

**1. General information****Course:** FOOD ANALYSIS AND COMPOSITION II**Code:** 58317**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:** 3**Duration:** C2**Main language:** Spanish**Second language:****Use of additional languages:****English Friendly:** Y**Web site:****Bilingual:** N

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2. Pre-Requisites

It is recommended to have studied the basic subjects of General Chemistry, Biology, Biochemistry, and Statistics, and the other subjects such as Chemical Analysis, Organic Compounds and their characterization, Bromatology I, and Structure and properties of food components.

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

Bromatology is the scientific discipline that comprehensively studies food: it allows to know its qualitative and quantitative composition; the hygienic and toxicological significance of the alterations and contaminations, in what way and why they occur and how to avoid them; what is the most appropriate technology to treat them and how to apply it; how to legislate and control to protect food and the consumer; what analytical methods to apply to determine its composition and quality.

At present, some of the objects of study mentioned above have acquired their own notoriety as well-defined sciences, such as the case of Dietetics and Nutrition, or Food Hygiene, so the field of study of Bromatology has been "reduced" to the no less laborious and important task of the study of the composition of the food, to its analysis and to the study of the modifications produced in the composition of the same due to its elaboration, adulteration or contamination. Concerning Bromatology II focuses on the analysis of food, while the other tasks are collected in Bromatology I.

The graduate in Food Science and Technology is qualified to perform in food analysis laboratories, responding to the needs of the private company and / or the actions of the inspection and control bodies, to determine the qualities and characteristics of raw materials and products, compliance with current legislation and aptitude for consumption in safeguarding health. Therefore, it is essential that the subject of Bromatology II is included in the current Degree Program in Food Science and Technology.

4. Degree competences achieved in this course**Course competences**

Code	Description
CB02	Apply their knowledge to their job or vocation in a professional manner and show that they have the competences to construct and justify arguments and solve problems within their subject area.
E05	To know the composition, phyco-chemical properties, nutritional value and sensory properties of foods
E06	To know and be able to handle the techniques and procedures of food analysis
E19	To know the fundamentals of quality and traceability systems and be able to perform their deploy, as well as to evaluate and control the food quality
E22	To perform formation of staff in the food sector
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.
G09	To develop the motivation for quality, the capacity to adapt to new situations and the creativity.

5. Objectives or Learning Outcomes**Course learning outcomes****Description**

To acquire an appropriate knowledge of the chemical composition, physico-chemical properties, nutritional value and functional properties of different food products.

Handling of bibliography and specific databases related to the composition, the physico-chemical analysis and the quality control of food products, and acquisition of aptitude to elaborate and realize scientific and technical presentations.

Knowledge of the official methodology of analysis and quality control applied to food products

Acquisition of capacity for the interpretation of the results of food analyses, as well as for the detection of anomalies and adulterations, and for the solution of problems that could arise from an efficient quality control.

Development of skills to carry out tasks in the analytical laboratory and to handle common technologies of physico-chemical analyses in the food laboratory, as well as the statistical procedures of data processing and sampling.

6. Units / Contents

Unit 1: Introduction

Unit 2: Sampling and sample preparation

Unit 3: pH and titratable acidity

Unit 4: Moisture, total solids and ash analysis

Unit 5: Nitrogen compounds analysis

Unit 6: Crude fat analysis

Unit 7: Carbohydrate and fiber analysis

Unit 8: Color analysis

Unit 9: Enzymatic methods

Unit 10: Sample preparation for the chromatographic analysis

Unit 11: Thin layer chromatography (TLC)

Unit 12: Gas chromatography (GC)

Unit 13: High performance liquid chromatography (HPLC)

Unit 14: Electrophoresis

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		1.3	32.5	N	-	
Laboratory practice or sessions [ON-SITE]	Practical or hands-on activities		0.8	20	Y	Y	
Problem solving and/or case studies [ON-SITE]	Guided or supervised work		0.1	2.5	Y	N	
Group tutoring sessions [ON-SITE]	Group tutoring sessions		0.08	2	N	-	
Writing of reports or projects [OFF-SITE]	Self-study		0.7	17.5	N	-	
Study and Exam Preparation [OFF-SITE]	Self-study		2.9	72.5	N	-	
Final test [ON-SITE]	Assessment tests		0.12	3	Y	Y	
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
Laboratory sessions	20.00%	20.00%	Laboratory practices will be evaluated by presenting a practice report and by incorporating questions in the final test.
Final test	70.00%	80.00%	The grades obtained in the tests carried out will be considered.
Assessment of problem solving and/or case studies	10.00%	0.00%	The grades obtained in the seminars delivered will be considered.
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:

The final grade will be obtained by weighing the grades obtained in the different activities carried out according to the criteria specified in the table above.

Non-continuous evaluation:

The final grade will be obtained by weighing the grades obtained in the different activities carried out according to the criteria specified in the table above.

9. Assignments, course calendar and important dates

Not related to the syllabus/contents

Hours	hours
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10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	City	ISBN	Year	Description
Lees Maier, Hans Gerhard	Métodos modernos de análisis de alimentos	Acribia		84-200-0487-1	1982	
Matissek, Reinhard	Análisis de los alimentos : fundamentos, métodos, aplicación	Acribia		84-200-0850-8	1998	
S. Suzanne Nielsen	Análisis de los alimentos	Acribia Kluwer		978-84-200-1114-1	2008	
Nielsen, S. Suzanne	Food Analysis Laboratory Manual	Academic/Plenum Publishers		0-306-47496-4	2003	
Kirk, Ronald S.	Composición y análisis de alimentos de Pearson	Compañía Editorial Continental		0-582-40910-1	1996	
S. Suzanne Nielsen	Análisis de los alimentos : manual de laboratorio			978-84-200-1059-5	2007	