

COURSE PROGRAM

Academic year 2025/2026

Identification and characteristics of the course			
Code	EIA: 501261 CUSA: 502136	ECTS Credits	6
Course name (English)	Food Industries of Animal Raw Products		
Course name (Spanish)	Industrias de Materias Primas Animales		
Degree programs	INGENIERÍA DE LAS INDUSTRIAS AGRARIAS Y ALIMENTARIAS		
Faculty/School	Escuela de Ingenierías Agrarias (EIA) (Badajoz) Centro Universitario Santa Ana (CUSA)		
Semester	First (7th)	Type of course	Mandatory
Module	Tecnología de los Alimentos.		
Matter	Industrias Agroalimentarias		
Lecturer/s			
Name	Office	Email	Web page
EIA: Ana Isabel Carrapiso Martínez	Jerte Valley Building.D712	acarrapi@unex.es	https://www.unex.es/conoce-la-unex/centros/eia/centro/profesor/info/profesor?id_pro=acarrapi http://campusvirtual.unex.es/zonaux/avuex/course/view.php?id=3691
CUSA: Enrique Riaguas Sanz	L	eriaguas@univsanta-na.com	
Subject Area	Food Technology		
Department	Animal Production and Food Science.		
Coordinating Lecturer (If more than one)	Ana Isabel Carrapiso Martínez (EIA) (Intercenter)		
Competencies /Learning outcomes*			
COMPETENCIES BASICS AND GENERALS			
CG7 - Knowledge of basic scientific and technological subjects that allows for continuous learning, as well as the ability to adapt to new situations or changing environments.			
CG8 - Problem-solving skills with creativity, initiative, methodology and critical reasoning.			
CG10 - Ability to search for and use the rules and regulations related to their field of action.			
CB1 - That students have demonstrated that they possess and understand knowledge in an area of study that forms part of general secondary education and is usually at a level that, while supported by advanced textbooks, also includes some aspects that involve knowledge from the forefront of their field of study.			
CB2 - Students should know how to apply their knowledge to their work or vocation in a professional manner 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.			

CB3 - Students should have the ability to gather and interpret relevant data (normally within their area of study) to make judgments that include a reflection on relevant issues of a social, scientific or ethical nature.

CB4 - Students can transmit information, ideas, problems and solutions to both specialized and non-specialized audiences.

CB5 - Students have developed the learning skills necessary to undertake further studies with a high degree of autonomy.

TRANSVERSALS

CT1 - ICT Mastery.

SPECIFICS

CETE1 - Ability to understand, comprehend, and utilize the principles of food engineering and technology. Basic food engineering and operations. Food technology. Processes in the agri-food industry. Modeling and optimization. Food quality and safety management. Food analysis. Traceability.

CETE2 - Ability to understand, comprehend, and utilize the principles of engineering in the agri-food industry. Auxiliary equipment and machinery for the agri-food industry. Process automation and control. Engineering of construction projects and facilities. Agro-industrial construction. Waste management and utilization.

LEARNING OUTCOMES

- Demonstrate adequate knowledge of the most relevant aspects of the food processing industries based on animal raw materials and the processes that take place in them.
- Know, understand and use the principles of food engineering and technology applied to food transformation processes vegetables in the different food industries, as well as the use of the main by-products.
- Know, understand, and utilize the principles of agri-food industry engineering applied to the auxiliary equipment and machinery used in industries related to the processing of plant-based foods.
- Acquire knowledge of automation and control of plant-based food processing processes.
- Select and structure information to propose development processes that meet specific requirements, and demonstrate that they can justify and evaluate them.
- Demonstrate that you can interpret and summarize information about the processes carried out in the agri-food industries.
- Correctly use ICT to search for information, process it, and prepare reports.

Contents

Course outline*

Meat and meat product processing technology. Fishery and aquaculture product processing technology. Milk and dairy product technology. Egg and egg product processing technology. Honey and honey derivatives technology. Disposal and utilization of by-products.

