



centro adscrito a:



UNIVERSITAT POLITÈCNICA
DE CATALUNYA
BARCELONATECH

GUIDENCE R+D+I AT THE SPORT 2024-25

DATOS GENERALES ASIGNATURA

Nombre:	R&D&I in SPORTS
Código:	801739
Curso:	2024-25
Titulación:	DEGREE IN SCIENCE AND TECHNOLOGY APPLIED TO SPORT AND FITNESS
N.º de créditos (ECTS):	6
Ubicación en el plan de estudios:	4º curso, 1r cuatrimestre
Departamento:	Sistemas de información y tecnología
Responsable departamento:	Dra. Cristina Cáliz
Fecha de la última revisión:	23/08/23
Profesor Responsable:	Antoni Paz

1. GENERAL DESCRIPTION

The subject consists of 5 modules, each with their own topic. Each module will take you about 4-8 hours. It consists of videos, informative texts, recap questions (to test whether you understand the concepts) and other exercises.

After this course you will be able to:

- Mention the key concepts of Research, development and Innovation (R&D&i) at the sports
- Know and understand the important aspects of R&D&i
- Explain why certain R&D&i can enhance fitness and sports performance
- Apply your developed critical mind-set in the field of R&D&i at the Sports

2. GENERAL OBJECTIVES

- Understand the differences between Research, Development, and Innovation
- Publicize technological and research trends that may be related to physical activity and analyze their impact on sport and fitness.
- Gain a strategic vision of the R&D&I process and understand the competitive advantages
 - Formulate and implement different strategies
 - Internal and external analysis to define R&D&I areas
 - Concept of Competitive Advantage and Value Generation and Capture
 - Value proposition
 - Innovative business models and digital business models

- Understand the key concepts of R&D in Sciences and Technologies being applied to sport and physical conditioning:
 - Understand the Research and Development system
 - Analyze the Lines of research in sport.
- Understand the keys to innovation in sciences and technologies applied to sport and physical conditioning:
 - Understand what innovation ecosystems and open innovation are.
 - Visualize the evolution of innovation through the 6 waves of innovation.
 - Understand the types of innovation: Innovation in product, process, marketing and organizational.
 - Understand the process and funnel of Innovation:
 - Know creativity and idea generation tools.
 - Know prioritization tools and selection of ideas or projects.
 - Know Project Management tools.
 - Determining the Impact of Innovation: ROI of Innovation.
 - Know the Concept and development of a new sports product or service from the Canvas Model.
- Know the basic principles of Intellectual and Industrial Property:
 - Identify Intangibles.
 - Intellectual and Industrial Property Mechanisms.
 - Economic and social valuation of intangibles.
- Visualizing the knowledge economy that can “clean” society for the future.

3. COURSE CONTENTS

BLOCK 1: INTRODUCTION. RESEARCH, DEVELOPMENT AND INNOVATION

T.1 INTRODUCTION TO RESEARCH, DEVELOPMENT AND INNOVATION (4 H X 3)

Learning outcomes

After studying the chapter and making the exercises, the student will be able to understand the difference between Research, Development, and Innovation. On the other hand, the student will associate trends in sport and extract behavioral patterns related to the Sciences and technologies applied to sport and physical conditioning.

1. Research & Development.
2. Innovation.
3. Trend Matrix: Societal Trends and Pattern Extraction.

Content

1.1. Research & Development.

- 1.1.1. Concepts.
- 1.1.2. Stages of research.
- 1.2. Types of Research and Development (R&D).
- 1.3. Phases of research and development.
- 1.4. Research in Sport.
- 1.5. Innovation.
- 1.6. Definition of Innovation.
- 1.7. Types of Innovation.
- 1.8. Why innovate?

T2: R&D&I AS A COMPETITIVE ADVANTAGE OF DIFFERENTIATION (4 H X3)

Learning outcomes

The student after studying the chapter and performing different practical exercises, will be able to understand the link between strategy and innovation:

1. Formulate and implement levels of innovation strategy.
2. Internal and external analysis to define the priority areas of R&D&I (Practice).
3. Concept of Competitive Advantage, Generation and Capture of Value (Practice).
4. Value Proposition (Practice).
5. Innovative business models and digital business models.

