



Universitat de Lleida

# DEGREE CURRICULUM **ANIMAL FOOD PROCESSING TECHNOLOGY**

Coordination: MOLINO GAHETE, FRANCISCO

Academic year 2022-23

## Subject's general information

Subject name	ANIMAL FOOD PROCESSING TECHNOLOGY			
Code	102236			
Semester	1st Q(SEMESTER) CONTINUED EVALUATION			
Typology	Degree	Course	Character	Modality
	Bachelor's Degree in Food Science and Technology	3	COMPULSORY	Attendance-based
Course number of credits (ECTS)	6			
Type of activity, credits, and groups	Activity type	PRALAB	PRAULA	TEORIA
	Number of credits	1.6	1.4	3
	Number of groups	1	1	1
Coordination	MOLINO GAHETE, FRANCISCO			
Department	FOOD TECHNOLOGY, ENGINEERING AND SCIENCE			
Teaching load distribution between lectures and independent student work	lectures 60h independent student work 90h			
Important information on data processing	Consult <a href="#">this link</a> for more information.			
Language	Catalan 60% Spanish 40%			

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
IBARZ MARTINEZ, RAQUEL	raquel.ibarz@udl.cat	3	
MOLINO GAHETE, FRANCISCO	francisco.molino@udl.cat	2	Office: 2.02.04 8.00h-18h
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## Subject's extra information

**DEGREE IN FOOD SCIENCE AND TECHNOLOGY** This subject is part of a block of Food Technology subjects that are taken during the third year of the Degree studies. This block of subjects is oriented towards the study of food preparation processes, applying the knowledge acquired in subjects of a transversal nature, specifically in the subjects of Fundamentals of Food Engineering and Processes in the Food Industry. In this particular subject, the processes of meat transformation and production of meat products, fish and egg products are studied. These processes range from slaughter technologies to obtain fresh meat, specific technologies for the production of cured and cooked meat products, fishery products, egg products and honey. It also includes issues related to traceability, the management of waste from these industries and the environment.

### Recommendations:

It is recommended to have passed, or at least have completed the following subjects: Food Physics and Chemistry I and II, Food Microbiology and Parasitology, Production of Raw Materials of Animal Origin, Fundamentals of Food Engineering and Food Industry Processes.

## Learning objectives

- Know the processes of elaboration of products of animal origin with greater frequency in our industries (except milk and dairy products).
- Select the most suitable equipment and facilities for the processing lines of the main products of animal origin.
- Resolve incidents and make decisions that may be decisive to ensure the correct processing of meat, meat products and other foods of animal origin such as fish, honey and eggs.
- Demonstrate knowledge of the market and consumption trends for products of animal origin.
- Plan and develop new products and processes.

## Competences

DEGREE IN FOOD SCIENCE AND TECHNOLOGY

**General skills At a minimum, the following basic skills will be guaranteed:**

CG2: That students know how to apply their knowledge to their work or vocation in a professional way and possess the skills that are usually demonstrated through the elaboration and defense of arguments and the resolution of problems within their area of study.

CG3: That students have the ability to gather and interpret relevant data to make judgments that include a reflection on relevant issues of a social, scientific or ethical nature.

CG4: That students can transmit information, ideas, problems and solutions to both a specialized and non-specialized public.

CG5: That students have developed those learning skills necessary to undertake further studies with a high degree of autonomy. In addition, the graduate must be able to:

CG6: Analyze specific situations, define problems, make decisions and implement action plans in the search for solutions.

CG7: Interpret studies, reports, data and analyze them numerically.

CG8: Select and manage available written and computerized sources of information related to professional activity.

CG9: Use existing computer and communication tools as support for the development of their professional activity (UdL strategic competence)

CG10: Work alone and in a multidisciplinary team.

CG11: Understand and express oneself in the appropriate terminology.

CG12: Present information correctly orally and in writing (UdL strategic competence)

CG13: Discuss and argue in various forums.

CG14: Communicate and master a foreign language (UdL strategic competence)

CG15: Recycle in the new technological advances through continuous learning.

CG16: Assess comprehensive training, personal motivation and mobility.

CG17: Analyze and assess the social and ethical implications of professional activity.

CG18: Have a critical and innovative spirit.

CG19: Analyze and assess the environmental implications in their professional activity.

GC20: Respect the fundamental rights of equality between men and women, the promotion of Human Rights and the values of a culture of peace and democratic values.

**Specific skills After completing their studies, the graduate in Food Science and Technology will have acquired the following knowledge and skills Food Technology**

CE18: Know the production systems of raw materials of animal and plant origin.

CE19: Know the technological aspects of animal production that determine the quality of the raw materials for their subsequent transformation.

CE20: Evaluate the characteristics of the main plant varieties and their aptitude for the different transformation processes.

