COURSE DATA

DATA SUBJECT

Code: 44698
Name: Innovation in biotechnology: Economy and markets
Cycle: Master's Degree
ECTS Credits: 4
Academic year: 2025-26

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	Bioeconomy	COMPULSORY

COORDINATION

SEMPERE MONERRIS JOSE JORGE

SUMMARY

The course presented corresponds to one of the two subjects within the block dedicated to Bioeconomy and is the theoretical complement to the other subject also included in the same block called "Case Studies in Biotechnology Companies". The course will provide students with the necessary tools to understand the functioning of technology-based companies, particularly those focused on activities related to biotechnology and biomedicine. This involves conveying to students the importance of innovation in the competitive environment of these types of companies. It will also convey how competition in innovation is one of the drivers of human and economic development and, consequently, is subject to regulation by public authorities in both its economic, legal, and ethical aspects. Upon completion of the master's degree, students should be able to gain an advantage over other researchers in recognizing difficulties and finding solutions to convert their scientific discoveries into process and product innovations that can be successfully commercialized. This course will include a cross-curricular seminar/workshop on employability to strengthen the professional integration of its graduates.

The course objectives are to help students understand the determining factors for the analysis of imperfect markets where firms have market power, and in particular, how strategic behavior explains many aspects of their functioning. A fundamental objective is for students to be able to master fundamental concepts for understanding the innovation process and internalize its relevance within sectors related to biotechnology and biomedicine. To achieve these objectives, the course proposes extensive use of analytical techniques

derived from mathematics, namely calculus, mathematical analysis, and game theory. Based on the aforementioned, this course constitutes a basic element for a better understanding of:

- business activity in most productive sectors of the economy, especially those related to biotechnology;

- the functioning of markets, i.e., the interaction of firms, consumers, and institutions.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

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

OTHER REQUIREMENTS

No restrictions

COMPETENCES / LEARNING OUTCOMES

-

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

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.

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 a market prospective study for a biotechnological product.

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.

Have an integrated vision of the R&D&I process, from the discovery of new fundamental knowledge to the development of concrete applications and the introduction of new biotechnological products to the market.

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.

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.

Search for and obtain information from major patent databases and prepare the application report for a biotechnological product patent.

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

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.

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. INTRODUCTION: THE BASICS IN ECONOMICS

1.1. Introduction.
1.2. Economic agents.
1.3. Supply and demand.
1.3. Markets.
1.4. Strategies.
1.5. Efficiency.

2. BUSINESS DECISIONS

2.1. Benefits and costs.
2.2. Decisions: marginal analysis.
2.3. Decisions in a strategic context.
2.4. The three fundamental strategies.

3. INNOVATION

3.1. Innovation and growth.
3.2. Incentives to innovate.
3.3. Competition and cooperation in R & D.
3.4. The technology market: patents and licenses.

4. SPECIFIC ASPECTS OF BIO-INDUSTRY FIRMS

4.1. Markets related to the biotechnology industry: Spain-EU-NAFTA and emerging countries.
4.2. The firm in the biotechnology industry.
4.3. The value chain of the biotechnology firm.
4.4. Public policy, regulation and ethical challenges for the biotechnology firm.
4.5. How to create a biotech firm?

5. INNOVATION IN BIOTECHNOLOGY

5.1. Stylized facts in biotechnology innovation processes.
5.2. Financing innovation in biotechnology firms.
5.3. Product development and diffusion of innovation.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	40,00
Total hours	**40,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	0,00
Independent study and work	20,00
Preparation of lessons	0,00
Preparation for assessment activities	40,00
Resolution of case studies	0,00
Total hours	**60,00**

TEACHING METHODOLOGY

The development of the subject revolves around two points:Both theoretical and practical classes where the teache
complex instruments for the use of the course . Attendance is essential because it ensures the correct transmissio
knowledge and guides the students for their personal work .The study and individual preparation of lessons and att

EVALUATION

Passing the subject requires obtaining at least half the score in each of the following items.

- A written examination lasting no more than two hours, corresponding to 80 % of the final grade.

- The remaining 20 % will be allocated according to the assistance and active participation in the classroom and public exposure of a project in which they detail and explain the most relevant aspects of the most important biotechnology companies.

REFERENCES

- Froeb, L. M., McCann, B. T., Ward, M. R., & Shor, M. (2023). Managerial Economics: A Problem-Solving Approach (6th ed.). Cengage Learning.USA.
- Scotchmer, S. (2004), Innovation and Incentives. The MIT Press. USA.
- Hine, D. and J. Kapeleris (2006), Innovation and Entrepreneurship in Biotechnology, An

International Perspective: Concepts, Theories and Cases. Edward Elgar, USA.

- Bonvillian, William B. (2024) Pioneering Progress: American Science, Technology and Innovation Policy. The MIT Press. USA.