Content

2. Formulate and implement levels of innovation strategy.
 - 2.1. Types of Strategies.
 - 2.2. Steps for effective innovation strategy.
 - 2.3. Internal and external analysis to define the priority areas of R&D&I (Practice).
 - 2.4. Competitive Advantage.
 - 2.5. Types of competitive advantage.
 - 2.6. Value Proposition.
 - 2.6.1. Definition of Value Proposition.
 - 2.7. Innovative business models and digital business models.
 - 2.7.1. What are innovative Business Models based on?

- 2.7.2. What is an Innovative Business Model?
- 2.7.3. Types of Innovative Business Models.
- 2.7.4. Examples of business models .
- 2.7.5. Digital Business Models.

BLOCK 2: INTANGIBLE & KNOWLEDGE MANAGEMENT

T3. RESEARCH, DEVELOPMENT, AND INNOVATION SYSTEM (4H X 3)

Learning outcomes

The student after studying the chapter and performing the practical exercises and developing cases, will be able to:

- Know lines of research in sport.
- Know what innovation ecosystems and open innovation are.
- Visualize the evolution of innovation through the 6 waves of innovation.
- Know the types of innovation in product, process, marketing and organizational.
- **Know the process and *funnel* of Innovation:**
 - Know creativity and idea generation tools.
 - Know prioritization tools and selection of ideas or projects.
 - Know Project Management tools.
 - Determining the Impact of Innovation: ROI of Innovation.
- Know the Concept and development of a new sports product or service from the Canvas model.

Content

3. R&D&I System national.
 - 3.1. National and European Sport Research Framework (White Paper on Sport in the EU).
 - 3.2. What are innovation ecosystems (clusters, hubs). Operation and usefulness.
 - 3.3. What is an innovation ecosystem?
 - 3.4. Roles of an innovation ecosystem.
 - 3.5. Success factors of innovation ecosystems.
 - 3.6. Introduction to Open Innovation and the 6 Waves of Innovation.
 - 3.6.1. Open Innovation Concept.
 - 3.6.2. The 6 waves of Innovation.

- 3.6.3. Innovation Management: innovation values and types of innovation.
- 3.6.4. Customer Centricity and the customer "journey".
 - 3.6.4.1. Customer Centric.
 - 3.6.4.2. How to implement a Customer Centric strategy: Step by step.
 - 3.6.4.3. Innovation process. The innovation funnel.
 - 3.6.4.4. Innovation Funnel Phases.
 - 3.6.4.5. The benefits of the innovation funnel.
- 3.6.5. Marketing of innovation. How to present an innovative project successfully? What is Innovation Marketing?

T4: INTANGIBLES AND INTELLECTUAL AND INDUSTRIAL PROPERTY RIGHTS (4 H X2)

Learning outcomes

The student will be able to know the basic principles of Intellectual and Industrial Property, the mechanisms, benefits, and their valuation.

Content

- 4. Basic Principles of Intellectual and Industrial Property.
 - 4.1. Identification of Intangibles.
 - 4.2. What are intangible assets?
 - 4.3. Intellectual and Industrial Property Mechanisms.
 - 4.4. Economic and social valuation of intangibles.
 - 4.5. Basic Principles of Intellectual and Industrial Property.

T5: KNOWLEDGE ECONOMY AS A "HYGIENIC" ELEMENT FOR THE SOCIETY OF THE FUTURE (3.5 H)

Learning outcomes

The student will learn about aspects related to the future of innovation from a holistic perspective that will include the culture of innovation, leadership, ethics, safety, and technological and labor perspectives.

Content

Round table with innovation professionals and related to ethics, the world of work, leadership, and the knowledge society.

4. TEACHING AND LEARNING METHODOLOGY

The methodology of the subject combines face-to-face classes in the classroom with the autonomous and group work of the student. The face-to-face sessions include activities such as the presentation of the theoretical contents, practical cases, and resolution of exercises.

On the other hand, autonomous work consists of personal study, search for information, guided work, test exercises, video capsules and team activities include the above and the realization of innovative projects.

