

COURSE TEACHING PLAN FOR FOOD TECHNOLOGY¹

Academic year: 2026-2027

Course identification and characteristics			
Code ²	501250	ECTS credits	6
Name (Spanish)	Food Technology		
Name (English)	Food Technology		
Degree programmes ³	Degree in Food Science and Technology/Degree in Agri-Food Industries		
Centre ⁴	School of Agricultural Engineering/ Santa Ana University Centre (CUSA, only the Industries degree)		
Semester	Fourth (4th)/ Sixth (6th)	Type	Compulsory
Module	Food Technology / Specific Technology in Agricultural and Food Industries		
Subject	Food Technology/ Food Engineering and Technology		
Lecturer(s)			
Name		Office	Email
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Knowledge area	Food Technology		
Department	Animal Production and Food Science		
Coordinating lecturer (if there is more than one)	Ana Isabel Andrés Nieto (EIA, Intercentro) Ms. Carmen Vidal-Aragón de Olives (CUSA)		

Competences ⁵ (see table at http://bit.ly/competenciasGrados)
DEGREE IN FOOD SCIENCE AND TECHNOLOGY

¹ In the case of joint, coordinated, inter-centre, PCEO plans, etc., the information for all degrees and all centres must be included in a single sheet.

² If there is more than one code for the same course, include them all.

³ If the course is taught in more than one degree programme, list them all, including PCEOs.

⁴ If the course is taught in more than one centre, include them all

⁵ They must fully comply with what is stated in the verified degree report. In particular:

-In the competences table: CG10 and CG11 are not eligible in GITI; CT8 and CT9 are not eligible in GITI;
CETE1 to CETE10 are eligible in GIE; CETE1 to CETE11 are eligible in GIEyA;
CETE1 to CETE8 are eligible in GIMec; CETE1 to CETE20 are eligible in GITI.

-In teaching methodologies two tables are shown; the first is the one to choose for the Degrees: GIE, GIEyA and GIMec; the second for GITI; in common courses, choose the first. Delete the one that does not apply.

Basic and general course competences:

CB1 - Students must have demonstrated knowledge and understanding in an area of study that builds on general secondary education and is usually at a level that, while supported by advanced textbooks, also includes

some aspects that involve knowledge from the cutting edge of their field of study

CB2 - Students must know how to apply their knowledge to their work or vocation in a professional manner and possess the competences usually demonstrated through the development and defence of arguments and problem-solving within

their area of study

CB3 - Students must have the ability to gather and interpret relevant data (usually within their area of study)

to make judgements that include reflection on relevant social, scientific or ethical issues

CB4 - Students must be able to communicate information, ideas, problems and solutions to both specialist and non-specialist audiences

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

CG3 - In the field of process and product development and innovation, ability to design and develop new processes and

products to meet market needs in the different aspects involved; assess the degree of acceptability of these products on the market; establish their production costs; assess the environmental risks of the new

production processes.

CG4 - In the field of food processing, be able to identify the problems associated with different foods and

their processing, which involves in-depth knowledge of raw materials, interactions between components, the

different technological processes (both production and packaging, storage, transport and distribution of products),

as well as the transformations that products may undergo during these processes; manage processing from an

environmental perspective; establish process-control tools.

CG8 - In the field of legal, scientific and technical advice, be able to study and interpret reports and administrative files concerning a product, in order to provide a reasoned response to the question raised; know the legislation

in force; defend before the administration the need to amend regulations relating to any product.

Cross-curricular course competences:

CT1 - Basic command of ICT.

Specific course competences:

CECTA2 - Ability to know, understand and use the principles of the basic foundations and the technological processes appropriate for food production, packaging and preservation.

CECTA3: Assess the impact of processing on food properties.

CECTA4: Determine the suitability of technological advances for innovation in foods and food-industry processes.

CECTA5: Ability to know, understand and use agri-food industry facilities, their equipment and auxiliary machinery in the agri-food industry.

CECTA6: Ability to know, understand and control processes in the agri-food industry. Modelling and optimisation of food processes.

