

## 28951 - Processing technologies in the food industries

### Syllabus Information

**Academic Year:** 2019/20

**Subject:** 28951 - Processing technologies in the food industries

**Faculty / School:** 201 - Escuela Politécnica Superior

**Degree:** 437 - Degree in Rural and Agri-Food Engineering  
583 - Degree in Rural and Agri-Food Engineering

**ECTS:** 6.0

**Year:** 4

**Semester:** First semester

**Subject Type:** Optional

**Module:** ---

### 1.General information

#### 1.1.Aims of the course

#### 1.2.Context and importance of this course in the degree

#### 1.3.Recommendations to take this course

### 2.Learning goals

#### 2.1.Competences

#### 2.2.Learning goals

#### 2.3.Importance of learning goals

### 3.Assessment (1st and 2nd call)

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

### 4.Methodology, learning tasks, syllabus and resources

#### 4.1.Methodological overview

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

- Lectures: participatory lectures which will deepen the quality assessment of raw of animal and vegetable origin and in the processes for the conservation of these raw materials and of the products derived therefrom.
- Practice sessions in the laboratory where students become familiar with the quality parameters of different foods and the factors influencing their elaboration process and its final quality.
- Visits to food industries: visits to food industries are crucial for practical training of students. They are an indispensable complement to theoretical explanations, especially those related to some technological processes that are difficult to understand for the student, even with flow charts, graphs or diagrams used in theoretical teaching. Before the visit, the processes and the salient features of the establishment will be explained. This will allow students to more easily follow the explanations of technicians and allow an exchange of views with students.
- Mentored or academically directed group work: the knowledge and skills acquired in the course will be integrated with the completion of a group work in which students have to elaborate on the Pilot Plant a food product that previously has been assigned by the teacher. To do this they must first identify the raw materials, ingredients and additives used, the necessary equipment and its operating parameters, the processes of maturation and/or storage after manufacture and then run it to present the product as appear on the market, including labelling, and taking into account legal requirements.

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

## 4.2.Learning tasks

The course includes the following learning tasks:

- 30 hours of lectures (participative master classes)
- 10 hours of laboratory practices organized in 5 sessions of 2 hours.
- 10 hours of visits to food industries organized in 3 visits of 3 - 4 hours
- 10 hours for preparation, implementation and presentation of a mentored work organized in 5 sessions of 1, 2 and 4 hours (for the session in the pilot plant).
- Academic tutorials: 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

#### UNIT 1. INTRODUCTION

- Topic 1. Introduction to the subject Technology of Agro-Food Industries (0,5 ECTS)
  - Teaching/learning activities:
  - Participatory Master Class: 0,5 ECTS

#### UNIT 2. TECHNOLOGY OF MEAT AND MEAT PRODUCTS

- Topic 2. Introduction (0,05 ECTS)
- Topic 3. Transformation of muscle in meat (0,1 ECTS)
- Topic 4. Quality of meat (0,15 ECTS)
- Topic 5. Fresh meat technology (0.1 ECTS)
- Topic 6. Meat derivatives: classification and main technological processes (0,3 ECTS)
- Topic 7. The technology of meat preparations and raw meat products (0.1 ECTS)
- Topic 8. The technology of whole raw meat products (0.1 ECTS)
- Topic 9. Heat-treated meat products technology (0.1 ECTS)
  - Teaching/learning activities:
  - Participatory Master Class: 1 ECTS

#### UNIT 3. FISH AND FISH PRODUCTS TECHNOLOGY

- Topic 11. Fish Technology (0.1 ECTS)
- Topic 12. The technology of fish products (0.1 ECTS)
  - Teaching/learning activities:
  - Participatory Master Class: 0,2 ECTS

#### UNIT 4. TECHNOLOGY OF MILK AND DAIRY PRODUCTS

- Topic 13. Introduction to the dairy sector (0,05 ECTS)
- Topic 14. Composition and physical-chemical structure of milk (0,15 ECTS)
- Topic 15. Physical, physical-chemical and organoleptic properties of milk. Hygienic quality of milk (0,1 ECTS)
- Topic 16. Collection, refrigeration and previous operations to the thermal treatment of milk (0.1 ECTS)
- Topic 17. Pasteurized milk and sterilized milk (0,1 ECTS)
- Topic 18. Concentrated milk (0.1 ECTS)
- Topic 19. Fermented milk: yoghurt and other fermented milk (0,1 ECTS)