SUSTAINABLE DEVELOPMENT GOALS CONTEMPLATED

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 <input type="checkbox"/>	 <input checked="" type="checkbox"/>	 <input checked="" type="checkbox"/>	 <input type="checkbox"/>	 <input type="checkbox"/>	 <input type="checkbox"/>

Course syllabus
<p>BLOCK 1. GENERALITIES (LARGE GROUP)</p> <p>Competencies: CETE1. Learning outcomes: RA136.</p>
<p>Name of lesson 1: Introduction to the food industries focused on obtaining and/or processing animal raw materials. Contents of lesson 1: Generalities: historical importance of foods of animal origin and related industries, general characteristics of factories, factors that limit the consumption of these foods by the consumers, trends in the demand for new foods of animal origin, Sustainable Development Goals (SDG). Description of the practical activities of lesson 1: see lesson P8.</p>
<p>BLOCK 2. DAIRY INDUSTRIES. (LARGE GROUP and other activities: development of cooperative work, classroom activities).</p> <p>Competencies: CG7, CG8, CG10, CB1, CB3, CB4, CB5, CT1, CETE1. Learning outcomes: RA136, RA140, RA141, RA142.</p>
<p>Name of lesson 2: Dairy Industries. Types of establishments and characteristics. Contents of lesson 2: Definition of dairy establishments; classification and definition of the different types of establishments; general characteristics. Description of the practical activities of lesson 2: none.</p>
<p>Name of lesson 3: Production, transport, and collection centers. Initial milk processing. Contents of lesson 3: Production farms, transportation, and collection centers; milk collection, storage, and transportation; initial or common treatments: physical purification, thermization, microfiltration, refrigeration, standardization, and homogenization. Description of the practical activities of lesson 3: none.</p>
<p>Name of lesson 4: Treatment facilities. Heat preservation treatments: pasteurization and sterilization. Contents of lesson 4: Introduction; pasteurization: introduction and systems; sterilization: introduction and systems. Description of the practical activities of lesson 4: none.</p>
<p>Name of lesson 5: Preservation treatments: reduction of water activity (evaporated, condensed and powdered milk). Contents of lesson 5: Processes for obtaining evaporated, condensed and powdered milk. Description of the practical activities of lesson 5: none.</p>
<p>Name of lesson 6: Modified milks: flavored milks, enriched and diet milks. Contents of lesson 6: Introduction; flavoring milk process, enriched and diet milks (low-lactose, low-sodium, etc.). Description of the practical activities of lesson 6: none.</p>
<p>Name of lesson 7: Ice cream, sorbet and popsicle manufacturing industries. Contents of lesson 7: Introduction; characteristics of industries; raw materials; manufacturing process. Description of the practical activities of the topic 7: see lesson P7.</p>
<p>Name of lesson 8: Cream, butter and fermented milk processing industries. Contents of lesson 8: Introduction; cream production process; butter production process using continuous and batch systems; yogurt and other fermented milk production processes.</p>

