

**COURSE DATA****Data Subject**

<b>Code</b>	44699
<b>Name</b>	Case studies in biotechnology companies
<b>Cycle</b>	Master's degree
<b>ECTS Credits</b>	4.0
<b>Academic year</b>	2023 - 2024

**Study (s)**

<b>Degree</b>	<b>Center</b>	<b>Acad. year</b>	<b>Period</b>
2224 - Master's Degree in Research and Development in Biotechnology and Biomedicin	Faculty of Biological Sciences	1	First term

**Subject-matter**

<b>Degree</b>	<b>Subject-matter</b>	<b>Character</b>
2224 - Master's Degree in Research and Development in Biotechnology and Biomedicin	2 - Bioeconomy	Obligatory

**Coordination**

<b>Name</b>	<b>Department</b>
FARIÑAS GOMEZ, MARIA ISABEL	357 - Cellular Biology, Functional Biology and Physical Anthropol.

**SUMMARY**

The course presented corresponds to one of the two subjects within the block dedicated to the bio-economy and involves the practice complement other stuff also included in the same block called "Innovation in biotechnology: economy and markets." The subject in this course aims to familiarize students with real situations that are experienced in biotech companies to develop products and bring them to market. Such situations involve not only solve technical problems. In many cases, success or failure depends on knowing marketing advantage or not gaps in legislation, or to launch attractive messages to the consumer. Legal and commercial frameworks vary between different regions of the world and this is another fact to consider.

Through case studies model it is to provoke the student tried dealing with situations that correspond to real problems suffered by some professional sector. After presenting the case team discussions obliging



develop imaginative ideas to solve the problem they will be made. After completing these discussions the teacher discussed as the problem was solved in the real case and alternatives will be compared.

This course aims to provoke students and submit them to situations similar to business decision taken daily in biotech companies. The main objective is that students be able to understand that biotechnology is not only research in the laboratory, is to do later put a product on the market. It is intended to understand that biotechnology is science and what surrounds the business (legislation and marketing).

By the above, this course is a basic element for a better understanding of business activity in the biotechnology sector. Also it will be to understand the functioning of markets and the interactions between businesses, consumers and institutions.

General cases (items 1 to 4), specific cases (items 5 to 9) and transverse cases (issues 10 to 12), which are detailed below: To meet these objectives a number of cases divided into three blocks are contemplated.

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

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

- 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.
- Critically analyse one's own work and that of colleagues.
- Select and manage available resources (instrumental and human) to optimise research outcomes.
- 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.



- 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 science from a social and economic perspective, promoting the transfer of knowledge to society.
- 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.
- 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.
- Develop scientific results obtained by oneself or other scientists into practical applications with social and/or economic profitability.
- Apply the knowledge acquired to identify career opportunities and sources of employment.
- Gain personal skills that facilitate professional integration and development.
- Know and use job search techniques and tools.
- Consider entrepreneurship as a professional alternative.
- 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.
- Project the knowledge, skills and competencies acquired to promote a society based on the values of freedom, justice, equality and pluralism.
- Handle scientific information sources appropriately and assess them critically, integrating the information to contribute knowledge to multidisciplinary research teams.
- Make proper use of IT tools, statistical and data simulation methods, applying IT tools and statistics to biomedical and biotechnological problems.
- Master the scientific method, the design of experimental protocols and the interpretation of results in the biomedical and biotechnological fields.
- Apply research experience acquired both in private companies and public organisations.
- Design multidisciplinary experimental strategies in the field of molecular biosciences to solve complex biological problems, especially those related to human health.
- Apply ethical and legal principles of scientific research in biotechnology and biomedicine.
- Deepen understanding of the role of biotechnology and biomedicine professionals within the scientific and social context and their contribution to the economic model.
- Design and carry out a complete protocol for the production and purification of a biotechnological product.



- 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.
- Search for and obtain information from major patent databases and prepare the application report for a biotechnological product patent.
- Know and apply risk assessment criteria in biotechnology and biomedicine.
- Understand the key elements of communication and public perception of biotechnological and biomedical innovations and the risks associated with them.
- Design a market prospective study for a biotechnological product.
- Use inclusive and non-discriminatory language in all the above-mentioned areas of communication.

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

After completing the course students must have an overall view of the various industrial applications of biotechnology and how to combine the most appropriate form the scientific basis for the creation of a biotechnology company with the legal and commercial reality.

After completing the course should have a strategic vision of biotechnological industries, realizing that to develop one as important is to apply the scientific knowledge of prestige as knowing fit the product to generate the appropriate legal and social framework.

## **DESCRIPTION OF CONTENTS**

### **1. How to transfer research in biotechnology and biomedicine.**

The problem of transfer of biotechnological results will arise as it speeds up in different countries. Comparison of the Dutch and the Nordic transfer models with the Spanish model in order to define the strengths and weaknesses of each of them.