DEGREE IN AGRI-FOOD INDUSTRIES

Basic and general course competences:

CG6 - Ability to direct and manage all types of agri-food industries, with knowledge of new technologies, quality, traceability and certification processes, and marketing and commercialisation techniques for food products.

CG7 - Knowledge of basic, scientific and technological subjects that allow continuous learning, as well as the ability to adapt to new situations or changing environments.

CB3 - Students must have the ability to gather and interpret relevant data (usually within their area of study) to make judgements that include reflection on relevant social, scientific or ethical issues

CB4 - Students must be able to communicate information, ideas, problems and solutions to both specialist and non-specialist audiences

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

Specific course competences:

CETE1: Food engineering and technology.

Ability to know, understand and use the principles of food engineering and technology. Food engineering and basic operations. Food technology. Processes in agri-food industries. Modelling and optimisation. Quality and food-safety management. Food analysis. Traceability.

Cross-curricular course competences:

CT2 - Knowledge of a foreign language (English)

Contents6

Brief description of the content

In this subject, studies will be carried out related to the technology of processes for preparing raw materials intended for the production and transformation of foods. These processes include cleaning, size reduction, selection and grading, peeling and blanching operations. Technologies for food-preservation processes will also be studied: pasteurization, sterilization, refrigeration, freezing, dehydration, freeze-drying, addition of solutes and smoking. Finally, food packaging, storage, transport and distribution processes will be studied. The relationship with the Sustainable Development Goals (SDGs) will be addressed:



Course syllabus (Large Group activities)

BLOCK I.- INTRODUCTION

Title of Topic 1: Food Science and Technology: concept, history, objectives.

Contents of Topic 1: Historical development. Concept of Food Science and Technology. Objectives of Food Technology. Relationships with other sciences. The current Spanish food industry.

Competences developed: CECTA2

Learning outcomes: RA74

BLOCK II.- TECHNOLOGICAL PROCESSES FOR THE PREPARATION AND TRANSFORMATION OF RAW MATERIALS.

Title of Topic 2.- Raw-material preparation operations (I)

Contents of Topic 2: Receipt of foods in the food industry. Preparation of raw materials. Cleaning: dry and wet methods.

Competences developed: CECTA2, CECTA3, CECTA4, CECTA5 and CECTA6

Learning outcomes: RA71, RA72, RA73, RA74, RA75, RA76 and RA81

Title of Topic 3.- Raw-material preparation operations (II)

Contents of Topic 3: Selection and grading. Peeling. Main peeling methods. Peeling equipment.

Competences developed: CECTA2, CECTA3, CECTA4, CECTA5 and CECTA6

Learning outcomes: RA71, RA72, RA73, RA74, RA75, RA76 and RA81

Description of the practical activities for Topic 3: PRACTICAL 1 Preparation of plant raw materials.

Practical-session contents: Cleaning, peeling and size reduction of different plant raw materials. Blanching by immersion in hot water. Application of the peroxidase test. Analysis and discussion of results.

Type and location: Pilot plant (vegetable PP)

Competences developed: CECTA2

Learning outcomes: RA71, RA72, RA73, RA74, RA75, RA76 and RA81

Materials and instruments to be used: Plant raw materials (courgette, potatoes). Washing-blanching tank. Reagents for peroxidase determination. Raw-material cutting equipment.

Title of Topic 4.- Size reduction and size enlargement (I)

Contents of Topic 4: Objectives. Size reduction of dry foods. Equipment and applications. Size reduction of fibrous foods. Equipment and applications. Effect on foods.

Competences developed: CECTA2, CECTA3, CECTA4, CECTA5 and CECTA6

Learning outcomes: RA71, RA72, RA73, RA74, RA75, RA76 and RA81

Description of the practical activities for Topic 4: PRACTICAL 4: Technology for producing a meat product.

Practical-session contents: Application of mixing, mincing, stuffing, salting and heat-treatment systems to a meat product. Analysis and discussion of results.

