/grupos/adapromet/Home.html>

Name: GARCÍA FERNÁNDEZ, JOSÉ MANUEL

Department: BIOQUÍMICA Y BIOLOGÍA MOLECULAR

Area: BIOQUÍMICA Y BIOLOGÍA MOLECULAR

Office location: Edificio Severo Ochoa, planta 1, ala Este, C6E120

E-Mail: jmgarcia@uco.es

Phone: 957211075

URL web: <http://www.uco.es/grupos/adapromet/Home.html>

Name: MUÑOZ MARÍN, MARÍA DEL CARMEN

Department: BIOQUÍMICA Y BIOLOGÍA MOLECULAR

Area: BIOQUÍMICA Y BIOLOGÍA MOLECULAR

Office location: Edificio Severo Ochoa, planta 1, ala Este, C6E130

E-Mail: b32mumam@uco.es

Phone: 957211075

URL web: <http://www.uco.es/grupos/adapromet/Home.html>

PREREQUISITES AND RECOMMENDATIONS

Prerequisites established in the study plan

B1 English level is required to enrol in this subject.

Recommendations

It would be convenient for students to fulfill previously the subjects of Biology, Inorganic and Organic Chemistries, corresponding to the first four-month period. Therefore, we suggest to use the indicated Bibliography and all the additional information provided along the course.

COURSE DESCRIPTION

INTENDED LEARNING OUTCOMES

CB1	To make students able to show they know and understand contents in a given study area from the basis of general secondary education, considering that this information can be found at a level that, based on specialised text books, also includes some aspects that entail knowledge from the recent advance in their study field.
CB2	Students will know how to apply their knowledge to their job or professional vocation, and will possess the knowledge that they can demonstrate by means of developing and defending arguments, and solving problems within their area of study.
CB3	To make the students able to obtain and interpret relevant data (normally within their field of study) to reflect on social, scientific and ethical topics
CB4	To make students able to share information, ideas, problems and solutions with an audience of specialists and non-specialists
CB5	To make students able to develop necessary learning abilities to begin further study with a high degree of independence
CU2	Improving user-level skills in ICT
CT1	Ability to correctly express oneself in the Spanish language in its disciplinary field.
CT2	Ability to resolve problems.
CT4	Ability to put knowledge into practice
CT7	Analysis and synthesis skills.
CT10	To have developed the incentive for quality.
CT11	Organisational and planning skills.
CT12	Information management skills.
CE1	To recognise and apply the necessary physical, chemical, biochemical, biological, physiological, mathematical and statistical principles for understanding and developing Food Science Technology.

OBJECTIVES

Study and understanding of the basis of life, in order to know the functioning of living beings at the molecular level, and its application in food science.

CONTENT

1. Theory contents

I. PROTEINS AND ENZYMES

1. Amino acids and peptides
2. Proteins
3. Enzymes

II. BIOENERGETICS AND INTEGRATION OF METABOLISM

4. Bioenergetics, membranes and transport
5. Intercellular communication
6. Introduction to metabolism and Krebs cycle
7. Respiratory chain and oxidative phosphorylation

III. CARBOHYDRATES, LIPIDS AND NITROGEN BIOMOLECULES METABOLISM

8. Carbohydrates and glucidic metabolism
9. Lipids and lipid metabolism
10. Metabolism of nitrogen biomolecules



www.uco.es
facebook.com/universidadcordoba
@univcordoba

INFORMATION REGARDING
UNIVERSITY OF CORDOBA DEGREES

uco.es/grados

COURSE DESCRIPTION

IV. MOLECULAR BIOLOGY

11. Structure of the genetic material
12. Chromosomal replication
13. Transcription
14. Genetic code and translation
15. Regulation of gene expression
16. Short overview of the research carried out by the teachers

2. Practical contents

CLASSROOM PRACTICES (CP)

CP I. AMINO ACIDS AND PEPTIDES. Problems and questions on the acid-base properties of amino acids. Determination of pI and electrophoretic mobility of amino acids and peptides.

CP II. ENZYMATIC KINETICS. Problems and questions on the bioenergetics of enzymatic catalysis. Lineweaver-Burk equation: K_m and V_{max} calculation. Effect of inhibitors on the kinetic parameters.

