UNIVERSIDAD DE CASTILLA - LA MANCHA

GUÍA DOCENTE

1. General information

Course:	FOOD TECHNOLOGY I	**Code:**	58315
Type:	CORE COURSE	**ECTS credits:**	6
Degree:	383 - UNDERGRADUATE DEGREE PROGRAMME IN FOOD SCIENCE AND TECHNOLOGY	**Academic year:**	2023-24
Center:	1 - FACULTY OF SCIENCE AND CHEMICAL TECHNOLOGY	**Group(s):**	22
Year:	2	**Duration:**	C2
Main language:	Spanish	**Second language:**	English
Use of additional languages:		**English Friendly:**	Y
Web site:		**Bilingual:**	N

Lecturer: **MIGUEL ANGEL GONZALEZ VIÑAS** - Group(s): **22**

Building/Office	Department	Phone number	Email	Office hours
Marie Curie	Q. ANALÍTICA Y TGIA. ALIMENTOS	+34926052167	miguelangel.gonzalez@uclm.es	Send an e-mail to the teacher to arrange a tutoring session.

Lecturer: **EVA SANCHEZ PALOMO LORENZO** - Group(s): **22**

Building/Office	Department	Phone number	Email	Office hours
Marie Curie	Q. ANALÍTICA Y TGIA. ALIMENTOS	+34926052167	eva.sanchez@uclm.es	Send an e-mail to the teacher to arrange a tutoring session.

2. Pre-Requisites

None in particular. The basic knowledge that the students will have, in general, and that will be very useful to them at the time of taking the subject, can be summarized in the following points:

- Basic knowledge of biochemistry, physiology and the structure and properties of food components.

- In addition, they must have studied the subjects of production of raw materials and basic operations, and obviously the knowledge acquired in the module of basic sciences will be very useful to them.

3. Justification in the curriculum, relation to other subjects and to the profession

The food processing operations in any food industry from the reception of raw materials to the distribution and sale of the food largely condition the final quality of the product and its profitability. Development and innovation in food technology is an essential element in the food industry. They are fundamental to food production, not only in terms of quantity and healthiness, but also in terms of quality, and they study prospects for sustainable production that can be adapted to the needs and demands of today's world. To be successful, it is necessary to know the mechanisms of action and the effects of processing and transformation processes on food of animal and plant origin. It is also necessary to study the changes that have occurred in the technological, nutritional and sensory characteristics of foods during all processing and storage operations. In short, knowledge of these operations is essential for the correct performance of the professional activity of graduates in food science and technology.

4. Degree competences achieved in this course

Course competences

Code	Description
CB03	Be able to gather and process relevant information (usually within their subject area) to give opinions, including reflections on relevant social, scientific or ethical issues.
CB04	Transmit information, ideas, problems and solutions for both specialist and non-specialist audiences.
E04	To know the basic fundamentals of instrumentation and process control in the food industry
E09	To know, optimize and control the production and conservation food processes
E10	To acquire knowledge on equipments and systems for the automatization and control of food processing
E11	To qualify to be able to evaluate the effects of processing on the components and properties of foods
E20	To manage sub-products and residues of the food industry according to an effective environmental management
E22	To perform formation of staff in the food sector
E23	To acquire knowledge on culinary techniques, catering, nutrition and culture
G01	To develop the aptitude to gather and interpret information and data to issue critical judgments that include a reflection on relevant topics of social, scientific or ethical nature.
G02	To possess a correct oral and written communication. To transmit information, ideas, problems and solutions to a both specialized and not specialized public.
G04	To develop the necessary skills of learning to undertake later studies with a high degree of autonomy.
G06	To dominate the Technologies of the Information and the Communication (TIC) to user's level, which allows to work in virtual spaces, Internet, electronic databases, as well as with common software packages (e.g. Microsoft Office).
G07	To possess ability of organization and planning, initiative, entrepreneurship and aptitude to be employed in teamworks. To possess capacity of resolution of specific problems of the professional area and to develop the critical reasoning and decision making.

5. Objectives or Learning Outcomes

Course learning outcomes

Description

To establish conclusions and to elaborate reports that allow him to expose his results adequately both in oral and written forms. Developing his capacity of synthesis, being critical and objective.

It is aimed that the students know the facts, concepts and fundamentals of the Food technology, so that the indispensable foundations are established in order that they could successfully address the study of the different processes that are employed for each of the food groups: vegetable, dairy, meat, drinks, etc.

To learn how to work in an autonomous way at a pilot plant, and using the laboratory results to be able to interpret the experimental obtained results.

The student will acquire the knowledge of each one of the operations that are involved in a technological process in the food industry: the equipment necessary to develop them and the principal applications at industrial scale, as well as the effect that it exert on every food.

To achieve that the student is capable of seeking and selecting the ideal conditions of every operation and to obtain the products of better quality with the minimal cost.

To develop his aptitude to be a member of a teamwork.

To achieve that the student acquires a complete formation that allows him to choose the packing most adequate for any food and to be able to interpret the functionality and the effect that that packing is going to cause in the final characteristics of the food.

To provoke and to promote in the student all those values and attitudes inherent to the scientific activity.