#### Unit 20. Cream and butter (0,1 ECTS)

- Topic 21. Cheese (0,2 ECTS)
  - Teaching/learning activities:
  - Participatory Master Class: 1 ECTS

#### UNIT 5. TECHNOLOGY OF EGG AND OVOPODULTS

- Topic 22. Egg and egg products (0 ECTS)
  - Teaching/learning activities:
  - Participatory Master Class: 0.1 ECTS

#### UNIT 6. TECHNOLOGY OF VEGETABLE PRODUCTS AND DERIVATIVES

- Topic 23. Introduction to the horticultural sector (0,5 ECTS)
- Topic 24. Characteristics and conservation of fresh fruits and vegetables (0.1 ECTS)
- Topic 25. Minimally processed products and products of the fifth range (0,05 ECTS)
- Topic 26. Canned, frozen and dehydrated fruit and vegetable products (0,15 ECTS)
- Topic 27. Juice and chromogen production (0.1 ECTS)
- Topic 28. Flour and bread (0.1 ECTS)
- Topic 29. Olive and olive oil production (0.1 ECTS)
  - Teaching/learning activities:
  - Participatory Master Class: 0,65 ECTS
  - Practical sessions

#### UNIT 2. TECHNOLOGY OF MEAT AND MEAT PRODUCTS

- Practical 1. Meat quality parameters (0.2 ECTS)
- Practical 2. Determination of meat additives (0.2 ECTS)
  - Visit the meat processing industry (0,3 ECTS)
  - Teaching/learning activities:
  - Laboratory Practice: 0,4 ECTS
  - Visits to agro-food industries: 0,3 ECTS

#### UNIT 4. TECHNOLOGY OF MILK AND DAIRY PRODUCTS

- Practical 3. Milk Quality Parameters (0.2 ECTS)
- Practical 4. Parameters for the control of the thermal treatment of milk. Factors influencing milk coagulation (0,2 ECTS)
  - Visit the cheese and yoghurt processing industry (0,3 ECTS)
  - Teaching/learning activities:
  - Laboratory Practice: 0,4 ECTS
  - Visits to agro-food industries: 0,3 ECTS

#### UNIT 6. TECHNOLOGY OF HORTO-FRUIT PRODUCTS AND DERIVATIVES

- Practical 5. Influence of different parameters on the organoleptic and nutritional quality of foods of plant origin (0.2 ECTS)
  - Visit the juice processing industry (0,4 ECTS)
  - Teaching/learning activities:
  - Laboratory Practice: 0,2 ECTS
  - Visits to agro-food industries: 0,4 ECTS
  - For the whole subject and coinciding temporarily with units 3, 4 and 5: Tutored work: 1 ECTS

### 4.4.Course planning and calendar

Type of activity / Week	1	2	3	4	5	6 <sup>(1)</sup>	7	8	9 <sup>(2)</sup>	10	11	12	13 <sup>(3)</sup>	14	15
<i>On-site activity</i>															
Theory	2	2	2	2	2		2	2	2	2	2	2	2	2	
Problems															
Lab practice			2	2			2		2					2	
Group work								1		1		2	2	2	
Field visit		4					3						4		

Tutorials																
Evaluation								1								
<i>Off-site activity</i>																
Autonomous work	4	4	4	6	4	0,5	4	5	2	3	2,5	4	2,5	4	4	
Group work							2	1,5			1,5	2	2	2		
TOTAL	6	10	8	10	6	0,5	13	11	6	6	6	10	13	12	4	

#### 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 Trepal . [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 Almuñí ... (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.] 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
- BC** Madrid Vicente, Antonio. Nuevo manual de industrias alimentarias / autores, Antonio Madrid Vicente, Javier Madrid Cenzano . [3ª] ed. amp. y corr. Madrid : A. Madrid Vicente : Mundi-Prensa, 2001

- 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
- 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?codigo=28951&Identificador=14221>