COURSE DATA

DATA SUBJECT

Code: 43095
Name: Methods of laboratory work in physiology
Cycle: Master's Degree / Doctorate
ECTS Credits: 6
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
2141 - Master's Degree in Physiology	Facultat de Medicina i Odontologia	1	Second quarter

SUBJECT-MATTER

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

COORDINATION

CARRETERO ASUNCION JULIAN

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 / LEARNING OUTCOMES

2141 - Master's Degree in Physiology

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.

Be able to access to information tools in other areas of knowledge and use them properly.

Be able to integrate new technologies in their professional and/or research work.

Select the appropriate commercialized instrumentation for the study to be carried out and apply the knowledge to use it correctly.

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.

To acquire a critical attitude that allows you to make reasoned judgments and defend them with rigor and tolerance.

To manage the use of laboratory techniques taking into account the basic principles of quality control, risk prevention, safety and sustainability.

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

PRESENCIAL ACTIVITIES

Activity	Hours
Tutorials	4,00
Theory	4,00
Laboratory	32,00
Total hours	**40,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	2,00
Individual or group project	24,00
Independent study and work	32,00
Preparation of lessons	10,00
Preparation for assessment activities	22,00
Resolution of case studies	20,00
Total hours	**110,00**

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

- 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.
- 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.
- Subashini R., Libro de texto de ingeniería genética: Bioquímica. Ediciones Nuestro conocimiento. 2023