CP III. BIOENERGETICS AND ENERGETIC METABOLISM. Problems and questions on basic thermodynamic concepts, difference of potential between two redox pairs, relationship between ΔG , ΔE , K_{eq} , activated intermediaries and coupled reactions, Krebs cycle, respiratory chain and oxidative phosphorylation.

CP IV. TRANSPORT THROUGH MEMBRANES. Problems and questions on transport bioenergetics: Na^+/K^+ , ATPase, Ca^{2+} -ATPase and secondary active transport systems.

CP V. BIOMOLECULES METABOLISM. Problems and questions on carbohydrate, lipids and nitrogen biomolecules.

LABORATORY PRACTICES (LP)

LP1. Quantitative analysis of proteins by the Lowry method

LP2. Kinetic characterization of alkaline phosphatase

LP3. Quantitative analysis of glucose by the glucose oxidase method

LP4. Acid and enzymatic hydrolysis of glycogen

SUSTAINABLE DEVELOPMENT GOALS RELATED TO THE CONTENT

Good health and well-being

Responsible consumption and production

METHODOLOGY

General clarifications on the methodology (optional)

Lectures: 15 theory units will be taught in classroom to large group, stimulating the participation through questions and dialogue with students. Presentations will be used, and handouts will be available for students in the moodle platform.

Case study: classroom practices and comprehensive reading activities. In classroom practices, topics requiring biochemical calculations will be explained, in order to allow students to solve quantitative problems, and realistic questions on different metabolic situations. In comprehensive reading activities, students will do 2 readings on matters selected by teachers, who will provide the necessary material and specify the procedure to follow. Problem collections and scientific papers for readings will be available in moodle.

Lab practice: laboratory practices will introduce students in the most usual methodologies used in Biochemistry, getting them familiar with the experimental procedures with different biomolecules. Protocols of practices will be available in moodle.

Assessment activities: they are fully described in Evaluation.

COURSE DESCRIPTION

Methodological adaptations for part-time students and students with disabilities and special educational needs

Specific adaptations for part-time students will be taken into account.

Students with disabilities and special educative needs will be treated according to the indications received from the Faculty of Veterinary, providing more time for exams whenever necessary.

Face-to-face activities

Activity	Large group	Medium group	Total
<i>Assessment activities</i>	2.5	-	2.5
<i>Case study</i>	-	12.5	12.5
<i>Lab practice</i>	-	10	10
<i>Lectures</i>	35	-	35
Total hours:	37.5	22.5	60.0

Off-site activities

Activity	Total
<i>Activities</i>	21
<i>Reference search</i>	9
<i>Self-study</i>	60
Total hours	90

WORK MATERIALS FOR STUDENTS

Case studies - <https://moodle.uco.es/m2324/>

Exercises and activities - <https://moodle.uco.es/m2324/>

Oral presentations - <https://moodle.uco.es/m2324/>

References - <https://moodle.uco.es/m2324/>

Clarifications

All materials for the subject (presentations, book chapters, lists of problems, etc) will be available at the moodle platform of the University of Córdoba.

EVALUATION

COURSE DESCRIPTION

Intended learning	Document Analysis	Exams	Laboratory Practice	Problem solving
CB1		X		
CB2	X		X	X
CB3	X	X		
CB4		X		
CB5		X		
CE1	X	X		
CT1		X		
CT10	X	X		
CT11		X	X	X
CT12		X		
CT2	X	X		
CT4		X	X	X
CT7			X	X
CU2		X		
Total (100%)	11%	55%	16%	18%
Minimum grade	0	4.5	5	4.5

(*)Minimum mark (out of 10) needed for the assessment tool to be weighted in the course final mark. In any case, final mark must be 5,0 or higher to pass the course.

COURSE DESCRIPTION

Attendance will be assessed?:

No

General clarifications on instruments for evaluation:

Document analysis: the evaluation of the Case study part in Methodology includes classroom practices and comprehensive reading activities. Student achievement in classroom practices will be evaluated based on the interest and participation of the student during its realization and by answering some questions related to the practice which will be posed after the practice has been carried out (attendance will be compulsory). The mark in this section will represent 5% of the total of the subject. The comprehension of every reading will be evaluated in written and its mark will represent 6% of the total of the subject.