Description of the practical activities of the topic 8: see lesson P6.
Name of lesson 9: Cheese industries. Contents of lesson 9: Introduction; Raw materials; Preparation. Description of the practical activities of the topic 9: see lesson P5.
BLOCK 3. MEAT INDUSTRIES. (LARGE GROUP and other activities: development of cooperative work, classroom activities). Competencies: CG7, CG8, CG10, CB1, CB3, CB4, CB5, CT1, CETE1. Learning outcomes: RA136, RA140, RA141, RA142.
Name of lesson 10: Meat industries. Introduction. Types of establishments and characteristics. Contents of lesson 10: Introduction. Types of meat establishments; classification of meat products. Description of the practical activities of lesson 10: none.
Name of lesson 11: Slaughterhouses for livestock: operations prior to stunning. Contents of lesson 11: Introduction; Fresh meat production process: animal transport, stabling, showering, animal welfare. Description of the practical activities of lesson 11: none.
Name of lesson 12: Slaughterhouses for livestock: stunning I. Contents of lesson 12: Introduction to stunning; mechanical methods: generalities, types. Description of the practical activities of lesson 12: none.
Name of lesson 13: Slaughterhouses for livestock: stunning II. Contents of lesson 13: Electrical methods: generalities, types. Description of the practical activities of lesson 13: none.
Name of lesson 14: Slaughterhouses for livestock: stunning III. Contents of lesson 14: Controlled atmosphere methods: generalities, types. Description of the practical activities of lesson 14: none.
Name of lesson 15: Slaughterhouses for livestock: post-stunning operations. Contents of lesson 15: Hanging, bleeding, and slaughtering; strategies to prevent the development of rigor mortis in the slaughterhouses. Description of the practical activities of lesson 15: none.
Name of lesson 16: Cutting rooms. Cutting. Mechanically separated meats. Contents of lesson 16: Introduction; hot and cold cutting; introduction and methods for obtaining mechanically separated meats. Description of the practical activities of lesson 16: none.
Name of lesson 17: Meat preservation by cold. Electrical stimulation of carcasses. Refrigeration and freezing. Contents of lesson 17: Introduction; preliminary operations: ripening and electrical stimulation; cooling; freezing. Description of the practical activities of lesson 17: none.
Name of lesson 18: Meat processing industries. meat derivatives. Contents of lesson 18: Introduction to meat derivatives; preparation of meat products. Description of the practical activities of lesson 18: see lessons P1, P2 and P4.
BLOCK 4. FISHING INDUSTRIES. (LARGE GROUP and other activities: development of cooperative work, classroom activities). Competencies: CG7, CG8, CG10, CB1, CB3, CB4, CB5, CT1, CETE1. Learning outcomes: RA136, RA140, RA141, RA142.
Name of lesson 19: Fishing industries: types of establishments and characteristics.

<p>Contents of lesson 19: Fishing industries: introduction, types of establishments, general characteristics and classification; classification of fishing species. Description of the practical activities of lesson 19: none.</p>
<p>Name of lesson 20: Fresh fish industries. Slaughter. Contents of lesson 20: Fresh fish industries: introduction, pre-slaughter operations, and slaughter. Description of the practical activities of lesson 20: none.</p>
<p>Name of lesson 21: Fresh fish industries. Preparation and preservation. Contents of lesson 21: Preparation; refrigeration; packaging. Description of the practical activities of lesson 21: none.</p>
<p>Name of lesson 22: Freezing of fishery products. Contents of lesson 22: Introduction; preparation of fishery products (including mechanically separated fishery products); freezing procedures. Description of the practical activities of lesson 22: none.</p>
<p>Name of lesson 23: Other fishery product industries. Contents of lesson 23: Fish salting and dehydration industries: main types and processing processes; others. Description of the practical activities of lesson 23: see lesson P3.</p>
<p>BLOCK 5. EGG AND EGGS PRODUCTS AND BEEKEEPING PRODUCTS INDUSTRIES. (LARGE GROUP and other activities: development of cooperative work, classroom activities).</p> <p>Competencies: CG7, CG8, CG10, CB1, CB3, CB4, CB5, CT1, CETE1. Learning outcomes: RA136, RA140, RA141, RA142.</p>
<p>Name of lesson 24: Egg and egg products and beekeeping industries. Contents of lesson 24: Characteristics of the egg and egg products and beekeeping industries; methods of egg processing and preservation, and egg product production. Description of the practical activities of lesson 24: none.</p>
<p>BLOCK 6. USE OF LOW-VALUE PRODUCTS. (LARGE GROUP)</p> <p>Competencies: CG7, CG8, CG10, CB1, CB3, CB4, CB5, CETE1, CETE2. Learning outcomes: RA136, RA140, RA141.</p>
<p>Name of lesson 25: Utilization of low-value products from the meat and fishing industries. Contents of lesson 25: Introduction; technological processes for the industrial use of skin, skeleton, fins, blood, viscera, and other meats for food. Description of practical activities of lesson 25: none.</p>
<p>Name of lesson 26: Utilization of low-value products from the dairy industry. Contents of lesson 26: Technological processes for the industrial use of cheese and butter whey; processes for obtaining caseins, caseinates, and whey-derived products. Description of practical activities of lesson 26: none.</p>
<p>SEMINAR/LABORATORY</p>
<p>Name of lesson P1: Production of fresh raw and restructured meat products. Contents of lesson P1: Production of fresh raw products in the pilot plant. Number of hours planned: 3 hours.</p> <p>Type and location: MEAT PILOT PLANT. Skills developed: CG7, CG8, CB1, CB5, CETE1. Learning outcomes: RA136, RA141. Materials and instruments to be used: necessary equipment, containers, scales, refrigerator or refrigeration chamber, necessary raw materials.</p>
<p>Name of lesson P2: Production of matured sausages.</p>