Type and location: Pilot plant (meat PP)

Competences developed: CECTA2, CECTA3, CECTA5

Learning outcomes: RA71, RA72, RA73, RA77, RA78 and RA81

Materials and instruments to be used: Cutter mincer. Mixer and mincer. Stuffer. Heat-treatment kettle. Meat raw materials.

Title of Topic 5.- Size reduction and size enlargement (II)

Contents of Topic 5: Size reduction of liquid foods or one of their components: homogenization and atomization. Equipment and applications. Size enlargement: agglomeration, instantization or granulation.

Competences developed: CECTA2, CECTA3, CECTA4, CECTA5 and CECTA6

Learning outcomes: RA71, RA72, RA73, RA74, RA75, RA76 and RA81

BLOCK III.- FUNDAMENTALS OF FOOD PRESERVATION

Title of Topic 6.- Causes and factors involved in food spoilage.

Contents of Topic 6: Nature of the causes of food spoilage. Factors involved in food spoilage. Actions against spoilage of physical and chemical origin. Possible actions to prevent or delay microbial activity.

Competences developed: CECTA2 and CECTA3

Learning outcomes: RA77 and RA78

BLOCK IV.- TECHNOLOGICAL PRESERVATION PROCESSES (HEAT AND COLD)

Title of Topic 7.- Blanching.

Contents of Topic 7: General aspects. Objectives. Blanching methods: steam, hot water. Other blanching methods. Evaluation of blanching in fruits and vegetables. Equipment and installations. Effects on the nutritional and sensory characteristics of foods.

Competences developed: CECTA2, CECTA3, CECTA4, CECTA5 and CECTA6

Learning outcomes: RA71, RA72, RA73, RA77, RA78 and RA81

Description of the practical activities for Topic 7: PRACTICAL 1 Preparation of plant raw materials.

Practical-session contents: Cleaning, peeling and size reduction of different plant raw materials. Blanching by immersion in hot water. Application of the peroxidase test. Analysis and discussion of results.

Type and location: Pilot plant (vegetable PP)

Competences developed: CECTA2

Learning outcomes: RA71, RA72, RA73, RA74, RA75, RA76 and RA81

Materials and instruments to be used: Plant raw materials (courgette, potatoes). Washing-blanching tank. Reagents for peroxidase determination. Raw-material cutting equipment.

Title of Topic 8. Fundamentals of thermobacteriology.

Contents of Topic 8: Bases of thermobacteriology. Kinetics of microbial destruction by heat. Survival curve. D value. Thermal-death curves. Z value. Concept of commercial sterility. F and Fo values. Practical examples of heat-treatment calculations in the canning industry.

Competences developed: CECTA2

Learning outcomes: RA71, RA72, RA73, RA77 and RA78

Description of the practical activities for Topic 8: PRACTICAL 3: Application of thermobacteriology to the production of a canned product and closing of metal containers.

Practical-session contents: Can closing. Production of a canned vegetable product. Thermal monitoring at the critical point of the canned product. Calculation of the F_0 sterilizing value. Analysis and discussion of results.

Type and location: Pilot plant (vegetable PP)

Competences developed: CECTA2, CECTA3

Learning outcomes: RA71, RA72, RA73, RA77 and RA78

Materials and instruments to be used: Semi-automatic metal-container seamer. Temperature probes. Hot-water heating kettle. Lethality calculation tables.

Title of Topic 9. Pasteurization.

Contents of Topic 9: Concept and objectives. Types of pasteurization. Applications in the food industry. Effects on foods.

Competences developed: CECTA2, CECTA3, CECTA4, CECTA5 and CECTA6

Learning outcomes: RA71, RA72, RA73, RA77, RA78 and RA81

Description of the practical activities for Topic 9: PRACTICAL 2: Milk pasteurization.

Practical-session contents: Application and control of a raw-milk pasteurization process. Knowledge and operation of the pasteurizer. Lactoperoxidase test. Analysis and discussion of results.

