Food Processing Methods II

Code: 103556
ECTS Credits: 6

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Degree	Type	Year
Food Science and Technology	OB	3

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Teaching groups languages

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Prerequisites

Although there are no official prerequisites, it is essential to have previously acquired the knowledge of the subjects: Fundamentals of Processes, Basic Operations, Food Chemistry, Food Microbiology. It would also be appropriate to have previously acquired the knowledge of the following subjects: Food Processing I, Biochemistry I and II, Reactors, Instrumentation and Control.

The practical contents of the subject are taught in Pilot Plant Practices, and the student should simultaneously take both subjects to take better advantage of the learning process.

Objectives and Contextualisation

The third year course "Food Processing II" is taught in the second semester of the UAB degree of Food Science and Technology.
The general training objective is to provide the student with the transversal and specific capacities of the theoretical aspects of different technological processes commonly used in the food industry, in order to preserve and transform foods, without entering into detailed processing of foods specifically, since this study is carried out, with a greater degree of deepening, in the fourth year optional course that refer to the technologies

of specific raw materials.
On the other hand, teaching of this course will also focus on the industrial aspects of food processing, since other courses such as "Fundamentals of Processing" and "Unit Operations", both taught during the second year, already broadly cover the basic knowledge related to food processing.
It should be emphasized that this subject is a continuation of the theoretical content presented in the subject "Food Processing I" that is taught during the first semester of the third course and that the practical aspects are addressed in the course of the second semester of the third degree year entitled "Pilot Plant Practicals".
Thus, "Food Processing II" is an integrative course of the previously acquired knowledge, with the fundamental objective of completing this knowledge by deepening the theoretical aspects of industrial processes.
The specific objectives of the course are to:
1. Identify those properties that are important for food processing.
2. Understand food processing operations and identify the unit operations involved.
3. Differentiate the purpose of the different processing operations.
4. Identify, understand and describe the processing facilities and equipment and its operating principles.
5. Compare the transformation and preservation processes typically applied to food and know how to select the most appropriate process under each situation.
6. Compare, select, control and optimize the processing operations, regardless of their complexity.
7. Know the effect of transformation and preservation processes on the nutritional and organoleptic quality of food.
Apply knowledge about food processing to ensure the quality and safety of products in the most respectful way possible with the environment.

Competences

- Apply knowledge of the basic sciences to food science and technology.
- Apply the principles of biology and chemical engineering to describe, analyse, control and optimise the processes of food transformation and conservation.
- Apply the principles of processing techniques and evaluate their effects on the quality and safety of the product.
- Communicate effectively with both professional and non-professional audiences, orally and in writing, in the first language and/or in English.
- Describe the principles of food conservation systems and the characteristics and properties of packaging materials and systems.
- Develop individual learning strategies and planning and organisation skills.
- Identify pathogenic, spoilage, and industrially-useful microorganisms, along with the conditions that are favourable or unfavourable to their growth in foods and in industrial and biotechnological processes.
- Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
- Search for, manage and interpret information from different sources.
- Show understanding of the mechanisms by which raw materials deteriorate and the reactions and changes that take place during storage and processing, and apply the methods for controlling this.
- Take account of social, economic and environmental impacts when operating within one's own area of knowledge.
- Use IT resources for communication, the search for information within the field of study, data processing and calculations.

Learning Outcomes

1. Apply the different techniques of microbiological, chemical or physicochemical analysis and interpret the results.
2. Build models to predict the effect of technological treatments on food components.
3. Communicate effectively with both professional and non-professional audiences, orally and in writing, in the first language and/or in English.
4. Correctly process samples of the different types of foods for subsequent microbiological, chemical or physicochemical analysis.

5. Describe the characteristics and use of the different systems for controlling processes.
6. Design complex processes in accordance with the established quality criteria.
7. Develop individual learning strategies and planning and organisation skills.
8. Identify the characteristics of the different types of foods that are important in deterioration processes and in controlling these.
9. Identify the control parameters of deterioration and spoilage processes.
10. Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
11. Recognise the importance of fermentation processes and appreciate the role of microorganisms in industrial processes.
12. Relate the characteristics of foods to their physical properties.
13. Search for, manage and interpret information from different sources.
14. Select food conservation methods that slow down deterioration.
15. Select processes of conservation, transformation, transport and storage that are suited to foods of animal and plant origin.
16. Take account of social, economic and environmental impacts when operating within one's own area of knowledge.
17. Use IT resources for communication, the search for information within the field of study, data processing and calculations.

Content

Block 1. Cooling and freezing
Topic 1. Cooling and freezing engineering.
Topic 2. Cooling of food and cooling systems.
Topic 3. Freezing of food and freezing systems.

Block 2. Heat treatment
Topic 4. Effect of heat treatments on microorganisms and food components.
Topic 5. Pasteurization and sterilization.
Topic 6. Continuous thermal processes.
Topic 7. Discontinuous thermal processes.
Topic 8. Dielectric, and infrared heating.
Topic 9. Baking and toasting.
Topic 10. Frying and cooking.

Block 3. Fermentation processes and enzymatic technology
Topic 11. Fermentation processes.
Topic 12. Biological processes of food preservation. Biopreservation.
Topic 13. Biotechnology, production and use of enzymes.

Block 4. Emerging food processing technologies
Topic 14. Non-thermal methods of minimum processing.
Topic 15. High pressure processing.
Topic 16. Combined methods in food preservation.

