

Academic Year/course: 2021/22

## 30816 - Physical and sensory analyses of food

### Syllabus Information

**Academic Year:** 2021/22

**Subject:** 30816 - Physical and sensory analyses of food

**Faculty / School:** 105 - Facultad de Veterinaria

**Degree:** 568 - Degree in Food Science and Technology

**ECTS:** 6.0

**Year:** 2

**Semester:** Second semester

**Subject Type:** Compulsory

**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. The course is organized in 30 participatory lectures, 10 hours of seminars and 20 hours of laboratory practices.

The seminars will be organized in sessions with different duration. During them some presentations of complementary subjects, practical exercises and problems of the different subjects will be done. In some cases English written tables and figures will be used. In this way at the same time the students will solve the problems and they will have also a glossary of English technical words related with the course with their corresponding translation in Spanish.

The laboratory practices will be 4 hours sessions. 3 sessions will be dedicated to physical analysis and other 2 sessions will be dedicated to sensory analysis. The practice number 2 will be coordinated with Food Chemistry and Biochemistry course.

The student will need also to make a project about the physical and sensory analysis necessary to do from a legal, technological, and commercial point of view to evaluate and control the food. This practical work will be coordinated with Food Chemical Analysis, Food Microbiological Analysis and Bromatology courses. The assignation of the food to the students will be when the academic year will start. The students will make the project in 3-4 people workgroups. Finally the project will be delivered to the teachers responsible of the four courses for evaluation. For evaluation an oral presentation will be necessary.

Students must follow the regulations described in:

- Prevention: A guide for students at the University of Zaragoza:  
[https://uprl.unizar.es/sites/uprl.unizar.es/files/archivos/Procedimientos/guia\\_preventiva\\_para\\_estudiantes.pdf](https://uprl.unizar.es/sites/uprl.unizar.es/files/archivos/Procedimientos/guia_preventiva_para_estudiantes.pdf)
- Manual de seguridad en los laboratorios de la Universidad de Zaragoza y normas marcadas por la Unidad de Prevención de Riesgos Laborales:

[https://uprl.unizar.es/sites/uprl.unizar.es/files/archivos/Procedimientos/manual\\_de\\_seguridad\\_en\\_los\\_laboratorios\\_de\\_la](https://uprl.unizar.es/sites/uprl.unizar.es/files/archivos/Procedimientos/manual_de_seguridad_en_los_laboratorios_de_la)

<https://uprl.unizar.es/inicio/manual-de-procedimientos>

In addition, students will follow as well any instructions related to biosecurity given by the professor

## 4.2. Learning tasks

The course will address the following learning tasks:

1. Lectures. 30 presential hours (1 hour sessions).
2. Laboratory practices. 20 presential hours (4 hours sessions).
3. Seminars: 10 presential hours (different duration sessions).
4. Elaboration and presentation of the Integration Project. 18 not presential hours.

## 4.3. Syllabus

The course will address the following topics:

Block 1- Food Physical analysis

Lectures

- Topic 1-FOOD Morphogeometrical properties (1 hour)
  - Importance of morphogeometrical properties in food processing operations and process control.
  - Farm products and particulate products shape and size. Experimental determination.
  - Volume and density. Porosity. Surface area. Experimental determination.
  - Density measurements application in food quality control.
- Topic 2- Food thermal properties ( 2 hours)
  - Importance of thermal properties in food processing.
  - Properties related with energetic content: sensible heat and latent heat. Enthalpy.
  - Properties related with heat transport: conductivity and diffusivity.
  - Differential scanning calorimetry: applications in thermal properties measurement and quality control.
- Topic 3. Food optical properties. Colorimetry (5 hours)
  - Colorimetric definitions.
  - The eye. Model of color vision.
  - Grassman Laws.
  - Perceived colors.
  - Color attributes.
  - Patterns illuminants.
  - Pattern observer. CIE Matching functions.
  - Calculation of tristimulus values ( CIE Method).
  - CIEYxy space.
  - CIELAB space.
  - Color practical determination. Lighting geometries detection.
  - Brightness and its measurement.
  - Colorimetry with photo cameras and scanners.
- Topic 4. Food rheological properties ( 4 hours)
  - Importance of rheological properties in food processing operations and process control.
  - Rheological classification of fluids. Definition of solids, fluids and viscoelastic materials. Newtonian and non- Newtonians fluids.
  - Rheological behavior, interest magnitudes and effect of different factors. Rheological models.
  - Instruments for rheological behavior measurement. Viscometers and rheometers. Measurement geometries.
  - Practical applications. Choice of tests and measurement parameters. Results interpretation.
- Topic 5. Food textural properties (4 hours)
  - Importance of textural properties in food processing operations and process control.
  - Texture concept. Elastic and viscoelastic products.
  - Texture evaluation method. Sensory and instrumental measurements. Instruments and tests. Texture measurement method choice.
- Topic 6. Food Surface properties ( 3 hours)
  - Importance of Surface properties in food processing operations and process control.
  - Surface tension. Contact angle and surface tension measurement.
  - Food colloidal systems: sols, gels, emulsions and foams.