Type and location: Pilot plant (dairy PP)

Competences developed: CECTA2, CECTA3

Learning outcomes: RA71, RA72, RA73, RA77, RA78 and RA81

Materials and instruments to be used: Raw milk. Plate pasteurizer. Heating bath for the lactoperoxidase test.

Title of Topic 10. Sterilization.

Contents of Topic 10: Objectives. Sterilization of packaged foods. Filling, evacuation and container-closing operations. Types of sterilizers: batch and continuous. UHT treatment. Effects on foods.

Competences developed: CECTA2, CECTA3, CECTA4, CECTA5 and CECTA6

Learning outcomes: RA71, RA72, RA73, RA77, RA78 and RA81

Description of the practical activities for Topic 10: PRACTICAL 3: Application of thermobacteriology to the production of a canned product and closing of metal containers.

Practical-session contents: Can closing. Production of a canned vegetable product. Thermal monitoring at the critical point of the canned product. Calculation of the F_0 sterilizing value. Analysis and discussion of results.

Type and location: Pilot plant (vegetable PP)

Competences developed: CECTA2, CECTA3

Learning outcomes: RA71, RA72, RA73, RA77 and RA78

Materials and instruments to be used: Semi-automatic metal-container seamer. Temperature probes. Hot-water heating kettle. Lethality calculation tables.

Title of Topic 11. Microwave heating.

Contents of Topic 11: General aspects of electromagnetic radiation. Characteristics of microwaves. Dielectric properties of the material. Conversion of microwave energy into heat. Equipment. Applications. Effects on foods.

Competences developed: CECTA2, CECTA3, CECTA4, CECTA5 and CECTA6

Learning outcomes: RA71, RA72, RA73, RA77, RA78 and RA81

Title of Topic 12. Infrared radiation.

Contents of Topic 12: Theoretical aspects. Equipment and installations. Applications. Other non-ionizing radiation.

Competences developed: CECTA2, CECTA3, CECTA4, CECTA5 and CECTA6

Learning outcomes: RA71, RA72, RA73, RA77 and RA78

Title of Topic 13. Refrigeration.

Contents of Topic 13: Fundamentals of preservation by refrigeration. Effect of refrigeration on the rate of chemical reactions and on microbial development. Factors to be controlled during refrigerated storage. Effects on foods.

Competences developed: CECTA2, CECTA3, CECTA4, CECTA5 and CECTA6

Learning outcomes: RA71, RA72, RA73, RA77, RA78 and RA81

Title of Topic 14. Freezing.

Contents of Topic 14: Freezing process and phases: crystallization theory. Freezing curves. Changes in foods during freezing. Effects on chemical and biochemical reactions. Effects on microorganisms. Thawing.

Competences developed: CECTA2, CECTA3, CECTA4, CECTA5 and CECTA6

Learning outcomes: RA71, RA72, RA73, RA77, RA78 and RA81

Title of Topic 15.- Cold-production systems.

Contents of Topic 15: Calculation of refrigeration and freezing requirements. Calculation of freezing time. Cold-production systems. Refrigerators and refrigerated storage. Freezers and frozen storage. Vapour compression and cryogenic systems.

Competences developed: CECTA2, CECTA3, CECTA4, CECTA5 and CECTA6

Learning outcomes: RA71, RA72, RA73, RA77, RA78 and RA81

BLOCK V.-FOOD PRESERVATION BY REDUCING WATER ACTIVITY**Title of Topic 16. Dehydration**

Contents of Topic 16: Concept, objectives and fundamentals. Psychrometry. Applications of the psychrometric chart. Drying rate. Drying phases and curves. Effects of dehydration on foods. Equipment and installations. Applications.

Competences developed: CECTA2, CECTA3, CECTA4, CECTA5 and CECTA6

Learning outcomes: RA71, RA72, RA73, RA77, RA78 and RA81

Description of the practical activities for Topic 16: PRACTICAL 5: Dehydration.

Practical-session contents: Simulation and control of a dehydration process. Use of the dry-bulb and wet-bulb thermometer. Use and application of the psychrometric chart. Calculation of the water content lost by the food. Analysis and discussion of results.