5. EVALUATION

According to the Bologna Plan, the model rewards the constant and continuous effort of the student body. 40% of the grade is obtained from the continuous evaluation of the directed activities and teamwork and the remaining 60% percentage, from the face-to-face final exam. The final exam has two calls.

The final grade of the subject (NF) will be calculated from the following formula:

- $NF = \text{Final Exam Grade} \times 60\% + \text{Continuous Evaluation Grade} \times 40\%$
- Minimum grade of the final exam to calculate the NF will be 40 points out of 100.
- The subject is passed with an NF equal to or greater than 50 points out of 100.

Continuous evaluation activities:

Type of activity	Description	% Continuous evaluation	
Work deliveries:			30 %
WORK DELIVERY 1. Practice with a Scientific Study	Read an article and answer the questions	33 %	
WORK DELIVERY 2: Critical Issues in Sport Science	<p>"New supplement improves your exercise performance by 20%"</p> <p>These type of headings appear frequently in the media. But are they justified? Is it backed up by science? How can you critically</p>	33%	

	evaluate such claims or messages?		
WORK DELIVERY 3. Trend Matrix	Understand and practice with the trend matrix as a reflection on the aspects that can guide our research and will lead us to define innovative projects	33%	
Quizzes:			10 %:
Physical Activity, Exercise and Sports	Quizz 1 Introduction	33%	
Sports Science: Empirical Cycle and Level of Evidence: Evidence Pyramid	Quizz 2. Sports Science	33%	
Intellectual Property	Quizz 3. IP	33%	
Final exam:			60 %
	Final Exam	100%	

6. BIBLIOGRAPHY

6.1 BASIC BIBLIOGRAPHY

- Chesbrough, H. W. (2003). *Open innovation: The new imperative for creating and profiting from technology*. Harvard Business School Press.
- Chesbrough, H. W. (2006). Open innovation: A new paradigm for understanding industrial innovation. En H. W. Chesbrough, W. Vanhaverbeke, & J. West (Eds.), *Open innovation: Researching a new paradigm* (pp. 1-12). Oxford University Press.
- Chesbrough, H. W., Vanhaverbeke, W., & West, J. (Eds.). (2008). *Open innovation: Reaching a new paradigm*. Oxford University Press.
- Martínez de Aldama Ortúzar, I., Cayero Alcorta, R., & Calleja González, J. (2012). *Research and innovation in sport*.
- Organisation for Economic Co-operation and Development (OECD). (2006). *Oslo manual: Guidelines for collecting and interpreting innovation data* (3rd ed.). European Community. (Spanish translation: Grupo Trasca).
- Osterwalder, A., & Pigneur, Y. (2011). *Generación de modelos de negocio* (L. Vázquez Cao, Trans.; 3rd ed.). Deusto S.A. Ediciones.

- Porter, M. E. (1979). How competitive forces shape strategy. *Harvard Business Review*, March 1979.
- Porter, M. E. (1985). *Competitive advantage: Creating and sustaining superior performance*. Free Press.
- Porter, M. E. (1987). From competitive advantage to corporate strategy. *Harvard Business Review*, May 1987.
- Porter, M. E. (1996). What is strategy? *Harvard Business Review*, Nov/Dec 1996.
- Porter, M. E., & Van der Linde, C. (1995). Towards a new conception of the environment-competitiveness relationship. *Journal of Economic Perspectives*, 9(4).
- Spanish Standardization Association AENOR. (2006). *STANDARDS UNE 166002 R&D&I Management: Requirements of the R&D&I Management System*.

