COURSE DATA

DATA SUBJECT

Code: 44700
Name: Current Issues in biomedical research
Cycle: Master's Degree
ECTS Credits: 6
Academic year: 2026-27

STUDY (S)

Degree	Center	Acad. year	Period
2224 - Master's Degree in Research and Development in Biotechnology and Biomedicin	Facultat de Ciències Biològiques	1	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
2224 - Master's Degree in Research and Development in Biotechnology and Biomedicin	Research and development in biomedicine	COMPULSORY

COORDINATION

GIL HERRERO M LUISA

PIQUERAS RUIZ LAURA

SUMMARY

This subject is integrated, along with the subjects of "Case Studies in biomedicine and biotechnology" and "Biomedicine and society" in the module denominated "R & D in biomedicine". In this course the current challenges of biomedical research will be discussed. We currently have no effective and definitive treatment for many diseases of high incidence in the population, such as cancer and many neurodegenerative, cardiovascular, psychiatric, metabolic or autoimmune disease treatments as well as for most rare diseases. The development of new treatments for such diseases and their translation to the clinic is a lengthy process that requires understanding the pathophysiological mechanisms, identification of therapeutic targets, the development of active compounds with biological activity related to these targets and the development and optimization of the drug use in various preclinical phases. Due to the complexity of biological processes molecular targets need to be validated in in vitro and in vivo models to demonstrate that they are indeed involved in the onset and /or progression of a disease. For this purpose, experimental models of disease in different organisms are required to assess the validity of therapies in preclinical and proof of concept studies. In this subject, experimental approaches used in biomedical research to solve human health problems will be presented, steps from basic research to clinical trials and other issues related to the transfer of basic research to the patient and its return will be discussed ("bench to bedside" and "bedside to bench" concepts). Teaching will include seminars given by specialists, who will explain the biomedical problem from their research and professional experience, and discussion sessions on the specific topics. Students will move to the centers of basic and clinical research where such

specialists carry out their task for the sessions.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

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

OTHER REQUIREMENTS

COMPETENCES / LEARNING OUTCOMES

2224 - Master's Degree in Research and Development in Biotechnology and Biomedicin

Access the necessary information within the specific subject area (databases, scientific articles, etc.) and have sufficient judgement to interpret and apply it.

Adquirir destrezas en el manejo de las metodologías avanzadas empleadas en las biociencias moleculares y en el registro anotado de actividades.

Apply critical reasoning and argumentation based on rational criteria.

Apply ethical and legal principles of scientific research in biotechnology and biomedicine.

Apply research experience acquired both in private companies and public organisations.

Apply science from a social and economic perspective, promoting the transfer of knowledge to society.

Apply the knowledge acquired to identify career opportunities and sources of employment.

Aprendizaje en la redacción de artículos científicos en los campos de la Biomedicina y la Biotecnología.

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

Conocer las aplicaciones de los nuevos conocimientos emergentes en el diagnóstico, prevención y tratamiento de las enfermedades humanas.

Consider entrepreneurship as a professional alternative.

Critically analyse one's own work and that of colleagues.

Deepen understanding of the role of biotechnology and biomedicine professionals within the scientific and social context and their contribution to the economic model.

Demonstrate motivation for quality and continuous improvement, acting with rigour, responsibility and professional ethics.

Demonstrate respect for fundamental rights and equality between men and women.

Design multidisciplinary experimental strategies in the field of molecular biosciences to solve complex

biological problems, especially those related to human health.

Develop scientific results obtained by oneself or other scientists into practical applications with social and/or economic profitability.

Gain personal skills that facilitate professional integration and development.

Handle scientific information sources appropriately and assess them critically, integrating the information to contribute knowledge to multidisciplinary research teams.

Know and apply risk assessment criteria in biotechnology and biomedicine.

Know and use job search techniques and tools.

Know how to apply acquired knowledge and problem-solving skills in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study.

Know how to communicate your conclusions (and the underlying knowledge and reasons) to both specialist and non-specialist audiences in a clear and unambiguous way.

