

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

<b>Code</b>	33189
<b>Name</b>	Economics and business management
<b>Cycle</b>	Grade
<b>ECTS Credits</b>	6.0
<b>Academic year</b>	2022 - 2023

**Study (s)**

<b>Degree</b>	<b>Center</b>	<b>Acad. year</b>	<b>Period</b>
1102 - Degree in Biotechnology	Faculty of Biological Sciences	4	Annual

**Subject-matter**

<b>Degree</b>	<b>Subject-matter</b>	<b>Character</b>
1102 - Degree in Biotechnology	91 - Legal and business aspects of molecular biosciences	Obligatory

**Coordination**

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

**SUMMARY**

This course aims to give students an understanding of the determinants of the firms' incentive to innovate, in particular for firms specialized in biotechnology. In view of that, it is important to analyze the strategic effects of potentially patentable innovations, either product or process ones. To achieve it, this course examines the public good nature of knowledge and its effect on innovation. Also how competition for innovation in technology-based industries such as biotechnology firms works and the effects of diffusion of innovations, either directly by the company that generates them or through licensing of patented innovations. Finally the study of R&D collaborative networks is also relevant in explaining innovation processes.



## PREVIOUS KNOWLEDGE

### Relationship to other subjects of the same degree

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

### Other requirements

## OUTCOMES

### 1102 - Degree in Biotechnology

- Saber aplicar los conocimientos en Biotecnología al mundo profesional.
- Capacidad para transmitir ideas, problemas y soluciones empresariales a partir de la Biotecnología.
- Desarrollo de habilidades para transferir la formación biotecnológica al mundo empresarial.
- Conocer las bases del diseño empresarial su aplicación a las empresas biotecnológicas.
- Saber utilizar la lengua inglesa en la redacción de informes, patentes y comunicaciones.

## LEARNING OUTCOMES

### SKILLS TO ACQUIRE

After completing the course the students should be able to address management and organization problems related to the biotechnology knowledge. Also they should be able to make decisions either of analytical or professional nature.

For this purpose the students should be able to:

- identify the possible market for innovations,
- evaluate the innovative capacity of competitors,
- identify the competition model that better fits with the strategic behavior of agents in the market,
- analyze the duality “competition-cooperation” with rivals to promote innovation,
- conduct an empirical study and/or experiment to determine the key variables

that determine the behavior of agents in the market.

### SOCIAL SKILLS



- Provide students with logical and cognitive tools necessary to develop their critical thinking when addressing issues related to innovation processes.
- Instilling in students a strategic vision of innovation in the fight of firms for the market.
- Promote the use of the co-opetition duality in solving complex problems when working in teams.
- Familiarize the students in the use of information to facilitate their work.

## DESCRIPTION OF CONTENTS

### 1. Introduction

- Basics.
- Economics foundations
- Overview of the biotechnology industry.

### 2. Demand and Supply

- Demand
- Supply
- Marquet equilibrium
- Elasticity

### 3. Enterprise, strategy, costs and revenues

- Firm's objectives
- Strategy
- Total, average and marginal cost
- Total, average and marginal revenue

### 4. Markets

- Perfect competition
- Monopoly
- Duopoly: Cournot (competition in quantities) and Bertrand (competition in prices)



### **5. Incentives to innovate.**

- Schumpeter and the process of creative destruction.
- Market structure and innovation.
- Measures of R&D output.
- Arrows model.
- Competition in R&D.

### **6. Patents**

- Patent race equilibrium. Deterministic models. Stochastic models. Expected time of discovery. Optimal patent length.
- Relevance of biotechnology innovation compared with the total patented innovations.

### **7. Technology diffusion. Licensing.**

- Introduction.
- Models of technology diffusion.
- Optimal licensing contracts.
- Motives to grant a license.
- Effect of licenses in R&D competition.

### **8. Cooperation in R&D, Knowledge Networks and Technology Policy.**

- Introduction.
- Cooperation in R&D: a theoretical model with externalities.
- Strategic subsidies to R&D in an international context.
- Network formation for the transmission of knowledge.
- Technology policy.