- Topic 7. Water activity and food sorption properties (1 hour)
  - Importance of water activity in food preservation.
  - The water in foods. Water activity.
  - Water activity measurement methods.
  - In each section firstly the definition of the different properties will be explained and the importance in foods. Then some values of these parameters in foods will be showed. The influence of processing, the more relevant equipments and technics for measurement and also the interpretation of the obtained results will be described.
- Laboratory practices
  - Practice 1- Food color experimental measurement: Spectroradiometer. Spectrophotometer.
  - Practice 2- Gels elaboration and textural and rheological properties measurement.
  - Practice 3- Obtaining foams and emulsions. Stability measurement. Bostwick Consistometer. Thermal analysis.

## Block 2- Food SENSORY analysis

### Lectures

- Topic 8. Introduction (1 hour)
  - Concept and utility of sensory analysis.
  - Relation with physiology and psychology.
  - The role of senses.
  - Thresholds and sensitivity.
- Topic 9. Terms for sensory analysis realization (1 hour)
  - Samples preparation and coding.
  - The testing room: environmental requirements. Tasting booths.
  - Utensils and materials for sensory analysis.
- Topic 10. Sensory analysis techniques ( 3 hours)
  - Types of tests.
  - Discriminatory tests: the paired comparison. The triangle test. Used scales. Ordination tests. Classification tests.
  - Descriptive test. Specific profiles.
  - Acceptance tests.
- Topic 11. Judges and panels test ( 2 hours)
  - Panels types
  - Judges preselection and selection.
  - General and specific training for judges.
- Topic 12. Experimental and statistical design in sensory analysis ( 1 hour)
  - Tests design.
  - Data statistical analysis.
  - Reports preparation.
- Topic 13. Consumer sensory analysis ( 2 hours)
  - Techniques
  - Preference tests and degree of satisfaction measurement
  - Consumer attitudes

### Laboratory practices

- Practice 4. Judges selection and training. Detection of the main tastes, flavors and odours. Detection thresholds.
- Practice 5. Discrimination tests. Preference or acceptance tests. Descriptive tests. Specific profiles in different foods: sensory analysis of dairy products, sensory analysis of meat products.

Before starts the block I during the first sesion an explanation of the content of the course will be done. Also the systematic about the lectures and laboratory practices, evaluation, bibliography, etc and an introduction about relation between food physical properties and sensory analysis will be explained.

ACTIVITY	PRESENTIALS HOURS	FACTOR	NON PRESENTIALS	TOTAL
Lectures	30	1,5	45	75
Seminars	10	1	10	20

## 4.4. Course planning and calendar

problems					The calendar of the matter is described with the other matters for second course of CTA Degree in the web of Veterinary Faculty in the next address <a href="http://veterinaria.un">http://veterinaria.un</a> ). This address will be updated each academic year.
Prácticas	20	0,5	10	30	
Practical work			18	18	
Exam			7	7	
<b>Total</b>	<b>60</b>		<b>90</b>	<b>150</b>	

#### 4.5. Bibliography and recommended resources

[BB: Bibliografía básica / BC: Bibliografía complementaria]

- [BB] Carpenter, Roland P. : Análisis sensorial en el desarrollo y control de la calidad de alimentos / Roland P. Carpenter, David H. Lyon, Terry A. Hasdell ; traducción de Manuel Alcalá Aguilera . - 1ª reimp. Zaragoza : Acribia, 2009
- [BB] 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
- [BB] Métodos para medir propiedades físicas en industrias de alimentos / editores, Juan de Dios Alvarado, José Miguel Aguilera . Zaragoza : Acribia, D.L.2001
- [BB] Sahin, Serpil. Propiedades físicas de los alimentos / Serpil Sahin y Servet Gülüm Sumnu ; traducción a cargo de Albert Ibarz Ribas . Zaragoza : Acribia, imp. 2009
- [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, 2009
- [BC] Lees, R.. Análisis de los alimentos : Métodos analíticos y de control de calidad / R. Lees . 2ª ed española / traducida de la 3ª ed. inglesa por José Fernández Salguero Zaragoza : Acribia, D. L. 1982
- [BC] Propiedades físicas de los alimentos /Chiralt Boix, Amparo [et al. ]. Valencia : Universidad Politécnica de Valencia, 2007