Block 5. Packaging, storage and distribution
Topic 17. Packaging and packaging materials.
Topic 18. Equipment and systems of packaging.
Topic 19. Application of modified and controlled atmospheres
Topic 20. Active and intelligent packaging.

Block 6. Complementary processes
Topic 21. Process control.

Topic 22. Application of coatings.
Topic 23. Water production.
Topic 24. Food distillation.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Presentation of the practical cases	2	0.08	16, 1, 13, 2, 5, 6, 9, 8, 10, 4, 11, 12, 15, 14
Theoretical lectures	50	2	16, 1, 13, 2, 5, 6, 9, 8, 10, 4, 11, 12, 15, 14
Type: Supervised			
Student tutoring	3	0.12	1, 3, 2, 5, 7, 6, 9, 8, 4, 11, 12, 15, 14
Type: Autonomous			
Self study, supervised learning and practical cases	86	3.44	1, 13, 3, 2, 5, 7, 6, 9, 8, 4, 11, 12, 15, 14, 17

This subject is theoretical, since the corresponding practical contents (pilot plant practices, laboratory practices, seminars and problem workshops) are given in full in the "Pilot Plant Practices" course. Therefore, in this topic the following teaching methodology will be used:
1. Theoretical lectures. Theoretical classes, which will consist of participative lectures (lectures) with ICT support and group discussion, will allow the student to acquire the scientific and technical knowledge of the topic.
2. Supervised self-learning. The teacher will propose to the students 2 practical cases on which they will have to work in a supervised way until they obtain the established learning outcomes. In an initial face-to-face session, the teacher will expose the case and the dynamics of resolution of it to the students. Throughout the time that the students will be assigned to work the case, the professor will offer tutoring sessions. After the work by the students, they will have to present a report and/or conduct a brief oral presentation, which will be evaluated by the teacher.
3. Self study. The autonomous work of the student will consist of the personal study of the material taught in the theoretical classes, the comprehensive reading of texts and the search of bibliographic material, which will allow the student to understand and assimilate the theoretical contents addressed in the topic as well as associate and relate the concepts studied with its practical and applied aspects, taught in the topic "Practices of Pilot Plant".
4. Students tutoring. Sessions for the resolution of doubts, correction of errors and discussions on specific aspects of special difficulty for the student.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes

Continuous evaluation	10%	2	0.08	1, 2, 5, 6, 9, 8, 4, 11, 12, 15, 14
Evaluation of cases	20%	2	0.08	1, 3, 2, 5, 7, 6, 9, 8, 4, 11, 12, 15, 14
First partial exam	38%	2	0.08	16, 1, 13, 3, 2, 5, 7, 6, 9, 8, 10, 4, 11, 12, 15, 14, 17
Second partial exam	32%	3	0.12	16, 1, 13, 3, 2, 5, 7, 6, 9, 8, 10, 4, 11, 12, 15, 14, 17

The evaluation of the programmed training activities will be evaluated by means of:

1. Continuous evaluation. The student must be prepared to respond to small questionnaires of four or five multiple choice questions that will be made through the virtual campus tool, which will be duly announced by the teacher. This method of evaluation will represent 10% of the final grade of the course.
2. Case evaluation. The tasks of the students (reports, oral presentations, etc.) in relation to each one of the cases proposed, will be evaluated by the teacher. The evaluation of the cases will represent 20% of the final grade of the course.
3. Exams. Exams will represent 70% of the final grade of the course. When half of the syllabus is completed, a partial exam will be carried out. At the end of the syllabus, the second partial exam will be carried out. Both partial exams can consist of multiple choice questions, short questions and long questions.

Students who have not passed any of the two partials with a 5 (out of 10) will have to recover those partial exams that have not been passed. The recovery exams will allow to pass the corresponding partial with a maximum grade of 5 out of ten (i.e., in a recovery exam you will not be able to obtain a grade higher than five out of ten in any case). The notes of the two partial exams will make a weighted average (average grade of theory) with a weight depending on the number of class hours that have been used in teaching them. The final grades of the course will be obtained through the weighted average of the grades of the different assessment methods described (theory -70%, cases -20%; continuous evaluation -10%). The course will be approved with an average grade of 5 (out of 10), provided that at least a 5 out of 10 have been obtained in theory as well as a 4 in the continuous evaluation and in the cases. In case that the grade obtained in thecontinuou evaluation or in the cases is smaller thanh 4, it will be necessary to obtain an mínimum average grade in theory of 5.5. It will be considered that a student is not evaluable if he has participated in assessment activities that represent $\leq$ 15% of the final grade.

Students who decide to apply for a single assessment must submit a reasoned application to the center. The single assesment will consist of an oral exam that will include questions on the application of the content in the form of a case resolution for any part of the subject. The grade obtained will mean 100% of the grade of the course, requiring a 5 (out of 10) to pass the course. The single assesment will be carried at the fixed date. For single assesment, the same recovery regulation and procedure will be applied as for continuous evaluation. Not taking the single assesment exam implies failing the subject.

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Complementary references

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Internet resources

1. http://www.knovel.com/web/portal/browse/subject/60/filter/0/

2. http://www.nzifst.org.nz/resources/unitoperations/index.htm

3. https://rpaulsingh.com/default.html

Software

Microsoft Office

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this link. To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn
(PAUL) Classroom practices	1	Catalan/Spanish	second semester	morning-mixed
(TE) Theory	1	Catalan/Spanish	second semester	morning-mixed