### **2. How to create a biotechnology company.**

With their respective CEOs, creating two different biotech companies filed in the Science Park of the University of Valencia it will be analyzed. the different strategies followed in each of the two cases and assess whether they are replicable or not scanned.

### **3. Biotechnology in EU and Asia.**

A comparative analysis will be conducted between the evolution of the biotechnology business in Asia, with particular attention to China and Japan, and the European Union. For it will start from the 80s and the current situation will be analyzed to determine the levels of progress and / or withdrawal of biotech businesses. Finally an exercise of common survey will take place in the classroom to try to understand where and how they could grow in the coming years biotech businesses in the two geographical areas



under study.

#### **4. The biotechnology market in the US and LATAM.**

It will be held a similar item 3 study but considering these other geographical regions.

#### **5. The market for biotech drugs design**

The cases of two of the first biotech products reached pharmacies will be studied. Subsequently, the current use of biotechnology in the pharmaceutical world and its most interesting results will be discussed. special attention to the problem of biosimilars will be provided.

#### **6. The problem of GMOs in food.**

The social debate on the marketing of GM foods and crops will be analyzed. Greenpeace / Monsanto dilemma, the French case and the attitude of the large food companies in the production and distribution: special attention to be paid three cases. They will be analyzed separately the risks of these products in food security and environmental impact and the risk / benefit in terms of the impact on the economic model.

#### **7. Systems biology: the future of biotechnology.**

Through scientific expert opinion on these issues the role of systems biology in the development of future companies and biotechnology products will be studied. two biotechnology companies created around the use of systems biology will be studied.

#### **8. Biotechnology improvement of flavors.**

The various markets of flavors and the possibilities for improvement from biotechnology (in vitro production of aromatic plants, production of aromas by fermentation, construction of transgenic microorganisms that produce flavor) will be analyzed. the positioning of different companies that produce fragrances for biotechnology study.

#### **9. Biotechnological revaluation of waste.**

Following examples of biotechnology companies created around these issues, the market revaluation of waste will be analyzed from biotechnology. company models created to isolate compounds from the residue value against companies that produce other compounds of growing microorganisms value on the residue compared. special attention to the case of ethanol and biodegradable plastics with examples of companies working on these issues will be provided.



**10. Social perception of biotechnology.**

The social perception of the different branches of biotechnology (red, white, green and blue) will be compared as well as that perception varies in different continents. Special attention to European case will be paid and how it affects the development of a biotech business sector. Finally, the discussion will focus on the situation in our country.

**11. Legislation in biotechnology: key or padlock?**

A comparative review between European law and US will be made and will be studied as based on those differences have accelerated business or spoiled. As a case study the legal framework for the marketing of functional ingredients in USA, LATAM and the EU will be discussed.

**12. Intellectual property: past, present and future.**

Using the case of probiotics different strategies for intellectual property protection of biotechnological development in the EU and USA will be analyzed. the conflict in USA on the legal protection of the natural and the artificial and the status of biotechnology patents in Argentina: two cases of interest are discussed. Finally the classical model of patent against the black box model will be discussed.

**WORKLOAD**

ACTIVITY	Hours	% To be attended
Theory classes	40,00	100
Development of group work	40,00	0
Study and independent work	40,00	0
Resolution of case studies	40,00	0
<b>TOTAL</b>	<b>160,00</b>	

**TEACHING METHODOLOGY**

The course will have a theoretical part and an applied part. In the theoretical part, eight four-hour sessions will be held. The first of them will be introductory and will describe the current reality of the biotechnological business sector in our country, in the EU and in the rest of the world. After this introductory session there will be six sessions given by biotech professionals who will narrate their experiences developing biotech companies. There will be an eighth session dedicated solely to the subject of intellectual property and industrial secrets.

The applied part involves the defense by the students of a project to create a biotechnological company. To do this, on the first day of class the total number of students will be divided into four groups and the person in charge of the subject will assign the business model to be created to each group. During the following weeks, the students will interact with the responsible professor to outline the business project. On the last day of class, after the previous eight sessions, students must defend their business project in front of the assistant professor and the rest of their classmates and answer all doubts and questions.



## EVALUATION

Passing the course requires obtaining at least half of the score in a written exam lasting no more than two hours and corresponding to 75% of the final grade. This exam will consist of a multiple choice part and three questions to develop with limited space (40/60% of the grade for this section, respectively). The remaining 25% of the final grade will be assigned based primarily on the preparation of practical work as well as attendance at both classes and participation in discussions.

## REFERENCES

### Basic

- Para el desarrollo de cada tema se suministrará material de apoyo al alumno que describirá el caso incluyendo información sobre cada una de las compañías analizadas.

Como bibliografía general se recomiendan los siguientes libros.

B. Werth. (2014). The billion dollar molecule: one company's quest for the perfect drug. Simon & Schuster Paperback. Nueva York.

R. Ono. (2016). Business of biotechnology: from the bench to the street. Elsevier.