

Academic Year/course: 2021/22

28938 - Fundamentals of food technology

Syllabus Information

Academic Year: 2021/22

Subject: 28938 - Fundamentals of food technology

Faculty / School: 201 - Escuela Politécnica Superior

Degree: 583 - Degree in Rural and Agri-Food Engineering

ECTS: 6.0

Year: 3 and 4

Semester: Second semester

Subject Type: Optional

Module:

1. General information

2. Learning goals

3. Assessment (1st and 2nd call)

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as:

- Lectures: participatory lectures where the basic principles that enable students to meet the physical, chemical, biochemical and microbiological characteristics of raw materials and processed food as well as the general processes of production, preparation, conservation and/or processing of food be established. Also, the methods of analysis of the parameters that determine the quality of such foods will be studied.
- Practice sessions in the laboratory and in the pilot plant where students become familiar with the methods of analysis of foods, with their quality parameters and with the equipment used for storage and processing.
- Seminars, which will allow us to deep in various aspects of food preservation: calculation, adjustment and optimization of thermal processing and needs for refrigeration and freezing.
- Mentored or academically directed group work: the knowledge and skills acquired in the course will be integrated with a group work in which students will describe the method/methods for the conservation of a particular food, its formulation and legal requirements to which it is subject. Besides the necessary analyzes be conducted to determine what meets the quality criteria established by law.

All materials and resources used in teaching will be available in the Digital Teaching Ring that the University of Zaragoza offers students and teachers (<http://add.unizar.es>)

4.2. Learning tasks

The course includes the following learning tasks:

- 28 hours of lectures (participative lectures)
- 8 hours of laboratory practices organized in 4 sessions of 2 hours.
- 7 hours of Pilot Plant practices organized in 2 sessions of 3.5 hours

- 5 hours of classroom seminars organized in 2 sessions of 2.5 hours.
- 10 hours for preparation, implementation and presentation of a mentored work in 5 sessions of 1-2 hours
- Academic tutoring: Students will have the support and advice of the teacher. The schedule will present well in advance.

4.3. Syllabus

The course will address the following topics:

Theory Sessions

Section 1. INTRODUCTION, FOOD COMPONENTS AND QUALITY PARAMETERS

Topic 1. Introduction (0.1 ECTS)

Topic 2. Food components (0.2 ECTS)

Topic 3. Food quality parameters (0.1 ECTS)

Topic 4. Physical and chemical food analysis (0.4 ECTS)

- Teaching/learning activities.

Participative master class: 0.8 ECTS

Section 2. AGENTS THAT CHANGE FOOD

Topic 5. Physical and chemical agents that change food (0.1 ECTS)

Topic 6. Biological agents that change food (0.8 ECTS)

- Teaching/learning activities.

Participative master class: 0.9 ECTS

Section 3. OPERATIONS RELATING TO PREPARATION, TRANSFORMATION AND PACKING OF FOODSTUFFS

Theoretical teaching

Topic 7. Operations relating to preparation and transformation of foodstuffs (0.1 ECTS)

Topic 8. Food packing (0.1 ECTS)

- Teaching/learning activities.

Participative master class: 0.2 ECTS

Section 4. FOOD CONSERVATION PROCESSES

Theoretical teaching

Topic 9. Fundamentals of food processing using heat (0.2 ECTS)

Topic 10. Fundamentals of food conservation by reducing temperature; refrigeration and freezing (0.2 ECTS)

Topic 11. Fundamentals of food conservation using drying methods (0.2 ECTS)

Topic 12. Fundamentals of food conservation by modifying the atmosphere (0.1 ECTS)

Topic 13. Chemical conservation, conservation using pickling and fermentation (0.1 ECTS)

Topic 14. Other food conservation and decontamination technologies. (0.1 ECTS)

- Teaching/learning activities.

Participative master class: 0.9 ECTS

Practice Sessions

Section 1. INTRODUCTION, FOOD COMPONENTS AND QUALITY PARAMETERS

Practice 1. Physical analysis of foods (0.2 ECTS)

Practice 2. Food analysis: values and spectrophotometry (0.2 ECTS)

- Teaching/learning activities.

Practice in the laboratory: 0.4 ECTS

Section 2. AGENTS THAT CHANGE FOOD

Practice 3. Factors that influence chemical changes in food and control methods (0.2 ECTS)

Practice 4. Factors that influence microbiological changes in food and control methods (0.2 ECTS)

- Teaching/learning activities.

Practice in the laboratory: 0.4 ECTS

Section 3. FOOD CONSERVATION PROCESSES

Seminar 1. Food conservation using heat; calculations, optimization and adjustment of heat treatments (0.25 ECTS)

Seminar 2. Food conservation using cold; calculation of refrigeration needs (0.25 ECTS)

Practice 5 (Pilot plant) Food conservation using heat (0.35 ECTS)

Practice 6 (Pilot plant) Food conservation by; reducing temperature, changing the atmosphere or drying (0.35 ECTS)

- Teaching/learning activities.