Type and location: Pilot plant (meat PP)

Competences developed: CECTA2, CECTA3

Learning outcomes: RA71, RA72, RA73, RA77, RA78 and RA81

Materials and instruments to be used: Drying-ripening chamber. Dry-bulb/wet-bulb thermometer. Psychrometric chart.

Title of Topic 17. Freeze-drying and freeze concentration.

Contents of Topic 17: Theoretical foundations. Freeze-drying systems. Applications. Effects on foods. Freeze concentration: foundations and objectives.

Competences developed: CECTA2, CECTA3, CECTA4, CECTA5 and CECTA6

Learning outcomes: RA71, RA72, RA73, RA77, RA78 and RA81

Title of Topic 18. Reduction of water activity in foods through the addition of solutes.

Contents of Topic 18: Main water-activity depressants and mode of action. Salting technology: salting methods, effects on foods. Addition of sugars and other chemical agents as water-activity depressants. Effects on foods.

Competences developed: CECTA2, CECTA3, CECTA4, CECTA5 and CECTA6

Learning outcomes: RA71, RA72, RA73, RA77, RA78 and RA81

Title of Topic 19. Smoking.

Contents of Topic 19: Definition and composition of smoke. Smoke-production systems. Characteristics of smokehouses. Smoking techniques. Effect on foods. Applications in the food industry.

Competences developed: CECTA2, CECTA3, CECTA4, CECTA5 and CECTA6

Learning outcomes: RA71, RA72, RA73, RA77, RA78 and RA81

BLOCK VI.- FINAL OPERATIONS

Title of Topic 20.- Food packaging.

Contents of Topic 20: Purposes of packaging. Design of containers and materials for their manufacture. Analysis of interactions between packaging and food. Packaging and dosing systems. Container closing and closure-control examinations. Packaging/packing for distribution. Labelling.

CECTA2, CECTA3, CECTA4, CECTA5 and CECTA6

Learning outcomes: RA79, RA80 and RA81

Description of the practical activities for Topic 20: PRACTICAL 7: Modified-atmosphere packaging.

Practical-session contents: Application of gas mixtures to increase shelf life. Use of heat sealer, gas mixer and gas analyser. Analysis of the gas mixture in the package headspace.

Type and location: Pilot plant (vegetable PP)

Competences developed: CECTA2

Learning outcomes: RA79, RA80 and RA81

Materials and instruments to be used: Rigid packaging trays. Plastic packaging material. Heat sealer. Gas mixer. Gas analyser. Protective-atmosphere packaging gases. Gas-control systems.

Title of Topic 21.- Food transport systems.

Contents of Topic 21: Material transport systems. Conveyors. Pneumatic devices. Cranes and vehicles. Transport of foods at regulated temperature.

Competences developed: CECTA2, CECTA3, CECTA4, CECTA5 and CECTA6

Learning outcomes: RA79, RA80 and RA81

Description of the practical activities for Topics 1-21: PRACTICAL 6: Production of a food product.

Practical-session contents: In this practical session, students, divided into groups, will have to produce a food product from different raw materials. To do so, they will have to use some of the equipment available in the pilot plant. Products to be produced include: tomato and olive-oil jelly; olive pâté; soft tomato candy, among others.

Type and location: Pilot plant (meat PP)

Competences developed: CT2, CECTA2, CECTA6

Learning outcomes: RA71, RA72, RA73, RA77, RA78 and RA81

Materials and instruments to be used: Pilot-plant equipment and materials. Variety of raw materials (tomato, olives, oil, etc.).

Preparation of a monographic assignment (Seminar)

Preparation of a highly practical monographic assignment related to practical session 6 of the programme. In it, students must describe the characteristics of the product prepared in practical session 6 of the programme, the production process, the flow chart, the defects found during the production process, and the process improvement plan for the commercialisation of the new product.