To develop in the student the capacity of initiative to propose and solve concrete problems of the food industry, as well as of interpreting the obtained results.

Additional outcomes

6. Units / Contents

Unit 1: Introduction to Food Technology. Updating the basics of food engineering. Industrial processes. Flow charts. Discontinuous and continuous processes.

Unit 2: Supply of raw materials to the food industry. Production, transport and reception of raw materials. Optimal transport, packaging and handling conditions. Transport vehicles.

Unit 3: Cleaning of raw materials. Functions and objectives of cleaning. Cleaning methods for solid raw materials. Purification of liquid and gaseous raw materials. Combined cleaning methods. Peeling, cutting and

Unit 4: Blanching. Definition and Objectives. Types of scalers and applications. Effect on food (changes in texture, color, smell and taste)

Unit 5: Food selection and classification. Gravimetric selection. Volumetric selection. Geometrical selection. Photometric selection. Food classification: criteria used.

Unit 6: Storage of raw materials. Storage conditions. Humidity and temperature control. Characteristics of the warehouse. Shelf life of stored materials.

Unit 7: Solid food size reduction. Grinding. Types of mills. Grinding diagrams. Granulometry. Sifting. Types of sieves. Association of sieves. Applications.

Unit 8: Mixing and molding. Mixing of solids. Mixing of liquids. Emulsification and homogenization. Characteristics of emulsions. Types of homogenizers. Product formulation.

Unit 9: Texturizing processes. Extrusion and gelation. Definition and objectives. Foundation. Equipment and applications. Characteristics of texturized foods.

Unit 10: Culinary techniques of baking and roasting food. Cooking techniques. Frying techniques. Coating techniques. Sauces. Equipment and applications

Unit 11: Sedimentation. Foundation. Solid-liquid separation. Liquid-liquid separation Influence of particle size Types of decanters and centrifuges. Applications.

Unit 12: Membrane separation processes. Definition and objectives. Basic principles, microfiltration, ultrafiltration and reverse osmosis. Membranes: types and properties.

Unit 13: Adsorption processes in the food industry. Ion exchange. Types of materials. Characteristics and applications.

Unit 14: Extraction systems. Extraction by pressure. Equipment and applications. Solid-liquid extraction. Liquid-liquid extraction. Supercritical fluid extraction. Equipment and applications.

Unit 15: Continuous and discontinuous distillation of hydroalcoholic solutions. Definition and objectives. Liquid-vapour balance. Equipment and applications.

Unit 16: Crystallization. Nucleation. Definition and objectives. Crystal growth. Crystallization speed. Continuous and discontinuous crystallizers. Crystallization processes. Equipment and applications

Unit 17: Planning of food industries. Location. Machinery distribution and space organization. Cleaning of the agro-alimentary installations. Cleaning systems. Deterioration, corrosion and protection

Unit 18: Water supply and effluent treatment in the food industry. Characteristics of water according to the industry (breweries, carbonated drinks,...). Community regulations on discharge. Pollution indicators

7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	Description
Class Attendance (theory) [ON-SITE]	Lectures	CB03 CB04 E04 E09 E10 E11 E20 E22 E23 G01 G02 G04 G06 G07	0.85	21.25	Y	N	
Laboratory practice or sessions [ON-SITE]	Practical or hands-on activities	CB03 CB04 E04 E09 E10 E11 E20 E22 E23 G01 G02 G04 G06 G07	0.8	20	Y	Y	
Practicum and practical activities report writing or preparation [OFF-SITE]	Group Work	CB03 CB04 E04 E09 E10 E11 E20 E22 E23 G01 G02 G04 G06 G07	0.5	12.5	Y	Y	
Workshops or seminars [ON-SITE]	Problem solving and exercises	CB03 CB04 E04 E09 E10 E11 E20 E22 E23 G01 G02 G04 G06 G07	0.5	12.5	Y	N	In addition to exercises, there will be technical virtual visits to industries (videos) in the classroom
Group tutoring sessions [ON-SITE]	Group tutoring sessions	CB03 CB04 E04 E09 E10 E11 E20 E22 E23 G01 G02 G04 G06 G07	0.1	2.5	Y	N	

Writing of reports or projects [OFF-SITE]	Guided or supervised work	CB03 CB04 E04 E09 E10 E11 E20 E22 E23 G01 G02 G04 G06 G07	0.5	12.5	Y	N	
Final test [ON-SITE]	Assessment tests	CB03 CB04 E04 E09 E10 E11 E20 E22 E23 G01 G02 G04 G06 G07	0.15	3.75	Y	N	
Study and Exam Preparation [OFF-SITE]	Self-study	CB03 CB04 E04 E09 E10 E11 E20 E22 E23 G01 G02 G04 G06 G07	1	25	Y	N	
Self-study [OFF-SITE]	Self-study		1.6	40	Y	N	
		Total:	**6**	**150**			
		Total credits of in-class work: 2.4					**Total class time hours: 60**
		Total credits of out of class work: 3.6					**Total hours of out of class work: 90**

As: Assessable training activity
Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

8. Evaluation criteria and Grading System

Evaluation System	Continuous assessment	Non-continuous evaluation*	Description
Assessment of problem solving and/or case studies	15.00%	0.00%	
Test	70.00%	85.00%	
Laboratory sessions	15.00%	15.00%	
Total:	**100.00%**	**100.00%**	

According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject , an ordinary and an extraordinary one (evaluating 100% of the competences).