<p>Contents of lesson P2: Production of matured sausages. Monitoring the ripening process during the practical sessions. Number of hours planned: 3 hours.</p> <p>Type and location: MEAT PILOT PLANT. Skills developed: CG7, CG8, CB1, CB5, CETE1. Learning outcomes: RA136, RA141. Materials and instruments to be used: necessary equipment, containers, scales, refrigerator or refrigeration chamber, necessary raw materials.</p>
<p>Name of lesson P3: Production of fishery products. Contents of lesson P3: Production of fishery products. Number of hours planned: 3 hours.</p> <p>Type and location: MEAT PILOT PLANT. Skills developed: CG7, CG8, CB1, CB5, CETE1. Learning outcomes: RA136, RA141. Materials and instruments to be used: necessary equipment, containers, scales, refrigerator or refrigeration chamber, necessary raw materials.</p>
<p>Name of lesson P4: Production of heat-treated products. Contents of lesson P4: Preparation of a heat-treated product. Heat treatment or cooking and calculation of yield and water and fat losses when possible. Number of hours planned: 3 hours.</p> <p>Type and location: MEAT PILOT PLANT. Skills developed: CG7, CG8, CB1, CB5, CETE1. Learning outcomes: RA136, RA141. Materials and instruments to be used: necessary equipment, containers, scales, refrigerator or refrigeration chamber, necessary raw materials.</p>
<p>Name of lesson P5: Making cheese and cottage cheese. Contents of lesson P5: Making cheese and cottage cheese. Number of hours planned: 3 hours.</p> <p>Type and location: DAIRY PILOT PLANT. Skills developed: CG7, CG8, CB1, CB5, CETE1. Learning outcomes: RA136, RA141. Materials and instruments to be used: necessary equipment, containers, scales, refrigerator or refrigeration chamber, necessary raw materials.</p>
<p>Name of lesson P6: Making yogurt and butter. Contents of lesson P6: Making yogurt and butter. Number of hours planned: 3 hours.</p> <p>Type and location: DAIRY PILOT PLANT. Skills developed: CG7, CG8, CB1, CB5, CETE1. Learning outcomes: RA136, RA141. Materials and instruments to be used: necessary equipment, containers, scales, refrigerator or refrigeration chamber, necessary raw materials.</p>
<p>Name of lesson P7: Production of ice cream and/or other dairy products. Contents of lesson P7: Production of ice cream and/or other dairy products. Number of hours planned: 2 hours.</p> <p>Type and location: DAIRY PILOT PLANT. Skills developed: CG7, CG8, CB1, CB5, CETE1.</p>

Learning outcomes: RA136, RA141.
Materials and instruments to be used: necessary equipment, containers, necessary raw materials.

Name of lesson P8: Visit to an industry related to the course content.
Contents of lesson P8: Visit to an industry related to the contents of the course.
Number of hours planned: 2.5 hours.