**WORKLOAD**

ACTIVITY	Hours	% To be attended
Theory classes	32,00	100
Classroom practices	24,00	100
Tutorials	4,00	100
Development of group work	22,00	0
Preparation of evaluation activities	24,00	0
Preparation of practical classes and problem	22,00	0
<b>TOTAL</b>	<b>128,00</b>	

**TEACHING METHODOLOGY**

This course is articulated around three points:

- Theoretical and problem set lectures where the professor will explain the most interesting concepts and the most complex instruments that will be used. Attendance is essential because it ensures the correct transmission of knowledge and guides the students for their personal work.
- Students are required to prepare a term paper (possibly in teams) where they translate a real problem faced by companies in the biotechnology industry. To prepare students to defend their projects in public the term paper will be presented to the class.
- Individual study, preparation of lessons and attendance to academic seminars is also required.

Important note: The final distribution of teaching and the relationship between face-to-face and non-face-to-face teaching activities may be modified throughout the course if health conditions require it. The teacher at any time will adopt the appropriate teaching measures to reduce health risks without undermining compliance with the current academic program.

**EVALUATION**

To pass the course requires a total of at least half of the score in each of the following items.

- A written exam for a period not exceeding two hours, which corresponds to 70% of the final mark.
- The elaboration and public presentation of a term paper that supposes 20% of the final mark (this activity cannot be re-examined).
- The remaining 10% will be allocated taking into account the attendance to lectures and seminars and active participation.





Important note: The final distribution of the weights may be modified throughout the course if the regionhealth conditions require a modification of the teaching.

## REFERENCES

### Basic

- Mankiw, N. (2012), Principios de Economía. Sexta edición ed cengage learning.
- Samuelson y Nordhaus (2010), 19 edición Ed. McGraw Hill.
- Scotchmer, S. (2004), Innovation and Incentives. The MIT Press.

También pueden consultarse los capítulos correspondientes a I+D en los manuales de economía industrial al uso, por ejemplo,

Cabral, L. (2000), Introduction to Industrial Organization. The MIT Press.

Church, J and R. Ware (2000), Industrial Organization, A Strategic Approach. McGraw-Hill.

Shy, O. (1995), Industrial Organization, Theory and Applications. The MIT Press.

Tirole, J. (1988), La Teoría de la Organización Industrial. Ariel.

### Additional

- d'Aspremont, C. y A. Jacquemin, (1988), Cooperative and Non-Cooperative R&D in Duopoly with Spillovers, American Economic Review vol. 78, pág. 1133-1137.
- Besen, S. y J. Farrell (1994), Choosing how to compete: Strategies and tactics in standardization, Journal of Economic Perspectives, spring, 117-131.
- Cockburn, I. y R. Henderson (1994), Racing to Invest? The Dynamics of Competition in Ethical Drug Discovery, Journal of Economics and Management Strategy, 3, 481-519.
- Cohen, W. y R. Levin (1989), Empirical Studies of Innovation and Market Structure, Handbook of Industrial Organization, North-Holland.
- Cohen, W., R. Nelson y J. Walsh (2000), Protecting their Intellectual Assets: Appropriability Conditions and Why U.S. Manufacturing Firms Patent (or not), NBER working paper 7552.
- Gilbert, R. J., y D. Newbery (1982), Preemptive patenting and the persistence of monopoly, American Economic Review 72(3), 514-526.
- Pérez-Castrillo, D., (1990), Procesos de I+D y estructura industrial: un panorama de modelos teóricos, De Economía Pública, 6, pág. 171-214.
- Pérez-Castrillo, D., (1993), Contratos de licencias de patentes, Revista Española de Economía, Monográfico de I+D, pág. 109-12
- Reinganum, J. (1989), The Timing of Innovation: Research, Development and diffusion, Handbook of Industrial Organization, North-Holland.
- Spencer, B. y J. Brander, (1983), International R&D Rivalry and Industrial Strategy, Review of Economic Studies 50, pág. 707-722.