CE21: Know the fundamentals and know how to apply the basic operations in food manufacturing processes.

CE22: Know food processing equipment and know how to use it.

CE23: Schematize, based on flow charts, the processes of preparing and preserving food.

CE24: Identify and evaluate raw materials, ingredients, additives and technological aids for use in the agri-food industry.

CE25: Know the function of ingredients and food additives.

CE26: Apply basic knowledge about raw materials, ingredients and additives in food formulation.

CE27: Interpret the physical and chemical changes that occur during the different processes of food preparation.

CE28: Modify the processes of preparing a food based on certain objectives.

CE29: Select equipment and organize food processing and packaging lines.

CE30: Develop new processes and products. CE31: Identify and assess the various parts of a project for an agri-food industry.

CE32: Dimension production lines.

CE33: Estimate equipment capacities for production lines and the needs for auxiliary systems.

## Subject contents

### DEGREE IN FOOD SCIENCE AND TECHNOLOGY

**CHAPTER I - INTRODUCTION** The Meat Sector. Structure of the meat sector. Economic importance. Current situation of the meat industry in Spain. The meat sector before the Single European Market. Sectoral perspectives. National and international exhibitions. Basic legislation of the sector. Technical-Sanitary Regulations. Quality standards for meat products.

**CHAPTER II - MEAT PRODUCTION TECHNOLOGY:** Sacrifice technology. Transportation. Reception and identification. Stabbing and ante-mortem inspection. Basic facilities of a slaughterhouse. Pig slaughter line. Beef slaughter line. Poultry slaughter line. Slaughter phases and facilities. Valuation and classification of the carcasses. Assessment: Classification systems. Instrumental classification. Classification of pork, beef and poultry. Meat quality: ante-mortem and post-mortem factors affecting meat quality. Slaughterhouse by-products. By-product classes. Edible by-products. Bones. Mechanically recovered meat (MDM). Use of blood. Other by-products. Scandal and valuation of channels. Refrigeration and freezing of meat. cooling systems. cooling methods. Cold storage of meat. Basic aspects of meat freezing processes. Freezing speed and time. Frozen storage. Thawing. Industrial defrosting procedures.

**CHAPTER III - MEAT PRODUCT MANUFACTURING TECHNOLOGY:** Classification of meat products. Fresh meat products. Cured meat products. Heat-treated meat products. Basic principles of curing. Adjuvants and ingredients. Raw-cured sausages. Classification and Quality Standards. Raw materials: selection criteria. Additives. Starter cultures: starters. Casings: natural and artificial. Description of the production process: chopping, kneading, stuffing, drying / maturing and final conditioning. Technological alternatives: fast curing and slow curing. Defects and alterations of raw cured sausages. Cured ham. Specifications for the production of Serrano ham. Control stamp. Raw material: selection criteria. Additives. Description of the elaboration process: reception, salting, post-salting, drying/maturation and final conditioning. Fast-curing and slow-curing ham production technology. Defects and alterations of cured ham. Certified quality products. PDO and PGI Fundamentals of drying and dryers. Cooked ham. Classification and Quality Standards. Raw materials and additives. Formulation and preparation of brine. Description of the manufacturing process: Previous operations, injection, massage, model, firing and final conditioning. "Zero waste" ham. Alternatives and new technologies for the manufacture of cooked ham. Defects and alterations of cooked ham. Heat-treated meat products. Classification and Regulation of heat-treated meat products. Cooked sausages: Raw materials and formulation. Production technology: minced / emulsion, stuffing, cooking / smoking and final conditioning. Co-extrusion system for the manufacture of sausages. Mortadella: Ingredients and formulation. Description of the elaboration process. Pates: Ingredients and formulation. Description of the elaboration process.

**CHAPTER IV - TECHNOLOGY FOR PREPARED DISHES:** Technology for the elaboration of prepared dishes

Packaging and clean rooms. Industrial slicing and packaging systems. Packaging of fresh meat, meat products and dishes prepared in modified atmospheres. Selection of gas barrier. Active packaging and intelligent packaging.

## CHAPTER V - TECHNOLOGY FOR PROCESSING FISHERY PRODUCTS

## CHAPTER VI - EGG PRODUCT PROCESSING TECHNOLOGY

CHAPTER VI- TRACEABILITY AND ENVIRONMENTAL IMPACT Traceability in the Meat Sector. Definition of traceability. Back traceability. Internal traceability. Traceability forward. Phases for the implementation and improvement of a traceability system Environmental impact of the Industry. General analysis of the contamination produced by the different types of facilities in the meat sector: slaughterhouses, cutting plants and meat product processing plants. Detection and analysis of operations with significant environmental impact.