Type and location: INDUSTRY OR SIMILAR.
Skills developed: CG7, CG8, CB1, CB5, CETE1.
Learning outcomes: RA136, RA141.
Material and instruments to be used: Bus.

Educational activities *

Student workload in hours by lesson		Lectures	Practical activities				Monitoring activity	Homework
Lesson	Total		HI	LAB	COM	SEM		
1	2	1						1
2	2	1						1
3	4	2						2
4	4	1					1.5	1.5
5	2.5	1						1.5
6	2	1						1
7	4	2						2
8	3	1						2
9	6.5	2					1.5	3
10	4	2						2
11	3.5	1.5						2
12	4	2						2
13	4	2						2
14	5.5	1					1.5	3
15	2	1						1
16	3	1						2
17	3	1						2
18	4	2						2
19	2	1						1
20	2	1						1
21	5	2						3
22	4	2						2
23	3	1						2
24	2	1						1
25	2	1						1
26	2	1						1
P1	4			3				1
P2	7.5			3			1.5	3
P3	4			3				1
P4	4			3				1
P5	4			3				1
P6	4			3				1

P7	3.5			2			1
P8	6.5			2		1.5	3
Assessment **	27.5	2		0.5			25.5
Total	150	37.5		22.5		7.5	82.5

L: Lectures (85 students)

HI: Hospital internships (7 students)

LAB: Laboratory or field practices (15 students)

COM: Computer room or language laboratory practices (20 students)

SEM: Problem classes or seminars or case studies (40 students)

SGT: Scheduled group tutorials (educational monitoring, ECTS type tutorials)

PS: Personal study, individual or group work and reading of bibliography

Teaching Methodologies*

1. Expository classes and discussion of theoretical contents.
10. Search and management of scientific bibliography.
11. Taking exams
14. Planning and development of an assignment.
3. Laboratory, pilot plant and field practices.
6. Development and presentation of seminars.
7. Use of the virtual classroom.
8. Visits.
9. Study of the matter.

Learning outcomes

RA136. Demonstrate adequate knowledge of the most relevant aspects of animal-based food processing industries and the processes involved.

RA140. Be able to select and structure information to propose development processes that meet specific requirements, and demonstrate that they can be justified and evaluated.

RA141. Demonstrate that information about the processes carried out in the agri-food industries can be interpreted and summarized.

RA142. Correctly use ICTs to search for information, process it, and prepare reports.

- Demonstrate adequate knowledge of the most relevant aspects of the animal origin food processing industries and the processes that take place in them.
- Know, understand and use the principles of food engineering and technology applied to food transformation processes vegetables in the different food industries, as well as the use of the main by-products.
- Know, understand, and utilize the principles of agri-food industry engineering applied to the auxiliary equipment and machinery used in industries related to the processing of plant-based foods.
- Acquire knowledge of automation and control of plant-based food processing processes.
- Select and structure information to propose development processes that meet specific requirements, and demonstrate that they can be justified and evaluated.
- Demonstrate ability to interpret and summarize information about the processes carried out in the agri-food industries.
- Correctly use ICT to search for information, process it and prepare reports.

Assessment systems *

Assessment system with a single final global test:

Assessment criteria:

- Be able to adequately respond to questions related to the processes carried out in the food industry for obtaining and/or processing animal raw materials.
- Demonstrate sufficient knowledge of the equipment and facilities used in this type of industry.

Activities and Assessment instruments:

- Final exam, based on short and/or multiple-choice questions on the lectures and seminar-laboratory activities. Questions on the lectures will be worth 63% of the grade, and those on the practical exam will be worth the remaining 37%. A grade of at least 5 out of 10 is required to pass the course.

Continuous assessment system:

Assessment criteria:

- Be able to adequately respond to questions related to the processes carried out in the food industry for obtaining and/or processing animal raw materials.
- Demonstrate sufficient knowledge of the equipment and facilities used in this type of industries.
- Develop appropriate work related to the subject and participate in self-assessment and peer assessment tasks.
- Active and appropriate participation in the tasks proposed during the development of the course.

