COURSE DATA

Data Subject	
Code	43095
Name	Methods of laboratory work in physiology
Cycle	Master's degree
ECTS Credits	6.0
Academic year	2024 - 2025

Study (s)

Degree	Center	Acad. year	Period
2141 - Master's Degree in Physiology	Faculty of Medicine and Odontology	1	Second term

Subject-matter

Degree	Subject-matter	Character
2141 - Master's Degree in Physiology	1 - Methodology for research in physiology	Obligatory

Coordination

Name	Department
CARRETERO ASUNCION, JULIAN	190 - Physiology

SUMMARY

This course has been designed to know and work on the experimental bases on which current research is based in Physiology laboratories. That is why it is eminently practical in nature and focuses on the most common cellular and molecular biology techniques and methodologies used in biomedical research laboratories.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

It is recommended to have taken the subjects of Biology, Biochemistry, Physiology and Chemistry.

COMPETENCES (RD 1393/2007) // LEARNING OUTCOMES (RD 822/2021)

2141 - Master's Degree in Physiology

- Students should apply acquired knowledge to solve problems in unfamiliar contexts within their field of study, including multidisciplinary scenarios.
- Students should be able to integrate knowledge and address the complexity of making informed judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities associated with the application of their knowledge and judgments.
- Students should communicate conclusions and underlying knowledge clearly and unambiguously to both specialized and non-specialized audiences.
- Students should demonstrate self-directed learning skills for continued academic growth.
- Students should possess and understand foundational knowledge that enables original thinking and research in the field.
- Be able to integrate new technologies in their professional and/or research work.
- Be able to access to information tools in other areas of knowledge and use them properly.
- To acquire a critical attitude that allows you to make reasoned judgments and defend them with rigor and tolerance.
- Assess the need to complete the scientific training, in languages, computer science, ethics, etc., attending conferences or courses and/or carrying out complementary activities, self-evaluating the contribution that the performance of these activities implies for their comprehensive training.
- To manage the use of laboratory techniques taking into account the basic principles of quality control, risk prevention, safety and sustainability.
- Select the appropriate commercialized instrumentation for the study to be carried out and apply the knowledge to use it correctly.

LEARNING OUTCOMES (RD 1393/2007) // NO CONTENT (RD 822/2021)

To use scientific instruments and know and apply good laboratory practices.

To apply the scientific method in solving experimental work.

To work with information sources, both traditional and through new Internet technologies.

To synthesize and communicate scientific information.

To acquire sufficient knowledge to allow the student, in her future research work in the field of Physiology, to carry out an adequate treatment of experimental data, both with the limitation of errors associated with direct and indirect measurements.

DESCRIPTION OF CONTENTS

1. Recombinant DNA technology

-Introduction to the basic techniques of molecular biology.
-Transformation of E. coli bacteria with recombinant DNA.
-Cultivation of bacteria transformed into solid and liquid media.
-Methods of purification and analysis of plasmid DNA.

2. Basic techniques of animal and human cell culture

-Introduction to the basic techniques of cell biology.
-In vitro animal cell culture.
-In vitro animal cell transfection methods.
-Vital tests using fluorescence microscopy.

3.

WORKLOAD

ACTIVITY	Hours	% To be attended
Laboratory practices	32,00	100
Tutorials	4,00	100
Theory classes	4,00	100
Other activities	2,00	100
Development of individual work	24,00	0
Study and independent work	22,00	0
Readings supplementary material	10,00	0
Preparation of evaluation activities	22,00	0
Preparing lectures	5,00	0
Preparation of practical classes and problem	5,00	0
Resolution of case studies	20,00	0
TOTAL	**150,00**	

TEACHING METHODOLOGY

- Theoretical classes of participatory master class.

- Practical laboratory classes. They include introductory seminars, carrying out the practices with the follow-up and support of the teacher and carrying out a memory or a written test about them.

- Debate and directed discussion on the practices carried out.

- Face-to-face and electronic tutoring with teachers

EVALUATION

Evaluation system:

- Written exam consisting of 20-25 multiple choice questions: evaluation up to10 points.

Attendance at 80% of the practices is compulsory.

Minimum passing grade: 5 points.

REFERENCES

Basic

- AUSUBEL FM et al. (eds.). Current Protocols in Molecular Biology. Vols 1 a 4. Greene & John Wiley. 2005.
- FRESHNEY RI. Culture of Animal Cells: A Manual of Basic Technique and Specialized Applications. 8ª edición. John Wiley & Sons. 2021.
- SAMBROOK J, RUSSELL D. Molecular Cloning. A Laboratory Manual. 4ª edición, Vols 13. CSH Laboratory Press. 2012.
- Subashini R., Libro de texto de ingeniería genética: Bioquímica. Ediciones Nuestro conocimiento. 2023

Additional

- ALBERTS et al. Biología Molecular de la Célula, 7ª edición, Ediciones Omega. 2022.
- IZQUIERDO-ROJO M. Ingeniería genética y transferencia genética. 2ª edición. Editorial Pirámide. 2001.

- WATSON JD, et al. ADN recombinante: Introducción a la Ingeniería Genética. Ed. Labor. 1988.