

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

|                      |                                                  |
|----------------------|--------------------------------------------------|
| <b>Code</b>          | 44698                                            |
| <b>Name</b>          | Innovation in biotechnology: Economy and markets |
| <b>Cycle</b>         | Master's degree                                  |
| <b>ECTS Credits</b>  | 4.0                                              |
| <b>Academic year</b> | 2022 - 2023                                      |

**Study (s)**

| <b>Degree</b>                                                       | <b>Center</b>                  | <b>Acad. year</b> | <b>Period</b> |
|---------------------------------------------------------------------|--------------------------------|-------------------|---------------|
| 2224 - M.U. Investigación y Desarrollo en Biotecnología Biomedicina | Faculty of Biological Sciences | 1                 | First term    |

**Subject-matter**

| <b>Degree</b>                                                       | <b>Subject-matter</b> | <b>Character</b> |
|---------------------------------------------------------------------|-----------------------|------------------|
| 2224 - M.U. Investigación y Desarrollo en Biotecnología Biomedicina | 2 - Bioeconomy        | Obligatory       |

**Coordination**

| <b>Name</b>                  | <b>Department</b>      |
|------------------------------|------------------------|
| SEMPERE MONERRIS, JOSE JORGE | 10 - Economic Analysis |

**SUMMARY**

The course presented corresponds to one of the two subjects within the block dedicated to the bio-economy and represents

the theoretical complement other stuff also included in it called "Case Studies in biotech companies" block.

The subject will provide students with the necessary tools to understand the operation of technology-based companies;

in particular, companies that focus on activities related to biotechnology and biomedicine.

This implies convey to students the importance of innovation in the competitive environment of these businesses.



Also convey how competition in innovation is one of the engines of human and economic development and, therefore,

is a matter of regulation by public authorities both in its economic aspect as legal and ethical. On finishing the master,

students must be able to take advantage over other researchers to recognize the difficulties and find solutions to convert

their scientific discoveries into innovations of process and product that can be marketed successfully. a seminar/workshop

transversal character on employability be included in this area, to strengthen the employability of their graduates.

The course objectives are to provide students with an understanding of the determinants for the analysis of imperfect

markets where companies have market power, and in particular how strategic behavior explains many aspects of the

functioning of the same factors. It will be essential objective that students be able to handle fundamental concepts for

the understanding of the innovation process and internalize its relevance within lossectores related to biotechnology and

biomedicine. To achieve these objectives the subject raises extensive use of analytical techniques from mathematics,

ie calculus, mathematical analysis and game theory. By the above, this course is a basic element for better understanding:• business activity in most productive sectors of the economy and especially those related to biotechnology,• the functioning of markets, ie interaction of businesses, consumers and institutions.

(This is a translation from the Spanish version, that version is the only valid one)

## 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



## OUTCOMES

### 2224 - M.U. Investigación y Desarrollo en Biotecnología Biomedicina

- 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.
- Ser capaces de analizar de forma crítica tanto su trabajo como el de su compañeros.
- Capacidad de seleccionar y gestionar los recursos disponibles (instrumentales y humanos) para optimizar resultados en investigación.
- Ser capaces de realizar una toma rápida y eficaz de decisiones en situaciones complejas de su labor profesional o investigadora, mediante el desarrollo de nuevas e innovadoras metodologías de trabajo adaptadas al ámbito científico/investigador, tecnológico o profesional en el que se desarrolle su actividad.
- Ser capaces de acceder a la información necesaria en el ámbito específico de la materia (bases de datos, artículos científicos, etc.) y tener suficiente criterio para su interpretación y empleo.
- Aplicar el razonamiento crítico y la argumentación desde criterios racionales.
- Aplicar la Ciencia desde la óptica social y económica, potenciando la transferencia del conocimiento a la Sociedad.
- Capacidad para preparar, redactar y exponer en público informes y proyectos de forma clara y coherente, defenderlos con rigor y tolerancia y responder satisfactoriamente a las críticas que pudieran derivarse de su exposición.
- Ser capaces de trabajar en equipo, sin discriminación entre hombres y mujeres, con eficiencia en su labor profesional o investigadora adquiriendo la capacidad de participar en proyectos de investigación y colaboraciones científicas o tecnológicas.
- Capacidad para desarrollar los resultados científicos obtenidos por uno mismo o por otros científicos a las aplicaciones prácticas de rentabilidad social y/o económica.
- Ser capaz de aplicar los conocimientos adquiridos en la identificación de salidas profesionales y yacimientos de empleo.
- Adquirir las habilidades personales que faciliten la inserción y desarrollo profesional.



