

Year : 2018/19

## **28938 - Fundamentals of food technology**

### **Syllabus Information**

<b>Academic Year:</b>	2018/19
<b>Subject:</b>	28938 - Fundamentals of food technology
<b>Faculty / School:</b>	201 -
<b>Degree:</b>	437 - Degree in Rural and Agri-Food Engineering
<b>ECTS:</b>	6.0
<b>Year:</b>	3
<b>Semester:</b>	Half-yearly
<b>Subject Type:</b>	Compulsory
<b>Module:</b>	---

### **General information**

#### **Aims of the course**

#### **Context and importance of this course in the degree**

#### **Recommendations to take this course**

#### **Learning goals**

#### **Competences**

#### **Learning goals**

#### **Importance of learning goals**

#### **Assessment (1st and 2nd call)**

#### **Assessment tasks (description of tasks, marking system and assessment criteria)**

#### **Methodology, learning tasks, syllabus and resources**

#### **Methodological overview**

The learning process that is designed for this subject is based on the following:

- Theoretical sessions: 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.

- Practical sessions in laboratory and in 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 that 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>)

## **Learning tasks**

The program that the student is offered to achieve the expected results includes the following activities ...

- 28 hours of lectures (participative master classes)

- 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. Schedule will present well in advance.

## **Syllabus**

### **Theory Sessions**

#### **UNIT 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

## UNIT 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

## UNIT 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

## UNIT 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

## **Practical Sessions**

### UNIT 1. INTRODUCTION, FOOD COMPONENTS AND QUALITY PARAMETERS

Practical 1. Physical analysis of foods (0.2 ECTS)

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

- Teaching / learning activities.

Practicals in laboratory: 0.4 ECTS

### UNIT 2. AGENTS THAT CHANGE FOOD

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

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

- Teaching / learning activities.

Practicals in laboratory: 0.4 ECTS

### UNIT 3. FOOD CONSERVATION PROCESSES

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

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

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

Practical 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 practicals: 0.7 ECTS

Mentored project: 1 ECTS

## **Course planning and calendar**

Tipo1 actividad / Semana	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
Actividad Presencial																				62
Teoría	2	2	2	2	2	2	2	2		2		2	2	2	2					28
Problemas											2	2	1							5
Prácticas laboratorio	2			2		2		2				3	4							15
Trabajos en grupo					1					2	2		2	2	1					10
Salidas de prácticas																				
Tutorías																				
ECTS																				
Evaluación								1							1			2		4
Actividad No presencial																				87,5
Trabajo individual	4	4	2	4	2,5	4	7	2,5	2,5	6	6	6	6	8	2,5	2,5	2,5	4		80
Trabajo en grupo					1,5					1,5	1,5		1,5	1,5						7,5
TOTAL	6	8	4	8	7	8	9	7,5	2,5	12	12	13	17	14	6,5	2,5	2,5	6		150

## 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 . [1º ed., 4ª reimp.] Zaragoza : Acribia, 2000
- BB** Fellows, Peter. Tecnología del procesado de los alimentos : principios y prácticas / Peter Fellows ; traducido por Francisco Javier Sala Trepas . [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 Almuadí

- ... (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
- BC** Cheftel, Jean-Claude. Introducción a la bioquímica y tecnología de los alimentos. Vol.II / Jean-Claude Cheftel, Henri Cheftel, Pierre Besançon ; prólogo de Pierre Desnuelle ; traducido del francés por Francisco López Capont . [1ª ed., 4ª reimp.] Zaragoza : Acribia, 2000
- 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. reimp.] 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** Microbiología de los alimentos : Características de los patógenos microbianos / ICMSF ; traducido por Manuel Ramis Vergés. Zaragoza : Acribia, D.L. 1998
- BC** Microorganismos de los alimentos. 6, Ecología microbiana de los productos alimentarios / [Patrocinado por the International Commission on Microbial Specifications for Foods of the International Association of Microbiological Societies] ; [traducción a cargo de Bernabé Sanz Pérez...(et al.)] . Zaragoza : Acribia, imp. 2001
- 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 Ordóñez Pereda, Gonzalo D. García de Fernando Minguillón] . Zaragoza : Acribia, 2006

The updated recommended bibliography can be consulted in:  
<http://psfunizar7.unizar.es/br13/egAsignaturas.php?id=8099>