



UNIVERSIDAD DE CORDOBA

FACULTAD DE CIENCIAS
GRADO DE BIOQUÍMICA
2024/25 YEAR
BIOQUÍMICA EXPERIMENTAL II



Course details

Course name: BIOQUÍMICA EXPERIMENTAL II**Code:** 101856**Degree/Master:** GRADO DE BIOQUÍMICA**Year:** 3**Field:** BIOQUÍMICA EXPERIMENTAL II**Character:** OBLIGATORIA**Duration:** SECOND TERM**ECTS Credits:** 6.0**Classroom hours:** 60**Face-to-face classroom percentage:** 40.0%**Study hours:** 90**Online platform:** <https://moodle.uco.es/>

Coordinating teacher

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Brief description of the contents

Principles and applications of Biochemistry and Molecular Biology techniques.

Main techniques for purification, manipulation and characterization of nucleic acids, subcellular fractionation and characterization of the fractions obtained and culture and transformation of microorganisms.

Learn to work safely and cleanly in a biochemical laboratory with biological material and chemical.

Prerequisites

Prerequisites established in the study plan

English level B1.

Recommendations

English level B2 is highly recommended.

To have previous practical experience in Biochemistry and Molecular Biology laboratories

Study programme

1. Theory contents

Module 1. Isolation and characterisation of nucleic acids. Techniques for those methodologies. Detection of nucleic acids.

Module 2. Basic techniques for manipulation and quantification of nucleic acids. Gene expression quantification: real-time PCR. Promotor activity determination by gene fusions. Non-traditional cloning methodologies. Mutant construction.

Module 3: Culture and transformation of cells.

Module 4: Subcellular fractioning. Charaterisation of subcellular fractions.

2. Practical contents

LP1. Isolation of RNA from eukaryotic cells. Retrotranscription.

LP2. Transcript level determination by real time PCR.

LP3. Gene deletion/ gene therapy in yeast by homolog recombination.

LP4. Mammalian transformation. Gene silencing (siRNA).

LP5. Gene therapy by CRISPR-Cas 9.

LP6. Organelle isolation from eukaryotic cells.

LP7. Characterisation of subcellular fractions by electrophoresis, metabolites analysis and enzymatic activities determination.

Bibliography

1. Basic Bibliography

Molecular Cloning: A Laboratory Manual (4th Edition) Michael R. Green; Joseph Sambrook Cold Spring Harbor Laboratory Press 978-1-936113-42-2 (2012).

Principles and Techniques of Biochemistry and Molecular Biology. 2010. Edited by Keith Wilson & John Walker. ISBN: 978-0-521-51635-6.

Protocolos Cold Spring Harbor: <http://cshprotocols.cshlp.org/>

2. Further reading

Specific bibliografy will be recommended for each module.

Methodology

General clarifications on the methodology (optional)

None

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

Partial-time student needs will be analysed individually.

Methodologies and evaluation parameters will be adapted to students with special needs.

Face-to-face activities

Activity	Large group	Medium group	Total
<i>Assessment activities</i>	3	3	6
<i>Practical experimentation activities</i>	-	42	42
<i>Projects based on the course contents</i>	12	-	12
Total hours:	15	45	60

Off-site activities

Activity	Total
<i>Exercise and problem solving activities</i>	35
<i>Information processing activities</i>	35
<i>Information search activities</i>	20
Total hours	90

Results of the training and learning process**Knowledge, competencies and skills**

- CB2 Knowing how to work collaboratively in a team and share responsibilities
- CB4 Being able to learn and work independently
- CB5 Knowing how to apply the principles of scientific approaches
- CB7 To know how to use basic ICT tools for communication, research and data processing in a professional context.
- CB8 To know how to read scientific texts in English.
- CE17 To understand the main methods of testing the biological activity of cell components, especially of enzymes, both in vitro and in vivo.
- CE20 To aid students' understanding of the manipulation of nucleic acids, as well as the principle techniques which facilitate the study of the functioning of genes.
- CE21 To possess the quantitative skills required to work in a biochemical laboratory, including the ability to prepare chemical reactants for experiments in a precise and reproducible manner.
- CE22 To understand how to work in a biochemical laboratory with biological and chemical material, including regarding safety, the handling of material, the disposal of biological and chemical waste and recording the activities carried out.

- CE23 To know how to apply experimental laboratory protocols within the field of Biochemistry and Molecular Biology.
- CE24 To possess skills in mathematics, statistics and ICT in order to obtain, analyze and interpret data and in order to understand simple models of biological systems and processes on the cellular and molecular level.
- CE27 To understand the basic principles of experiment design in the field of Biochemistry and Molecular Biology, taking into consideration the limitations of experimental approaches.

Assessment methods and instruments

Intended learning outcomes	Examination	Means of practical execution	Students assignments
CB2	X	X	X
CB4		X	X
CB5	X	X	X
CB7		X	X
CB8	X	X	X
CE17	X	X	
CE20	X	X	X
CE21		X	
CE22		X	
CE23		X	X
CE24		X	X
CE27		X	
Total (100%)	50%	25%	25%
Minimum grade (*)	4	4	4

(*)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.

General clarifications on instruments for evaluation:

There will be a continuous evaluation during the practical sessions that will cover 50% of the final qualification, that will be divided in 25% for means of practical execution and 25% for students assignments for each practical sessions. The remaining 50 % will be evaluated by a final exam that will cover both theoretical and practical issues.

Assistance is mandatory for all practical sessions. Assistance to theoretical sessions will be considered positively in the continuous evaluation.

Teachers may decide to examine certain students exclusively orally and even take a second oral exam to confirm the results of the written exams, when well-founded suspicions of fraud.

Repeater students will be evaluated using the same parameters as new ones. Continuous marks will be maintained during all the course.

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

Partial-time student needs will be analysed individually.

Methodologies and evaluation parameters will be adapted to students with special needs.

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

In the extraordinary call, the partial qualifications of the continuous evaluation instruments of the previous course (means for practical execution and students assignments) are maintained. In the extraordinary call for completion of studies, the marks obtained by the student in the continuous assessment tests that appear specifically in the teaching guide of the previous academic year will be kept.

Qualifying criteria for obtaining honors:

According to the UCO Regulation

Sustainable development goals

Unrelated

Other Faculty

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The methodological strategies and the evaluation system contemplated in this Teaching Guide will respond to the principles of equality and non-discrimination and must be adapted according to the needs presented by students with disabilities and special educational needs in the cases that are required. Students must be informed of the risks and measures that affect them, especially those that may have serious or very serious consequences (article 6 of the Safety, Health and Welfare Policy; BOUCO 23-02-23).