Evaluation criteria for the final exam:

Continuous assessment:

Both in the different tests (practical - case studies - assignments) and in the final exam a minimum of 4/10 in each of the parts and an average grade equal to or higher than 5/10 will be required to pass the course.

Non-continuous evaluation:

Students who do not opt for the continuous evaluation system, valuations indicated above, will take a final test, corresponding to 85% of the grade. The remaining 15% corresponds to the qualification of the practices. To pass the course a minimum of 4/10 in each of the parts and an average grade equal or higher than 5/10 will be required.

Specifications for the resit/retake exam:

The same criteria will be maintained as in the ordinary call.

Specifications for the second resit / retake exam:

It will consist of a final test, corresponding to 85% of the grade, which will be weighted with the grade of the practical, 15%.
In both the final exam and the laboratory, a minimum of 4/10 will be required in each of the parts and an average grade equal to or higher than 5/10.

9. Assignments, course calendar and important dates

Not related to the syllabus/contents

Hours	hours
Class Attendance (theory) [PRESENCIAL][Lectures]	21.25
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	20
Practicum and practical activities report writing or preparation [AUTÓNOMA][Group Work]	12.5
Workshops or seminars [PRESENCIAL][Problem solving and exercises]	12.5
Group tutoring sessions [PRESENCIAL][Group tutoring sessions]	2.5
Writing of reports or projects [AUTÓNOMA][Guided or supervised work]	12.5
Final test [PRESENCIAL][Assessment tests]	3.75
Study and Exam Preparation [AUTÓNOMA][Self-study]	25
Self-study [AUTÓNOMA][Self-study]	40

Global activity

Activities	hours
Workshops or seminars [PRESENCIAL][Problem solving and exercises]	12.5
Group tutoring sessions [PRESENCIAL][Group tutoring sessions]	2.5
Writing of reports or projects [AUTÓNOMA][Guided or supervised work]	12.5
Class Attendance (theory) [PRESENCIAL][Lectures]	21.25
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	20
Practicum and practical activities report writing or preparation [AUTÓNOMA][Group Work]	12.5
Final test [PRESENCIAL][Assessment tests]	3.75
Study and Exam Preparation [AUTÓNOMA][Self-study]	25
Self-study [AUTÓNOMA][Self-study]	40
Total horas:	150

10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
	Ingeniería de los alimentos: Las					

Earle, R.L.	operaciones básicas aplicadas a la tecnología de los alimentos.	Acribia, S.A.		1984
Hermida Bun, J.R.	Fundamentos de Ingeniería de Procesos Agroalimentarios.	Mundi Prensa		2000
Cheftel, J.C. y Cheftel, H	Introducción a la Bioquímica y la Tecnología de los Alimentos. Vol. I.	Acribia, S.A.		1980
Singh, R.P. y Heldman, D.R.	Introducción a la Ingeniería de los Alimentos.	Acribia, S.A		1997
Barbosa-Cánovas, G.V.; Ma, L. y Barletta, B.	Food Engineering Laboratory Manual.	Technomic Publishing Co., Inc. Lancaster, Pensylvania		1997
Cheftel, J.C., Cheftel, H. y BesanÇon, P	Introducción a la Bioquímica y a la Tecnología de los Alimentos. Vol.II.	Acribia, S.A.		1983
Brennan, J.C., Butters, J.R., Cowel, N.D. y Lilly, A.E.V.	Las operaciones de la Ingeniería de los Alimentos	Acribia, S.A.		1998
GEOFFREY CAMPBELL-PLATT	FOOD SCIENCE AND TECHNOLOGY	WILEY-BLACKWELL	978-0-632-06421-2	2009
Ibarz, A.; Barbosa, G.; Garza, S. y Gimeno, V.	Métodos experimentales en la Ingenieria alimentaria.	Acribia, S.A.		2000
ANTONIO MORATA BARRADO	NUEVAS TECNOLOGÍAS DE CONSERVACIÓN DE ALIMENTOS.	A. MADRID VICENTE EDICIONES	978-84-96709-20-1	2009
Mafart, P.	Ingeniería Industrial Alimentaria. Vol.I. Procesos Físicos de conservación. Vol.II. Técnicas de separación	Acribia, S.A.		1994
PHILIP RICHARSON	TECNOLOGÍAS TÉRMICAS PARA EL PROCESADO DE LOS ALIMENTOS	Acribia, S.A.	84-200-1042-1	2005
Barbosa-Cánovas, G.V.; Ma, L. y Barletta, B.	Manual de laboratorio de ingeniería de los alimentos	Acribia, S.A.		2000
Lewis, M.S	Propiedades Físicas de los Alimentos y de los Sistemas de Procesado.	Acribia, S.A.		1993
Aguado, J.	Ingeniería de la industria alimentaria. Vol.1. Conceptos Básicos.	Sintesis		1999