



Universitat de Lleida

# DEGREE CURRICULUM **FOOD PACKAGING**

Coordination: SOLIVA FORTUNY, ROBERT CARLES

Academic year 2021-22

## Subject's general information

<b>Subject name</b>	FOOD PACKAGING			
<b>Code</b>	102256			
<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 Food Science and Technology	4	OPTIONAL	Attendance-based
<b>Course number of credits (ECTS)</b>	6			
<b>Type of activity, credits, and groups</b>	<b>Activity type</b>	PRALAB	PRAULA	TEORIA
	<b>Number of credits</b>	0.8	1.6	3.6
	<b>Number of groups</b>	1	1	1
<b>Coordination</b>	SOLIVA FORTUNY, ROBERT CARLES			
<b>Department</b>	FOOD TECHNOLOGY			
<b>Teaching load distribution between lectures and independent student work</b>	On-site hours: 60 Off-site hours: 90			
<b>Important information on data processing</b>	Consult <a href="#">this link</a> for more information.			
<b>Language</b>	Catalan/Spanish: 50/50			

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
ELEZ MARTINEZ, PEDRO	pedro.elez@udl.cat	1,5	
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SOLIVA FORTUNY, ROBERT CARLES	robert.soliva@udl.cat	3	

## Subject's extra information

Packaging is a key element for the protection and presentation of a food product. The subject will be focussed on packaging as a unit operation within food processing. The student will learn the characteristics and applicability of different packaging materials used for food preservation, as well as the required systems and equipment.

## Learning objectives

The student must be able to:

- Demonstrate the safety and properties of food exploitation and the different levels of packaging.
- Handle existing legislation related to the packaging and environmental protection materials.
- Demonstrate the following functions and different packaging materials.
- Select and handle the most suitable packaging systems for each food and packaging material.

## Competences

### General skills

CB2: To apply their knowledge to their work or vocation in a professional way and have the skills that are usually demonstrated by developing and defending arguments and solving problems within their area of study.

CB3. To gather and interpret relevant data (usually within their area of study) to make judgments that include reflection on relevant issues of a social, scientific, or ethical nature.

CB4. To convey information, ideas, problems and solutions to both specialized and non-specialized audiences.

CB5. To develop learning skills necessary to undertake further studies with a high degree of autonomy

**Specific skills**

CG1. To analyze specific situations, define problems, make decisions and implement action plans in the search for solutions.

CG4. To work alone and in a multidisciplinary team.

CG5. To understand and express themselves with the appropriate terminology.

CG6. To discuss and argue in various forums.

CG7. To recycle in the new technological advances through continuous learning.

CG10. To have a critical and innovative spirit.

CG11. To analyze and assess the environmental implications in their professional activity.

**Transversal skills**

CT1. To present information correctly orally and in writing

**Specific Competences**

CE5. To apply the basic processes of a laboratory and use equipment, handle reagents, meet safety conditions and prepare reports.

CE6. To pose and solve problems correctly applying the concepts acquired to specific situations.

CE22. To recognize food processing equipment and know how to use it

CE29. To select equipment and organize food processing and packaging lines.

CE47. To identify, analyze and solve the environmental problems generated by the agri-food industries.

CE48. To search for and interpret legislative provisions and sources of information that affect the food industry.

**Subject contents****Part I. INTRODUCTION TO PACKAGING**

Topic 1. Definition of packaging. Current situation of the packaging industry.

Topic 2. Packaging levels. Properties and forms of packaging materials.

**PART II LEGISLATION**

Topic 3. Legislation on packaging. Packaging and packaging and environment.

**PART III METAL CONTAINERS**

Unit 4. Nature and characteristics of metallic materials.

Unit 5. Manufacture of metallic containers. New developments.

Unit 6. The closure of metal containers. Evaluation parameters and characteristic defects.

Unit 7. Protection and decoration of metallic materials.

Unit 8. Corrosion problems of metal containers.

#### PART IV GLASS, PAPER AND CARTON CONTAINERS

Unit 9. Nature and properties of glass for food containers.

Unit 10. Manufacture of glass containers. The closing of the glass containers.

Unit 11. Nature and properties of paper and cardboard for containers and packaging.

#### PART V. PLASTIC MATERIALS

Unit 12. General characteristics of plastic materials. Relationship between physical structure and polymer properties.

Unit 13. Plastic polymers. Processes for obtaining complex materials. Complex and multilayer films and films.

#### PART VI PACKING SYSTEMS

Unit 14. Machinery for forming, filling and sealing.

Unit 15. Aseptic packaging. Components and conditions.

Unit 16. Packaging in modified atmosphere. Products of high, medium and low water activity. Practical applications.

#### PART VII. INNOVATIONS IN FOOD PACKAGING

Unit 17. Biodegradable containers and edible coatings. Properties Constituent substances. Practical applications.

Unit 18. Active packaging. Smart packaging

Practical activities

#### JOB

Selection of a certain food and analysis of the product at the point of sale (types of packaging and forms of presentation, location in the distribution lines, ...). An evaluation of the material or materials used and the packaging system will be carried out. Special emphasis will be placed on the innovations incorporated and also those applicable to the product in question.