Competences developed: CB2, CG3, CG4, CT1, CECTA2, CECTA3, CECTA4, CECTA5, CECTA6

Learning outcomes: RA71 to RA81, RA83, RA87 and RA89

Training activities ⁶								
Student workload hours by topic		Theoretical hours	Practical activities				Follow-up activity	Non-attendance-based
Topic	Total	GG	PCH	LAB	ORD	SEM	TP	EP
1	3	1						2
2	3,5	1,5						2
3	7	2					1	4
4	5	2						3
5	3	1						2
6	4	1					1	2
7	5	2						3
8	10	3					1	6
9	4	1						3
10	5	2						3
11	7	2					1	4
12	4	2						2
13	6	2					1	3
14	6	2						4
15	6	2						4
16	7	2					1	4
17	6	2						4
18	8	2						6
19	7,5	2					1,5	4
20	6	2						4
21	2	1						1
FIELD OR LABORATORY	0							
1	5			3				2
2	5			3				2
3	5			3				2
4	3			2				1
5	4			3				1
6	4			3				1
7	4			3				1
SEMINAR	2,5					2,5		
⁷ Assessment **	2,5							
TOTAL	150	37,5	0	20	0	2,5	7,5	80

⁶ This table must match exactly what is established in course sheet 12c.

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GG: Large Group (100 students).
PCH: hospital clinical practicals (7 students)
LAB: laboratory or field practicals (15 students)
ORD: computer-room or language-laboratory practicals (30 students)
SEM: problem classes, seminars or case studies (40 students).
TP: Scheduled Tutorials (teaching follow-up, ECTS tutorial type).
EP: Personal study, individual or group work, and reading of bibliography.

Teaching methodologies⁶

- Lecture.
- Practical classes in laboratory and pilot plant.
- Seminar classes or monographic assignments.
- Tutorials (ECTS, complementary and degree tutorials).

Learning outcomes⁶

RA71. Understand and know the fundamentals of unit operations in the food industry and be able to select possible alternatives for a specific purpose.
RA72. Be able to analyse the influence of operating variables on process performance and effectiveness and their possible effect on foods.
RA73. Understand the need to work with engineering criteria for process control and optimisation and environmental sustainability.
RA74. Know the different mechanisms available in food technology for preparing raw materials for their subsequent transformation into processed foods.
RA75. Know the basic foundations and the different technologies for transforming foods throughout the entire production chain.
RA76. Apply the previous knowledge to adapt the most appropriate technological processes in the transformation of each type of raw material into processed foods.
RA77. Understand the foundations of the different food-preservation technologies available to the food industry.
RA78. Apply to each food the most appropriate preservation method according to its characteristics and the desired final product.
RA79. Know food-packaging systems and analyse the possibilities and conditions for packaging processed foods.
RA80. Plan the storage and transport of raw materials and processed products in the food industry.
RA81. Students must know the equipment and auxiliary machinery of the agri-food industry. Process automation and control. Engineering of works and installations. Agri-industrial constructions. Waste management and use.
RA83. Correctly use ICT to search for information, process it and prepare reports and draft projects.
RA84. Knowledge of ways to search for sources of information related to food technology.

Assessment systems⁶

CONTINUOUS ASSESSMENT SYSTEM

1. Final assessment of knowledge: **Final exam**¹ to assess the contents and competences related to large-group activities. It will be based on multiple-choice questions and/or short questions and/or problems and will account for ~~60%~~**65%** of the final grade.
2. Continuous assessment: **Practical-session reports and questionnaires** to assess the contents and competences related to seminar/laboratory activities². They will be based on the submission of practical-session reports according to the established template and/or short questions, which will begin to be completed during the seminar/laboratory activities (when attended) or in a final exam (when not attended) and will account for ~~35%~~**30%** of the final grade. (25% corresponding to the

submission of practical-session reports and 5% corresponding to the questionnaires). To pass continuous assessment, it will be necessary to attend all course practical sessions. Unjustified absence from more than one practical session will mean failure to pass continuous assessment. In this latter case, the student will be entitled to a final practical exam that will include all the practical sessions carried out, and which will be held on the same day scheduled for the final exam.