Make proper use of IT tools, statistical and data simulation methods, applying IT tools and statistics to biomedical and biotechnological problems.

Make rapid and effective decisions in complex situations within one's professional or research activity by developing new and innovative working methodologies adapted to the scientific/research, technological or professional field in which the activity takes place.

Master the scientific method, the design of experimental protocols and the interpretation of results in the biomedical and biotechnological fields.

Mejorar la capacidad de trabajar con seres vivos o muestras biológicas.

Possess the learning skills that will allow them to continue studying in a way that will be largely self-directed or autonomous.

Prepare, write and present reports and projects in public in a clear and coherent manner, defend them with rigour and tolerance and respond satisfactorily to any criticism that may arise from the presentation.

Project the knowledge, skills and competencies acquired to promote a society based on the values of freedom, justice, equality and pluralism.

Select and manage available resources (instrumental and human) to optimise research outcomes.

Students should possess and understand foundational knowledge that enables original thinking and research in the field.

To be able to integrate knowledge and face the complexity of formulating judgments from information that, being incomplete or limited, includes reflections on the social and ethical responsibilities linked to the application of their knowledge and judgments.

Understand the key elements of communication and public perception of biotechnological and biomedical innovations and the risks associated with them.

Use inclusive and non-discriminatory language in all the above-mentioned areas of communication.

Work in a team, without discriminating between men and women, carry out professional or research work efficiently and acquire the ability to participate in research projects and scientific or technological collaborations.

DESCRIPTION OF CONTENTS

1. Current challenges of biomedical research.

Translational research on prevalent diseases as well as in rare diseases. Some topics that may be covered in this part of the course include: aging and related diseases, diseases related to metabolism, orphan diseases and rare diseases, cancer and biomedical research, translational oncology, advanced therapies, regenerative medicine and tissue engineering, research in neurology, challenges in immunology and hematology, severe infections, pre-obesity and cardiometabolic risk, cardiovascular disease, biomarkers, free radicals and inflammation, reproductive biology, among others.

2. Experimental approaches in biomedical sciences.

In this part of the subject different methodological and conceptual tools of transversal nature, which contribute to the advancement of biomedical research, will be considered. Some topics that may be covered in this part of the course include: analytical and separative flow cytometry, medical imaging, pharmacogenomics and personalized medicine, studies in model organisms applied to biomedicine and biotechnology, biomedical database management data, genetic diagnostics, nanomedicine.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	60,00
Total hours	**60,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	20,00
Independent study and work	60,00
Preparation of lessons	0,00
Preparation for assessment activities	0,00
Resolution of case studies	20,00
Total hours	**100,00**

TEACHING METHODOLOGY

Lectures (27 h): Aimed at obtaining basic knowledge. The dogmatic and heuristic methods for the presentation of the fundamental concepts and the relevant contents of the subject with audiovisual support will be used.
Seminars (23 h): Taught by specialists who develop their activity in different hospital research centers. They will present strategies for the resolution of specific problems in the development of professional and research activity in different fields of biomedicine.
Case method (10 h): Different cases / problems will be proposed to be solved by the students and discussed in classroom sessions under the supervision of specialists.
Individual work (40 h). It will consist in the elaboration of a written work developing basic questions related to some of the cases raised in the seminars.

EVALUATION

The evaluation will be carried out taking into account the following aspects:

- The formative assessment throughout the course: based on the resolution of problems and activities (80%).
- Preparation of a report (20%).

To pass the course will require assistance to 80% of the sessions and obtaining a score greater than or equal to 50%.

REFERENCES

- PubMed database. U.S. National Libary of Medicine and the National Institutes of Health http: //www.pubmed.com
- Cochrane Library. Biblioteca Cochrane Plus http://www.cochrane.org
- EMEA. Agencia europea del Medicamento http://www.emea.eu.int/
- Agencia Española del Medicamento http://www.agemed.es
- OMS. Organización Mundial de la Salud http://www.who.int/en/
- ONT. Organización Nacional de Transplantes http://www.ont.es/Paginas/Home.aspx