Exams: a final examination will be done at the date determined by the Faculty of Veterinary on the concepts and intended learning outcomes taught at lectures. It will represent 55% of the final mark of the subject.

Laboratory practice: each lab practice will be evaluated based on the interest and participation of the student during its realization, the obtained results delivered as a scientific memory and the answers to questions which will be posed after the practice has been carried out. The mark will represent 16% of the total of the subject.

Problem solving: capacity to solve quantitative problems requiring biochemical calculations and realistic questions on different metabolic situations will be evaluated in written and its mark will represent 18% of the total of the subject.

The subject is passed with a mark of 5. It is required to have at least 45% of the points from the exams, 45% of those from the problem solving evaluation, and 50% of the points from laboratory practice.

All marks obtained from each evaluation tool will be valid for the whole course, including the call of September. The mark of Laboratory practice will be indefinitely valid for subsequent courses.

Clarifications on the methodology for part-time students and students with disabilities and special educational needs:

Specific considerations for part time students and students with especial needs will be taken into account. The overall evaluation system will be the same as for the rest of students.

Clarifications on the evaluation of the extraordinary call and extra-ordinary call for completion studies:

All considerations explained in General clarifications concerning evaluation tools will be applied to the first and the end of study extraordinary calls, adding up the marks previously obtained from different activities and taking the corresponding valid periods for those activities into account.

Qualifying criteria for obtaining honors:

It will be reserved for students obtaining a mark equal or higher than 9.0 without being more than 5 % of the enrolled students. Honors will be given according to the obtained mark and to the continual evaluation from teachers along the course.

COURSE DESCRIPTION

BIBLIOGRAPHY

1. Basic Bibliography

Español:

Berg JM, Tymoczko JL, Gatto GJ & Stryer L (2013) Bioquímica (7ª Ed), Reverté.

Nelson DL & Cox MM (2018) Lehninger Principios de Bioquímica (7ª Ed), Omega.

Voet D, Voet JG & Pratt CW (2016) Fundamentos de Bioquímica: La vida a nivel molecular (4ª Ed), Panamericana.

English:

Berg JM, Tymoczko JL, Gatto GJ & Stryer L (2019) Biochemistry (9th Ed), MacMillan.

Nelson DL & Cox MM (2021) Lehninger Principles of Biochemistry (8th Ed), MacMillan.

Voet D, Voet JG & Pratt CW (2016) Fundamentals of Biochemistry: Life at the Molecular Level (5th Ed), Wiley.

2. Further reading

Devlin, TM (2019) Textbook of Biochemistry with Clinical Correlations (8th Ed), Wiley.

Garret RH & Grisham, CM (2017) Biochemistry (6th Ed), Cengage Learning.

COORDINATION CRITERIA

Tasks performance

SCHEDULE

Period	Assessment activities	Case study	Lab practice	Lectures
1# Week	0,0	0,0	0,0	2,0
2# Week	0,0	2,5	0,0	3,0
3# Week	0,0	0,0	2,5	2,0
4# Week	0,0	2,5	0,0	2,0
5# Week	0,0	0,0	2,5	3,0
6# Week	0,0	2,5	0,0	2,0
7# Week	2,5	0,0	0,0	3,0
8# Week	0,0	0,0	0,0	2,0
9# Week	0,0	0,0	2,5	2,0
10# Week	0,0	2,5	0,0	3,0
11# Week	0,0	0,0	2,5	2,0
12# Week	0,0	2,5	0,0	3,0
13# Week	0,0	0,0	0,0	2,0

COURSE DESCRIPTION

Period	Assessment activities	Case study	Lab practice	Lectures
14# Week	0,0	0,0	0,0	2,0
15# Week	0,0	0,0	0,0	2,0
Total hours:	2,5	12,5	10,0	35,0

The methodological strategies and the evaluation system contemplated in this Course Description will be adapted according to the needs presented by students with disabilities and special educational needs in the cases that are required.