Classroom seminar: 0.5 ECTS

Pilot plant practice: 0.7 ECTS

Mentored project: 1 ECTS

4.4. Course planning and calendar

Type of activity / Week	1	2	3	4	5	6	7	8	9	10	11	12 (1)	13	14	15	16	17
<i>In-class Activity</i>																	
Theory	2	4	2	2	2	2	2	2	2		2		2	2	2	2	
Problems											2		2	1			
Laboratory			2	2		2	2								7		
Group work					2			2	2					2		2	
Fieldwork																	
Tutorials ECTS																	
Assessment									1								1
<i>No presential activity</i>																	
Autonomous work	2,5	2,5	4	4	3	4	4	8	4		4	2,5	6	4	8	6	6
Group work					1,5	1,5	1,5							1,5		1,5	
TOTAL	4,5	6,5	8	8	8,5	9,5	9,5	12	9	0	8	2,5	10	11	17	13	6

4.5. Bibliography and recommended resources

- BB** Cheftel, Jean-Claude. Introducción a la bioquímica y tecnología de los alimentos. Vol. I / Jean-Claude Cheftel, Henri Cheftel / traducido del francés por Francisco López Capont. [1a. ed.]. Zaragoza : Acribia, D.L. 1980
- BB** Fellows, Peter. Tecnología del procesado de los alimentos : principios y prácticas / Peter Fellows ; traducido por Francisco Javier Sala Trepat. [1a. ed.]. Zaragoza : Acribia, D.L. 1993
- BB** Jay, James M. Microbiología moderna de los alimentos / James M. Jay, Martin J. Loessner, David A. Golden ; [traducción a cargo de Juan Antonio Ordóñez Pereda, Miguel Ángel Asensio Pérez, Gonzalo D. García de Fernando Minguillón]. 5ª ed. Zaragoza : Acribia, imp. 2009
- BB** Química de los alimentos / editado por Srinivansan Damodaran, Kirk L. Parkin, Owen R. Fennema ; [traducción a cargo de Pascual López Buesa, Rosa Oria Almudí... (et al.)]. 3ª ed. en español, traducción de la 4ª ed. inglesa. Zaragoza : Acribia, D.L. 2010
- BB** Tecnología de los alimentos. Vol. I, Componentes de los alimentos y procesos / Juan A. Ordóñez Pereda (editor). Madrid : Síntesis, D.L. 1998
- BC** Análisis de los alimentos : manual de laboratorio / editora S. Suzanne Nielsen ; traducción de Ana Cristina Ferrando Navarro ; revisión de Miguel Ángel Usón Finkenzeller . Zaragoza : Acribia , D. L. 2007
- BC** Análisis de los alimentos / editora S. Suzanne Nielsen ; traducción de Ana Cristina Ferrando Navarro ; revisión de Miguel Ángel Usón Finkenzeller . [ed. en español, traducción de la 3ª ed. en inglés] Zaragoza : Acribia, D. L. 2008
- BC** Barbosa-Canovas, G.V. ; Tapia, S. ; Cano, P. Novel food processing technology. - CRC Press
Cheftel, Jean-Claude. Introducción a la bioquímica y tecnología de los alimentos. Vol. II / Jean-Claude

- BC** Cheftel, Henri Cheftel, Pierre Besançon ; prólogo de Pierre Desnuelle ; traducido del francés por Francisco López Capont. [1ª ed.]. Zaragoza : Acribia, D.L. 1982
- BC** Coultate, Tom P. Manual de química y bioquímica de los alimentos / T.P. Coultate ; [traducción de José Fernández-Salguero Carretero]. 3ª ed., 1ª reimpr. Zaragoza : Acribia, 2007 (reimp. 2013)
- BC** Envasado de alimentos en atmósferas controladas, modificadas y a vacío / editado por Aaron L. Brody ; [traducción realizada por Juan Antonio Ordoñez Pereda, Gonzalo D. García de Fernando Minguillón, Miguel Ángel Asensio Pérez]. Zaragoza : Acribia, imp. 1996
- BC** Fábricas de alimentos : procesos, equipamiento, costos / editado por Alfred Bartholomai ; [traducido por Agustín Díez Cisneros, J. Carlos Lizama Abad]. [1a. reimpr.]. Zaragoza : Acribia, 2001
- BC** Las operaciones de la ingeniería de los alimentos / J.G. Brennan... [et al.]. 3ª ed. Zaragoza : Acribia, 1998
- BC** Lewis, M.J. Propiedades físicas de los alimentos y de los sistemas de procesado / M.J. Lewis ; traducido por Julián Zapico Torneros, Juan Pablo Barrio Lera. Zaragoza : Acribia, D.L.1993
- BC** Lück, Erich. Conservación química de los alimentos : características, usos, efectos / Erich Lück, Martin Jager ; [traducido por Andrés Marcos Barrado]. 2ª ed. Zaragoza : Acribia, imp. 2000
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- BC** Matissek, Reinhard. Análisis de los alimentos : Fundamentos-Métodos-Aplicaciones / Reinhard Matissek, Frank-M. Schnepel, Gabriele Steiner. Zaragoza : Acribia, D.L. 1998
- BC** Microbiología alimentaria. Vol. II, Fermentaciones alimentarias / coordinadores, C.M. Bourgeois, J.P. Larpent ; traducido por José Antonio Beltrán Gracia. [1ª ed.] Zaragoza : Acribia, D.L. 1995
- BC** Microbiología de los alimentos : Características de los patógenos microbianos / ICMSF ; traducido por Manuel Ramis Vergés. Zaragoza : Acribia, D.L. 1998
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- BC** Microorganismos de los alimentos. V. 1, Técnicas de análisis microbiológico / patrocinado por The International Commission on Microbiological Specifications for Foods of the International Association of Microbiological Societies. 2ª ed. Zaragoza : Acribia, D.L. 1983
- BC** Yousef, Ahmed E. Microbiología de los alimentos : manual de laboratorio / Ahmed E. Yousef, Carolyn Carlstrom ; [traducción realizada por Juan Antonio Ordoñez Pereda, Gonzalo D. García de Fernando Minguillón]. Zaragoza : Acribia, 2006

The updated recommended bibliography can be consulted in:
<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=28938>