### Practical activities

- Practices of cured/drying products
- Practice of elaboration of a fine paste emulsified in hot and cooked (pâté)

**Visits** (as long as there is date availability):

- Slaughterhouse and cutting room. Pork, beef and poultry lines
- Industrial plant for the production of cured and cooked meat products

### Seminars:

- Problems of the implementation of the traceability system in the meat sector

## Methodology

### Methodology

- (1). Master classes. Explanation of the main concepts taught in the subject.
- (2). Solution of problems and cases simulating real situations (participatory classes and practicals).
- (3). Seminar (participatory class).
- (4). Directed activities: tutorials.

## Development plan

The teaching of the subject is distributed in 36 hours (3.6 ECTs) of face-to-face participatory master classes, where the students previously have the documentation. At the end of each session, questions will be asked regarding the most outstanding topics of the same. The seminars involve 10 hours of teaching (1 ECTs) in which special emphasis will be placed on solving real situations related to the calculation of carcass cooling times, drying, thermal treatments, brine determination and traceability. The practical teaching will be given in the pilot plant of Food Technology and practical laboratory of building 3 in 8 hours (0.8 ECTs) and will deal with the handling of laboratory equipment for the determination of the drying of products of animal origin and the elaboration of an hot emulsion for the production of a fine paste treated by heat. A visit will be made to companies in the sector as long as it is possible for food safety and availability of dates (0.4 ECTs).

## Evaluation

There will be two written or partial tests set in advance in the academic calendar that consist of short concise answer questions, multiple choice, T/F and problems (45%+45% of the final grade) related to the theory classes and seminars . The remaining 10% of the final grade is the evaluation of the practices by means of an independent

test (multi-choice multiple-choice questions) that will be carried out in a maximum of 30 minutes on the same day as the first partial exam. Each partial/written test lasts 2 hours (0.4 ECTs) and 50% of each partial/written test must be passed to pass the subject and be able to add the evaluation obtained in the independent test on practices to the final grade. The final grade in the case of the 2 failed partial exams is the average of them and if one of them is passed, the final grade may not be higher than 4. Average could only be made if the failed part has obtained at least a 4.6.

For informational and approximate purposes, the first part consists of about 30 T/F test questions and three problems related to carcass cooling times, drying, heat treatments or brine-determination calculation seminars. The second part consists of a number of test questions similar to the first and some concise answer questions.

Carrying out the practices and their evaluation is neither mandatory nor suspended, but without their completion you will not be able to opt for the highest qualification.

## **Attitude to follow in the event of a voluntary or accidental infringement of the rules for conducting the exam:**

The voluntary or accidental infraction of the rules for carrying out the exam prevents its assessment. Therefore, the offender fails the subject without the option of recovery with a "0". If intentionality in the deception is confirmed, it will be considered a very serious ethical misconduct, and the Services Inspection will be informed to take the disciplinary measures it deems appropriate.

**The student has the right to carry out an alternative evaluation to the continuous evaluation as long as he follows the regulations regarding said evaluation process.**

## Bibliography

BERMEJO, A. "El matadero, centro de control higiénico de la carne". Ed. Ayala (1991). CORETTI, K. "Embutidos: elaboración y defectos". Acribia. Zaragoza (1986).

PRANDL, O.. "Tecnología e higiene de la carne". Acribia (1994)

PRICE, J.F, SCHW EIGERT, B."Ciencia de la carne y de los productos cárnicos".2ª ed. Acribia (1994).

REICHERT, J.E. "Tratamiento térmico de los productos cárni-cos". Acribia. Zaragoza (1988).

GIRARD, J.P. "Tecnología de la carne y de los productos cárni-cos". Acribia. Zaragoza (1991). GRACEY, J.F. "Higiene de la carne". Ed Interamericana-Mc Graw-Hill. México (1989).

IBARZ, A. y BARBOSA-CÁNOVAS, G.V. (2005). *Operaciones Unitarias en la Ingeniería de Alimentos*. Mundiprensa, Madrid

LAW RIE, R. "Avances en la ciencia de la carne". Acribia (1984). MOHLER, K. "El curado" Acribia (1982).

YAGÜE, A. "Preparación, fabricación y defectos de los embutidos curados". Ed Ayala (1992).

CORETTI, K. Embutidos: elaboración i defectos. Acribia. Zaragoza (1986)

GIRARD, J.P. Tecnología de la carne i de los productos cárnicos. Acribia. Zaragoza (1991).

MARTÍN BEJARANO, S. Enciclopedia de la carne i de los productos cárnicos. Vols. I i II. Ediciones Martin&Macias (2001)

MOHLER, K. El curado. Acribia. Zaragoza (1982)

ORDÓÑEZ, J.A.; CAMBERO, I.; FERNÁNDEZ, L.; GARCÍA, ML.; GARCÍA DE F., G.; SELGAS, MD. Tecnología de los Alimentos. Vol II: Alimentos de origen animal. Ed. Síntesis. Madrid. (1998).