3. Attendance and satisfactory completion of face-to-face activities: **Other activities** (~~attendance at ECTS tutorials, preparation of assignments,~~ class attendance, class participation, completion of voluntary questionnaires on theoretical contents) ~~etc., correct spelling in exams...~~) will be assessed with **5%** of the final grade.

Observations

¹ The final exam will only be valid in the final course grade if it is passed with a score of at least 5.

² Seminar-Laboratory activities are "non-recoverable", unless the student repeats that part of the work plan the following year.

To pass the course, it will be necessary to obtain a minimum score of 5 in the theoretical exam and pass the practical sessions. Likewise, spelling mistakes will be negatively assessed in the final grade.

Exam announcements, grades and appeal periods will be published in due time and form as established by the regulations in force.

GLOBAL ASSESSMENT

In compliance with Resolution 26/10/2020, DOE No. 212, Tuesday, 3 November 2020, this section includes the characteristics and conditions of the alternative global test for the assessment of this course's competences.

In accordance with Article 4 of the aforementioned resolution, students who wish to use this assessment system must inform the lecturer through the specific space created for this purpose in the course Virtual Campus. The deadline for choosing the global modality will be during the first quarter of the teaching period for the course or until the last day of the enrolment-extension period if this ends after that period. In the absence of an express request by the student, the assigned modality will be continuous assessment

The alternative global test consists of two parts:

1st Part: written final exam (65% of the final grade): it will consist of multiple-choice and short questions related to the syllabus taught. Multiple-choice questions will have only one correct answer; questions answered incorrectly will subtract

1/3 of the value of the question, that is, three incorrect answers cancel out one correct answer. Short questions, if answered correctly, will be scored as a multiple-choice question. This part will be assessed out of a total of ten points.

2nd Part: Theoretical-practical test (35% of the final grade): it will consist of short questions,

essay questions and/or practical questions on the practical contents worked on during the course.

This part

will be assessed out of a total of ten points.

To pass the course through this alternative assessment system, it will be necessary to achieve a minimum of five points in each of these two parts. Competences assessed: CECTA2, CECTA3, CECTA4, CECTA5, CECTA6.

In both assessment systems, the grading system in force at any given time will be applied. The results obtained by the student in each of the subjects of the study plan will be graded according to the following numerical scale from 0 to 10, with one decimal place, to which the corresponding qualitative grade may be added: 0 - 4.9: Fail (SS), 5.0 - 6.9: Pass (AP), 7.0 - 8.9: Good (NT), 9.0 -

10: Excellent (SB). The mention of "Distinction" may be awarded to students who have obtained a grade equal to or higher than 9.0. Its number may not exceed five percent of the number of students enrolled in the course in the corresponding academic year, unless this number is fewer than 20, in which case a single "Distinction" may be awarded.

Bibliography and other resources

BASIC BIBLIOGRAPHY OR DOCUMENTATION:

- Aleixandre, JL and García, MJ (1999). Agri-food industries. Publications Service of the Polytechnic University of Valencia, Valencia.
- Aleixandre and García (1999). Practical sessions on food production and preservation processes. Publications Service of the Polytechnic University of Valencia. Valencia.
- Brenan, Butters, Cowell and Lilly (1998). Food engineering operations. Ed. Acribia. Zaragoza.
- Casp A. and Abril J. (1999). Food preservation processes. A. Madrid Vicente and Mundi-Prensa, Madrid.
- Cheftel and Cheftel (1980-1982). Introduction to food biochemistry and technology. Vols. 1 and 2. Ed. Acribia. Zaragoza.
- Fellows, P. (1993). Food processing technology: principles and practices. Ed. Acribia. Zaragoza.
- Holdsworth, S. (1988). Preservation of fruits and vegetables. Ed. Acribia. Zaragoza.
- Ordóñez et al. (1998). Food Technology. Vol. I: Food components and processes. Ed. Síntesis. Madrid.
- Paine, F. and Paine, H.(1994). Food Packaging Manual. Ed. A. Madrid Vicente Ediciones. Madrid.
- Raventós, M. (2003). Food industry. Emerging Technologies. Ed. UPC. Barcelona.
- Rodríguez, F. et al. (2002). Food Industry Engineering. Vols. II and III. Ed. Síntesis. Madrid.