6.2 WEBGRAPHY / BLOGS

- Business canvas. (n.d.). *Business Model Canvas* [online]. Disponible en https://docs.google.com/drawings/d/1ZimNRli0HIFO8GUOuU9We13lOrFR1-s9m-0Ft_hnb8U/edit
- Empathy map. (n.d.). *Empathy maps* [online]. Disponible en <https://docs.google.com/drawings/d/13rGG5x9-nk0N2x49ki6gRymoDNZd6jK0px6zzgEQ1Jl/edit>
- International Sports Engineering Association (ISEA). (n.d.). Disponible en <https://www.sportsengineering.org/>
- Sanchez, J. (2011, October). *Business Model Canvas: Learn how to create business models* [online]. Disponible en <http://www.emprenderalia.com/aprende-a-crear-modelos-de-negociocon-business-model-canvas/>
- Spanish Patent and Trademark Office. (n.d.). Disponible en <http://www.oepm.es/es/index.html>
- World Intellectual Property Organization. (n.d.). Disponible en <https://www.wipo.int/patentscope/es/>

6.3 ADITIONAL BIBLIOGRAPHY

- *2006 FIFA World Cup – Intellectual Property Results.pdf*
- *CRITERIA FOR INNOVATION IN THE DESIGN OF USER-FOCUSED FITNESS EQUIPMENT*
- *Deportistas Tecnologicamente Modificados.pdf*
- *Guide-of-PI-VF-20012015.pdf (spinoffcolombia.org)*
- *How Innovation Extensions Can Change Your Fitness Business - Gym Factory Magazine.pdf*
- *Innovation strategies (upv.es)*
- *InnovacionDiseñoEquiposDeportivos.pdf*
- *IP and sport Colombia.pdf*
- *LaExplotacionDeBienesIntangiblesVinculadosConActiv-3710006 (1).pdf*
- *Management of Intangibles of the Sports Industry.pdf*
- *Manual_I&D&I.pdf*
- *R&D&I Manual*
- *Sport and intellectual property.pdf*
- *Sport and it is design.pdf*
- *Sport, sporting goods and the sports industry (wipo.int)*
- *Sport, sporting goods and the sports industry.pdf*

- *Sport as a business model | UDG Gazette*
- *Technology, innovation and coraje_ faster, higher, stronger in disabled sport.pdf*
- *The exploitation of intangible assets linked to sports activities*
- *The fabulous world of innovation in sport*
- *The technology of the line of gol_ the solution to the problem.pdf*
- *USAIN BOLT AND SCIENCE*
- *VALUATION OF INDUSTRIAL AND INTELLECTUAL PROPERTY ASSETS – CLARKE*
- *VALUATION OF INTANGIBLE ASSETS IN SPORTS ENTITIES: FOOTBALL CLUBS*
- *VALUATION OF INTANGIBLE ASSETS SEMANA FINANZAS OVIEDO 29-10-10.pdf*
- *ValoracionIntangiblesenDeporte.pdf*
- *Sport and innovation. What really matters | Raúl Respaldiza*
- *Sport and technology.pdf*

6.4 ADITIONAL WEBGRAPHY

- *A look into the future of Paralympic sports.pdf*
- *Athlete performance - Technology in sport - WJEC - GCSE Physical Education Revision - WJEC - BBC Bitesize*
- *Charla TED The science of sprinting. Disponible en <https://www.youtube.com/watch?v=1lish-9ru9E>*
- *Innovation in the Sports Industry (Talk). Disponible en <https://www.youtube.com/watch?v=0KebwPa1nyo&t=956s>*
- *Running Science. Disponible en <https://www.youtube.com/watch?v=jPgTnhJjU0I>*
- *Sport and innovation. What really matters | Raúl Respaldiza. Disponible en <https://www.youtube.com/watch?v=Bl-kL6SeVT8>*
- *Sports Tech Nation 2020: Innovation & The Future of Sports. Disponible en <https://www.youtube.com/watch?v=-QRwh3k09oM>*
- *Technology in Sport. Disponible en <https://www.innovationnewsnetwork.com/strong-approach-sports-science/803/> <https://rdsportsmanagement.com/>*
- *The Impact of technology on elite sports performance. Disponible en https://www.researchgate.net/publication/2006_FIFA_World_Cup_Intellectual_Property_Results*
- *The World According to Jeff Goldblum. Disponible en <https://www.youtube.com/watch?v=cjkaZ1vfOCU>*
- *USAIN BOLT AND SCIENCE. Disponible en https://www.linkedin.com/posts/vidalmarc_science-sports-health-activity-6827882990677434368-NQ0f*