- Considerar el emprendimiento como alternativa profesional.
- Motivación por la calidad y la mejora continua, actuando con rigor, responsabilidad y ética profesional.
- Respeto a los derechos fundamentales y de igualdad entre hombres y mujeres.
- Capacidad de proyectar los conocimientos, habilidades y destrezas adquiridos para promover una sociedad basada en los valores de la libertad, la justicia, la igualdad y el pluralismo.
- Manejar adecuadamente las fuentes de información científica y poseer la habilidad de hacer una valoración crítica de las mismas, integrando la información para aportar conocimientos a grupos de investigación multidisciplinarios.
- Utilizar adecuadamente las herramientas informáticas, métodos estadísticos y de simulación de datos, aplicando los programas informáticos y la estadística a los problemas biomédicos y biotecnológicos.
- Dominar el método científico, el planteamiento de protocolos experimentales y la interpretación de resultados en el ámbito biomédico y biotecnológico.
- Ser capaces de aplicar la experiencia investigadora adquirida tanto en la empresa privada como en organismos públicos.
- Saber diseñar estrategias experimentales multidisciplinarias en el ámbito de las biociencias moleculares para la resolución de problemas biológicos complejos, especialmente los relacionados con salud humana.
- Saber aplicar los principios éticos y legales de la investigación científica en biotecnología y biomedicina.
- Profundizar en el papel del profesional en biotecnología y biomedicina en el contexto científico y social y su contribución en el modelo económico.
- Tener una visión integrada del proceso de I+D+i desde el descubrimiento de nuevos conocimientos básicos hasta el desarrollo de aplicaciones concretas de dicho conocimiento y la introducción en el mercado de nuevos productos biotecnológicos.
- Saber buscar y obtener información de las principales bases de datos sobre patentes y elaborar la memoria de solicitud de una patente de un producto biotecnológico.
- Saber diseñar una investigación prospectiva de mercado para un producto biotecnológico.
- Saber utilizar un lenguaje integrador y no discriminatorio en todos los ámbitos de la comunicación anteriormente mencionados.

## LEARNING OUTCOMES

After completing the course students must be able to address problems of management and business organization with



technical criteria as well as decisions both analytic and professional type. For these purposes students must be able to:

- identify the relevant biotech market ,
  - assess the market power of its competitors ,
  - identify the competency model tighter strategic behavior of agents in the market ,
  - analyze the most important strategic variables for decision makers market players ,
  - conduct an empirical study to determine the key variables that determine the behavior of agents in the biotechnology market.
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- have an integrated view of the R &D + i since the discovery of new basic knowledge to the development of specific applications of this knowledge and market introduction of new biotech products.

## 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**

| ACTIVITY                             | Hours         | % To be attended |
|--------------------------------------|---------------|------------------|
| Theory classes                       | 40,00         | 100              |
| Study and independent work           | 20,00         | 0                |
| Preparation of evaluation activities | 40,00         | 0                |
| <b>TOTAL</b>                         | <b>100,00</b> |                  |

**TEACHING METHODOLOGY**

The development of the subject revolves around two points: Both theoretical and practical classes where the teacher will explain the most interesting concepts and develop the most

complex instruments for the use of the course . Attendance is essential because it ensures the correct transmission of

knowledge and guides the students for their personal work .The study and individual preparation of lessons and attending academic seminars are scheduled.

**EVALUATION**

Passing the subject requires obtaining at least half the score in each of the following items.1. -A written examination lasting no more than two hours, corresponding to 80 % of the final grade.2. -The remaining 20 % will be allocated according to the assistance to both classes and seminars and active participation in the classroom and public exposure of a project.



## REFERENCES

### Basic

- Froeb L. and B. McCann (2008), Managerial Economics: A Problem Solving Approach. (2ª Edición) South-Western, 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.