ADDITIONAL BIBLIOGRAPHY OR DOCUMENTATION:

- Aleixandre, J.L. and García, M.J. (1999). Agri-Food Industries. Publications Service of the Polytechnic University of Valencia, Valencia.
- Barbosa, G.V., Pothakamury, U.R., Palou, E. and Swanson, B.G. (1999). Non-Thermal Food Preservation. Acribia, Zaragoza.
- Brody A.L. (1989). Food Packaging in Controlled, Modified and Vacuum Atmospheres. Ed. Acribia S.A. Zaragoza.
- Coles, R. et al. (2004). Handbook of food and beverage packaging. AMV Ediciones and Mundiprensa. Madrid.
- Fennema, O. (2000). Introduction to Food Science. 2nd Edition. Editorial Reverté, S.A. Barcelona.
- Guy, R. (2001). Food extrusion. Ed. Acribia. Zaragoza.
- International Institute of Refrigeration. (1990). Frozen Foods. Processing and Distribution. Editorial Acribia, S.A. Zaragoza.
- Lamúa, M. (1999). Application of Cold to Foods. Ed. A. Madrid Vicente Ediciones and Ediciones Mundiprensa. Madrid.
- Lewis, M.J. (1993). Physical Properties of Foods and Processing Systems. Acribia, Zaragoza.
- Lück, E. and Jager, M. (1995). Chemical Preservation of Foods. Characteristics, Uses, Effects. Editorial Acribia, S.A. Zaragoza.
- Madrid, A. et al. (1997). Refrigeration, freezing and packaging of foods. AMV Ediciones and Mundiprensa. Madrid.
- Mallet, C.P. (1994). Frozen Food Technology. Ed. A. Madrid Vicente Ediciones. Madrid.
- Ordóñez, J.A., Cambero, M.I., Frenández, L., García, M.L., García, G., De La Hoz, L. and Selgas, M.D. (1998). Food Technology. Vol. I and II. Ed. Síntesis. Madrid.

- Potter, N.N. and Hotchkiss, J.H. (1999). Food Science. Acribia, Zaragoza.
- Rees, T.A. and Bettison, J. (1994). Thermal Processing and Packaging of Foods. Ed. Acribia S.A. Zaragoza.
- Satin, M. (2000). Food Irradiation. Editorial Acribia, S.A. Zaragoza.
- Sielaff, H. (2000). Technology of canning manufacture. Ed. Acribia. Zaragoza.
- Walter, K. (1995). Practical manual of food smoking. Ed. Acribia. Zaragoza.

- <http://www.casals-vinicola.com/Catalogo-Indice.htm>
- <http://www.perryvidex.com/perry/perryvidex2.nsf/pSearchFood?OpenPage>
- http://www.spec-equip.com/desalinadora_por_osmosis_inversa.html
- <http://www.diquima.upm.es/Investigacion/proyectos/chevic/catalogo/FILTROS/Func4.htm>
- <http://www.komline.com/SiteDirectory.html>
- <http://www.solidliquid-separation.com/PressureFilters/pressure.htm>
- <http://www.carbueros.com/>
- <http://www.unavarra.es/genmic/micind-0.htm>
- <http://www.agronort.com/informacion/abcbiotec/abcbio1.html>
- <http://www.consumaseguridad.com>

Available material

- Blackboard.
- Audiovisual media (computer, video projector).
- Written media (sources).
- Computer resources.
- Technical resources (classrooms, laboratories, pilot plants).

Virtual resources

- UEx Virtual Classroom: <http://campusvirtual.unex.es/portal/>
- School of Agricultural Engineering website: <http://www.unex.es/conoce-la-uex/estructura-academica/centros/eia>
- UEx Library website: <http://biblioteca.unex.es>.