



Universitat de Lleida

# DEGREE CURRICULUM **FOOD INDUSTRIES**

Coordination: LOPEZ FRUCTUOSO, MARIA LUISA

Academic year 2023-24

**Subject's general information**

<b>Subject name</b>	FOOD INDUSTRIES			
<b>Code</b>	102582			
<b>Semester</b>	1st Q(SEMESTER) CONTINUED EVALUATION			
<b>Typology</b>	<b>Degree</b>	<b>Course</b>	<b>Character</b>	<b>Modality</b>
	Bachelor's Degree in Agricultural and Food Engineering	3	COMPULSORY	Attendance-based
<b>Course number of credits (ECTS)</b>	9			
<b>Type of activity, credits, and groups</b>	<b>Activity type</b>	PRACAMP	PRAULA	TEORIA
	<b>Number of credits</b>	0.2	2.8	6
	<b>Number of groups</b>	1	1	1
<b>Coordination</b>	LOPEZ FRUCTUOSO, MARIA LUISA			
<b>Department</b>	FOOD TECHNOLOGY, ENGINEERING AND SCIENCE			
<b>Teaching load distribution between lectures and independent student work</b>	The course is taught in the first semester, and is divided into 5 cr theory, plus 3 cr problems and 1 cr deliverable personal work. Independent workload estimated at least 1.5 times the time to attend classes.			
<b>Important information on data processing</b>	Consult <a href="#">this link</a> for more information.			
<b>Language</b>	Catalan 50% Spanish 50%			
<b>Distribution of credits</b>	Theory: 5 cr. Problems:3 cr. Practical personal work: 1 cr.			

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
GORDO MURILLO, CECILIA	cecilia.gordo@udl.cat	3	
ISLA LLANES, ALFREDO	alfred.isla@udl.cat	1	
LOPEZ FRUCTUOSO, MARIA LUISA	marialuisa.lopez@udl.cat	4	
PALATSÍ CIVIT, JORGE MANUEL	jordi.palatsi@udl.cat	1	

## Subject's extra information

The food processing industry is based on a knowledge of the technical, legal and financial features of food products and the raw materials from which they result.

This course provides knowledge on food processing lines and their equipment, and calculation tools for the design and selection of common facilities in the food industry.

The skills taught in this course are necessary for the proper sizing of auxiliary systems, processing plant design, projects and final project work related to the manufacturing processes carried out in the food industries.

## Learning objectives

- Conèixer la metodologia d'anàlisi dels processos de fabricació d'aliments.
- Aplicar la tecnologia i enginyeria necessària per al correcte funcionament d'una indústria alimentària.
- Conèixer els equips de processat dels aliments segons els diversos tipus d'operacions comuns a la indústria alimentària.
- Calcular els barems d'esterilització tèrmica en aliments.

## Competences

CB1. Students must demonstrate to have and to understand the bases of knowledge in a study field that arises from general secondary education, and that is taught at a level including knowledge at the frontiers of its own field of study.

CB2. Students have to be able to apply their knowledge in a professional way and must be able to develop competences in elaborating and defending arguments and problem solving within their own study field.

CB3. Students must be able to gather and interpret relevant data (normally within their own study field), in order to

make judgements including relevant social, scientific and ethical issues.

CB4. Students must be able to transmit ideas, problems and solutions both to specialised and non-specialised audiences.

CB5. Students must acquire enough abilities as to face further studies with a high degree of autonomy.

CG1. Capacity to preview and outline projects that can be included within the agrifood industry. (extractive, fermentative, dairy, canning, packinghouses, meat, fish, salted products and, in general, any other that manufactures, transforms, cans, handles and distributes food products)

CG6. Capacity for managing all kinds of agrifood industries, with knowledge of new technologies, and quality processing.

CG8. Capacity to solve problems with creativity, initiative, methodology and critical reasoning.

CG10. Capacity to search and apply legislation and regulations affecting its own field.

CG12. Capacity for working in multidisciplinary and multicultural teams.

CG13. Correctness in oral and written expression

## **Specific competences**

CEIAA1. Food technology and engineering: Modelling and optimization.

CEIAA2. Food industries engineering. Equipment and machinery for agrifood industries. Process automation and control. Facilities and buildings engineering.

CEMC9. Decision making using tools available for multidisciplinary groups.

CEIAA1. Food technology and engineering: Food Technology. Processing in the agrifood industries.

