Development and Innovation

Code: 103256
ECTS Credits: 6

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Degree	Type	Year
2501925 Food Science and Technology	OB	3

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Teaching groups languages

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Prerequisites

Although there are no official pre-requisites, it is advisable for the student to have studied processing methods I, Economics, Management and Logistics in the Food Company, Food Products, Fundamentals of Processes, Analysis and Quality Control of Food , Basic Operations, Human Nutrition, Reactors, Instrumentation and Control and Food and Culture.
To study the subject correctly, it is necessary to have a clear idea of the concepts explained in the previous subjects. Specifically, to study new product development methodologies, it is very important to have prior knowledge of food industry processes, knowledge of raw materials and additives, of human nutrition, as well as the regulations in force at any given time.

Objectives and Contextualisation

Know the organizational structure of companies, the decision-making mechanisms, and differentiate the concepts of research, development and innovation. Also, know the calculation of costs, markets, distribution and labeling and presentation of products.
Innovation is a characteristic of advanced economies and is of great importance to guarantee the competitiveness of companies, as is the knowledge of the protection of intellectual property and also of how technological transfer occurs.
Objectives of the subject are to know and understand:
• The concepts and the difference between research, development and innovation.
• The methodology for the development of new products.
• The phases that lead to a new product from its development until it goes on the market.

• The calculation of costs for the development of a new product.
• The structure of the food company and its decision-making mechanisms.
• The departments and factors involved in the company during the development and launch of a new product.
• The current evolution of the food industry and market needs.
• The marketing elements needed by business managers.
• The elements and approaches necessary for the realization of the product's business plan.
• Detection of new trends and market niches.
• Social responsibility in the food industry.
• The possibilities of innovation that the food industry has.
• The mechanisms of intellectual protection, technology transfer and exploitation.
• Creativity and innovation techniques.
• Project presentation and defense techniques.
• Technological innovation that can favor the creation of new products.
• The specific Communication Plan for the food industry.
• The most sustainable technologies that are being developed in the food industry.
• The new digital tools that are being incorporated in the food industry.
• The support environment for research and innovation in the food sector, including the main technological centers, universities and public research centers.
• The main sources of public funding for carrying out research projects in food companies.

Competences

- Adopt an ethical stance and attach importance to quality in work.
- Design, formulate and label foods that fit in with the needs of consumers and their cultural traits.
- Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
- Show sensitivity to environmental, sanitary and social issues.
- Take account of social, economic and environmental impacts when operating within one's own area of knowledge.

Learning Outcomes

1. Adopt an ethical stance and attach importance to quality in work.
2. Classify the procedures for processing functional foods.
3. Comprehend the concept of technofunctionality.
4. Define the concept of functional food and related areas.
5. Establish the differences between development and innovation.
6. Identify the processes for obtaining bioactive components.
7. Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
8. Present the processes for incorporating ingredients and additives.
9. Relate the formulation to the stability and the processing of the food.
10. Show sensitivity to environmental, sanitary and social issues.
11. Take account of social, economic and environmental impacts when operating within one's own area of knowledge.

Content

1. Food business environment: a global market. (Session 1 bis; AG)
Environment of food companies and main food distribution channels. Market niches in the food industry and social responsibility of companies in the new trends in food.
2. Product development focused on the consumer. (Session 2; SB)

Why start with the consumer? Analysis of needs. Analysis of alternatives (competitors and substitutes). Discovery questionnaire ("Discovery survey"). Detect and evaluate market opportunities.
3. Methodology for the development of a new product. (Sessions 3 and 4; AG)
Creativity techniques. Definition of the "brief". Formulation tools. Laboratory, pilot plant and industrial tests. Calculation of costs. Type of consumer test.
4. Design and test of the value proposition. (Session 5; SB)
Beyond the product: the unique value proposition. "Design thinking" workshop. Preparation of a series of tests of the value proposition.
5. The innovation process in the food industry. (Session 6; AG/JP)
Basic concepts in R+D+i: definitions of research, development and innovation. Stages of the innovation process. Model of technological innovation. Involvement of a company's departments in the innovation strategy. Identification of the type of product innovation.
6. Innovative technologies of the food industry. (Session 7; AG)
Description of the most innovative technologies in the food industry based on sustainability. Alternative proteins: plant-based, insects, micro-algae, fungi. Cultured meat Biorefinery processes and valorization of by-products. 3D printing of food. Personalized nutrition. Precision fermentation.
7. New technologies based on digitization. (Session 8; AG)
New technologies applied in the food sector based on digital tools. Explanation of Industry 4.0 concepts. Description of "Blockchain" technology, Artificial Intelligence, Automation and Robotization, Internet of Things. Example applications of digital tools (e.g. market research, formulations, sustainability, etc.)
8. Structure and organization of the food business. (Session 9; JP)
Organization chart and factors involved in the development and launch process of a product. Current models of R + D + i: Multinational, PYME, Distribution brand.
9. Basics of the business plan. (Session 10; SB)
Production, value chain and required resources. Marketing mix (product, distribution, price, promotion). Definition of "core business"; what we do and what we outsource.
10. "Roadmap" of implementation. (Session 11; SB)
Sources of income. Costs and financing needs. Preparation for the investment (proposal + "pitch" presentation
11. R&D funding programs and public research bodies. (Session 12; AG)
Identification of the main public funding programs and the main research support agencies at regional, state and European level. Identification of technology centers, research centers and universities as a support environment for business research. Basic concepts in the preparation of a technical report to obtain public funding.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Conferences	24	0.96	2, 4, 3, 5, 8, 6, 9
Prácticas	14	0.56	11, 1, 2, 4, 10, 3, 5, 8, 6, 7, 9
Tutorials	13	0.52	1, 2, 4, 3, 5, 8, 6, 9
Type: Supervised			
Supervised	5	0.2	6, 9
Type: Autonomous			
Preparing self-learning work	32	1.28	2, 4, 3, 5, 8, 6, 9
Study and bibliographic alquiry consultation	60	2.4	2, 4, 3, 5, 8, 6