Activities and instruments for continuous assessment:

- Final exam on lectures, based on short and/or multiple-choice questions. It will account for 50% of the final grade. A grade of at least 4 out of 10 is required. Optionally, during the term, there may be midterm exams, which will be eliminatory if the students score more than 5 out of 10.
- Questionnaires and/or exams taken during the practices are mandatory for continuous assessment. They will account for 25% of the final grade. They cannot be retaken.
- Preparation and presentation of a cooperative project related to the subject. It will account for 10% of the final grade. It cannot be retaken.
- Class activities. These will account for 15% of the final grade. Non-recoverable.

To pass the course, it is required to obtain a grade equal to or greater than 5 out of 10 in the resulting grade for all activities, in addition to obtaining at least a 4 on the final exam for the lectures-based exams not eliminated by midterms.

The choice of the assessment system with a single final global test is up to the students, who may complete it during the first quarter of the course period. Requests must be made through a dedicated space on the Virtual Campus. If the student does not expressly request it, the method assigned will be continuous assessment.

Bibliography (basic and complementary)

Basic bibliography.

Meat industries.

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- DURAND, P. (2002). "Technology of charcuterie and cured meat products." Ed. Acribia. Zaragoza.
- MARTÍN BEJARANO, S. (2001). "Encyclopedia of Meat and Meat Products." Ed. Martín & Macías. Plasencia.
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- PÉREZ ALVAREZ, J.A., FERNÁNDEZ LÓPEZ, J., BARBERÁ SKIRTS, E. (editors) (2007). "*Industrialization of animal products*". Vol. I and II. Miguel Hernández University. Elche.
- VENTANAS, J. (2001). "Iberian ham technology. From traditional systems to the rational exploitation of flavor and aroma." Ed. Ediciones Mundi-Prensa, Madrid.
- VV.AA. (2018). "Meat: Science, Technology, and Health." Institute of Food Science and Technology (INTAL), Medellín.

Dairy industries.

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- University of Guelph. "Dairy Chemistry and Physics." <https://books.lib.uoguelph.ca/dairyscienceandtechnologyebook/part/dairy-chemistry-and-physics/>

Fishing, egg and egg product, and honey industries.

- HALL, G. M. (2010). "Fish Processing: Sustainability and New Opportunities". Ed. Wiley-Blackwell.
- MADRID, A., VICENTE, J.M., MADRID, R. (1999). "Fish and its derived products". Second edition. Ed. Mundiprensa.
- MAGEM, L., ESTEBAN, J. (2010). "Guide to correct hygiene practices for the beekeeping sector." Ed. Generalitat de Catalunya.
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- SIKORSKI, ZE (1994). "Seafood Technology: Resources, Nutritional Composition, and Preservation." Ed. Acribia, Zaragoza.

Complementary bibliography.

- FANKHAUSER, D.B. "*CHeesemaking*". <https://fankhauserblog.wordpress.com/cheese-making-for-new-folks/>
- GENOT, C. (2003). "Freezing and Meat Quality." Ed. Acribia. Zaragoza.

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- MORATA BARRADO, N. (2010). "New Food Preservation Technologies." AMV Editions. 2nd ed.
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- WALSTRA, P. (2001). "Milk Science and Dairy Technology." Ed. Acribia. Zaragoza.

Other resources and complementary educational materials

- Material available on Virtual Campus.
- Spanish Association of Ice Cream Manufacturers: <http://www.aefhelados.com/>
- National Federation of Dairy Industries: <http://www.fenil.org/home.asp>
- Eurocarne: <http://www.eurocarne.com/index.php?/home/index.php>
- University of Guelph: <http://www.foodsci.uoguelph.ca/dairyedu/chem.html>
- Meat Science: <http://www.sciencedirect.com/science/journal/03091740>