## Subject contents

### Syllabus

#### **1.Introduction. (0,7 ECTS; Prof. M.L. López)**

1.1.Agrifood industries: structura, sectorial importance, legislation.

1.2.Processes and facilities in food industries.

Fundamentals of food processing operations: manufacturing, preservation and packing. Techniques for process analysys. Products. Raw materials. Materials and equipment for the food industry. Auxiliary facilities. Introduction to inner organization and design of a food industry: personnel, sections, layout.

1.3.Aptitude of raw materials.

Vegetal raw materials. Animal raw materials. Characteristics of raw materials. Additives and coadjuvants in the food industry.

#### **2.Processing at room temperature. (0,8 cr.; Prof. M.L.López)**

2.1.Preparing raw materials. Cleaning. Sorting. Peeling.

2.2.Size reduction and mixing.

2.3.Mechanical and physical separations at room temperature.

Filtration. Pressing. Centrifugation. Membrane separation. Extraction solid-liquid.

2.4.Fermentations and enzyme technology.

Kinds of fermentations. Industrial enzymes. Fermenters and reactors.

#### **3.High temperature processing. (2 cr; Prof. E.Fons)**

3.1.Pasteurization and thermal sterilisation.

Fundamentals: thermoresistance parameters, heating curves, calculations. Equipment for thermal pasterization and sterilization.

3.2.Other processes using steam.

Blanching, evaporation, extrusion. Principles, equipment and applications.

3.3.Hot air processing.

Deshydration, baking. Principles, equipment and applications.

3.4.Other processes using heat or close techniques.

Frying. Food irradiation. Principles, equipment and applications.

#### **4.Low temperature processing. (1 cr; Prof. E.Fons)**

## 4.1.Refrigeration and controlled atmosphere.

Principles of food refrigeration. Cooling facilities. Modified atmospheres: effects on food, equipment, applications.

## 4.2.Freezing and operations at very low temperatures.

Principles and equipment for freezing. Crioconcentration and freeze drying.

## **5.Post-processing operations and others. (0,5 cr; Prof. M.L. López)**

5.1.Packaging and other operations.

## **6.Production management (1 cr; Prof. T. Ramo)**

## **7.By-products and residues: productin and management (1 cr; Prof. R. Teira)**

### **Practical activities**

#### **1.Class practices (problems and cases)**

Resolution of cases and problems including calculations on transformation and conservation of foods. Included in former epigraphs.

#### **2.Subject work (1 cr.; Prof. M.L. López)**

Personal work describing a food processing line, following the guidelines given along the subject.

REMARK: workload assigned to each part is orientative.

### **Activitats pràctiques**

#### **Pràctiques en aula (problemes i casos)**

Resolució de casos i problemes sobre diversos aspectes propis del càlcul en operacions de transformació i conservació d'aliments.

### **Treball**

Treball personal descriptiu d'una línia de processat d'aliments, d'acord amb les pautes que es donaran al llarg de l'assignatura.

### **Visita**

Visita a indústries per visualitzar per part dels alumnes els processos existents en les mateixes.

## Methodology

Kind of activity	Description	Presential activity			No presential activity	Total time
		Objectives	Workload	Student work	Workload	Hours/ECTS
<b>Lectures</b>	master class	Main concepts explained	<b>50</b>	Study: Know and understand; synthesise knowledge	<b>75</b>	<b>125h / 5</b>
<b>Exercises and cases</b>	Collaborative class	Solving exercises and cases	<b>30</b>	learning to solve exercises and cases	<b>45</b>	<b>75h / 3</b>
<b>Directed activity</b>	Personal work	Subject work	<b>10</b>	Write memory	<b>15</b>	<b>25h / 1</b>
<b>Total</b>			<b>90</b>		<b>135</b>	<b>225h / 9</b>

### Remarks

A total of 25 h of activity per ECTS have been considered

## Evaluation

Learning activity	Assesment activity		Weight
	Procedure	Number	
<b>Theory, exercises and cases</b>	Written assessment on theory, exercises and cases	2	<b>90</b>
<b>Personal activity</b>	Dossier and oral defense	1	<b>10</b>
<b>TOTAL</b>			<b>100</b>

### Remarks

As a global grade to pass the subject, the final mark must be 5 or higher.

## Bibliography

### Basic references

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**alimentos.** Ed. Acribia. Zaragoza.

BRENNAN, J.G. (ed.) (2008) **Manual del procesado de los alimentos.** Ed. Acribia. Zaragoza.

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## **Complementary references**

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