Master classes

The student acquires the scientific knowledge specific to the subject by attending lectures and supplementing them with personal study of the topics explained.
In some sessions, students receive the content 2 weeks before each session:The slides must be read and the questions sent to the teacher. Each session begins with answers to submitted questions. The session ends with 15 minutes of reflection « what have we learned today? »
Seminars (PAUL, 1 group)
The seminars will be led by a teacher, in which the student actively participates to deal with a predetermined topic through the exchange of partial information, the collective analysis of this information. Self-learning work: in groups, it will be developed partly in the classroom, and partly outside the classroom.

- Product development:

D+I_DP1: Explanation of the Brainstorming technique as a tool for the innovation process. Innovative product development proposal. (JP-AG-VF). 2 hours
D+I_DP2: Food Formulation (JD) 2h
D+I_DP3: Presentation of the food to be developed (VF-JP) 2 h
D+I_DP4: Competition for the products developed by each group (VF-AG-JP-SB). 3 hours

- Marketing and Market:

D+I_MM: Final presentations (Start-up pitch) (SB). 2 hours
Digital Tools:

- D+I_ED Digital tools (AG). 2 hours

Laboratory
The practical development part of a product will be done in groups in the laboratory (14 h in 4 sessions). The aim of the practical classes is to complete, apply and reinforce the knowledge acquired in the theoretical classes and those acquired in other subjects throughout the degree. The results will be presented in a competition.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Examination	40%	1	0.04	11, 1, 2, 4, 10, 3, 5, 8, 6, 7, 9
Self learning and practical training	60%	1	0.04	1, 2, 4, 10, 3, 5, 8, 6, 9

The learning outcomes of this subject will be assessed through:

- Final Exam: Its weight on the overall grade is 40%. The minimum to make an average with the other assessable parts is a 4 out of 10. If you do not reach this mark, you will have to take the make-up exam.
- Development work on a new product: Represents 30% of the grade (includes laboratory work, seminars DP Report and final presentation). Each group will also evaluate the people who make it up and can influence the individual grade.
- "Start-up pitch" work: 20%. The minimum to make an average with the other evaluable parts is a 4 out of 10. If you do not reach this mark, you can recover.

- Digital tools seminar: 10%. The minimum to make an average with the other evaluable parts is a 4 out of 10. If you do not reach this mark, you can recover.

The subject will be approved with an overall score of 5.0 or higher out of 10

You must have been evaluated by two thirds to be able to make the recovery.

It will be considered that a student is not assessable if he has participated in assessment activities that represent ≤ 15% of the final mark.

This subject does not provide for the single assessment system.

Bibliography

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web pages of interest

http://www.knovel.com/web/portal/browse/subject/60/filter/0/

http://www.magma.ca/~scimat/

http://www.caixabankresearch.com/documents/10180/54279/ee33_esp.pdf

https://webgate.ec.europa.eu/foods_system/main/?event=display

Software

Paid software with an partial opensorce

- www.foodparing.com main digital tool for the combination of ingredients for new formulations, especially from an aromatic/culinary point of view.
- www.mintel.com the world's leading market research company in the food and convenience/cleaning/cosmetics sector. Its potential use will be shown and reports on market trends, new ingredients, etc. will be accessed. that they have made public.

Online search engines to calculate the carbon footprint, water footprint and occupation of arable land, among others. (ENT foundation, acuaes foundation, online databases)

- www.delectatech.com digital tool for the foodservice sector based on Bigdata. It supplies data mainly to the Horeca/restaurant sector and also to food companies and distributors, including, for example, types of food consumed by area, points of sale, etc.

Product development support:

- www.miro.com base for the project
- https://chat.openai.com to generate product/brand name
- www.looka.com to generate logo

Language list

Name	Group	Language	Semester	Turn
(PAUL) Classroom practices	1	Catalan/Spanish	second semester	morning-mixed
(PLAB) Practical laboratories	1	Spanish	second semester	afternoon
(PLAB) Practical laboratories	2	Catalan	second semester	afternoon
(PLAB) Practical laboratories	3	Catalan	second semester	afternoon
(TE) Theory	1	Catalan	second semester	morning-mixed