LABORATORY PRACTICAL SESSIONS \*

Practice 1. Testing of global migration of plastic materials.

Practice 2. Design and modeling of packaging systems under modified atmosphere.

Practice 3. Analysis of closures in metal containers.

Practice 4. Porosity of metal packaging varnish.

Practice 5. Coating the varnish.

Practice 6. Adhesion of varnish. Test of adhesive tape.

Practice 7. Resistance of varnish to rubbing.

Practice 8. Determination of tin coating.

\* It is MANDATORY that students and students wear the following personal protective equipment (PPE) in the course of teaching practices:

UdLunisex white lab coat

Safety glasses

Chemical / biological protection gloves

## Methodology

Kind or activity	Description	On-site activity		Autonomous activity		Evaluation	Total time/ECTS
		Objectives	Hours	Student's work	Hours	Hours	Hours
<b>Lliçó magistral</b>	Magistral class (Classroom/Videoconference)	Explanation and discussion of the main concepts.	<b>35</b>	Study: Learn, understand and synthesized knowledge.	<b>52</b>	2	<b>54/3.56</b>
<b>Seminar</b>	Participative class	Discussion of applications and problems resolution	<b>9</b>	Problems resolution and cases discussion.	<b>9</b>	2	<b>20/0.8</b>
<b>Laboratory</b>	Laboratory practice	Practice development	<b>15</b>	Preparation of a practice report, study and examination.	<b>15</b>		<b>30/1.2</b>
<b>Supervised activities</b>	Monographic exercise	Student orientation.	<b>1</b>	Preparation of presentation.	<b>10</b>		<b>11/0.44</b>
<b>Total</b>			<b>60</b>		<b>86</b>	4	<b>150/6</b>

Due to the special circumstances derived from sanitary crisis caused by the COVID-19, this subject can be taught through on-site and off-site classes. As long as circumstances allow it, exams, seminars, practical activities

and plenary lectures will be carried out as on-site activities. If circumstances require a modification in the degree of on-site sessions, this will be informed in due time.

## Development plan

### Lectures

These will be taught with the whole group. The aim is to provide a general view of the contents specifically related with the course with emphasis on skills that refer to food processing.

### Lab practice

Assistance to this activity is compulsory. Lab practice will be carried out in groups of 3-4 students and will take place in the pilot plant of the food technology department.

### Course project

It will be proposed to small groups. Each group will prepare a brief oral exposition and a written document and will have to attend to the scheduled meetings in order to follow up the development of the work.

## Evaluation

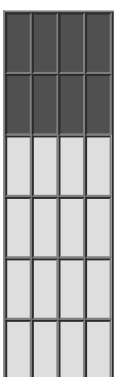
1. **Seminars: 20%.**
2. **Written test I (individual): 30%.**
3. **Written test II (individual): 30%.**
5. **Lab practice: 10%.**

A memory will be presented. Formal (1/10), bibliographical (2/10) and conceptual (6/10) aspects will be evaluated.

6. **Packaging project activity: 10%.**

### Observations

In order to pass the subject, a minimum mark of 5.0 in the written tests is required.







## Bibliography

### Basic bibliography

- BRODY, A.L. Envasado de alimentos en atmósferas controladas, modificadas y a vacío. Ed. Acribia. Saragossa (1996).
- COLES, R., McDOWELL, D., KIRWAN, M.J. Food packaging technology. Ed. Blackwell, Boca Raton, EEUU (2003).
- LEE, D.S., YAM, K. L. Food packaging, science and technology. Ed. CRC Press, Boca Raton, EEUU (2008).
- ROBERTSON, G.L. Food packaging: principles and practice. Ed Marcel Dekker Inc, Nova York, EEUU (1992).
- YAM, K.L. The Wiley encyclopedia of packaging technology. Ed. John Wiley & Sons. Hoboken, EEUU (2009).
- DAVID, J.R.D., GRAVES, R.H., SZEMPLENSKI, T. Handbook of aseptic processing and packaging. Ed. CRC. Boca Raton, FL, EEUU (2010).

### Additional bibliography

- BALDWIN, E.A. Edible coatings and films to improve food quality. Ed Technomic Publ. Co. Inc., Lancaster, EEUU (1994).
- BARNES, K.A., SINCLAIR, R., WATSON, D.H. Chemical migration and food contact materials. Ed. Woodhead, Cambridge, UK (2007).
- CHIELLINI, E. Environmentally compatible food packaging. Ed. Woodhead, Cambridge, UK (2008).
- HAN, J.H. Innovations in food packaging. Ed. Elsevier Academic Press, San Diego, EEUU (2005).
- PARRY, R.T. Envasado de los alimentos en atmósfera modificada. A. Madrid Vicente ediciones (1995).
- THEOBALD, N., WINDER, B. Packaging closures and sealing systems. Ed. CRC Press. Boca Raton, EEUU (2006).