COURSE DATA

DATA SUBJECT

Code: 33988
Name: Food Analysis
Cycle: Undergraduate Studies
ECTS Credits: 6
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
1103 - Degree in Food Science and Technology	Facultat de Farmácia i Ciències de L'alimentació	3	Second quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1103 - Degree in Food Science and Technology	Food analysis	COMPULSORY

COORDINATION

GARCIA LLATAS GUADALUPE

SUMMARY

Food analysis is a mandatory subject, carrying 6 ECTS in the third year, second semester of the Degree in Food Science and Technology. It is part of Module 2: Food Science, which includes other subjects such as Food Science and Food Chemistry.

This course is intended to convey basic knowledge of food analysis for the student of the Degree in Food Science and Technology to acquire a solid foundation in this topic.

In the first part of the subject, general aspects of food analysis, for instance concepts of types of analysis, analysis protocol, sample and sampling, among others are taught. The central block of the subject focuses on the nutritional analysis of food components of interest to determine the centesimal composition and labeling of food. The final block includes the analysis of other food components that may be beneficial to health or, on the contrary, which content may be controlled in foods.
The practical part of the course is developed in lab sessions in which the student uses several and diverse analytical methodologies.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

OTHER REQUIREMENTS

Subjects of the Basic Module, essentially, biology, chemistry (general, organic and analytical), biochemistry and statistics. It is advisable to have done other courses such as Food Science (Bromatology) and Food Chemistry.

COMPETENCES / LEARNING OUTCOMES

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Acquire knowledge of the approach, methodology and development of food analyses in order to assess their application to specific cases.

Acquire skills for searching, selecting, preparing, improving and evaluating procedures of food analysis.

Adquirir capacidad de utilizar adecuadamente las fuentes de información y comunicación disponibles.

Analyse food.

Be familiar with discipline-specific terminology.

Capacidad de interpretar datos relevantes.

Capacidad para transmitir ideas, problemas y soluciones dentro de su área de estudio.

Develop skills to undertake further study.

Know general aspects preliminary to the analysis and apply them to the specific field of food.

Know how to apply that knowledge to the professional world contributing to the development of human rights, democratic principles, the principles of equality between women and men, solidarity, protection of the environment and promotion of the culture of peace, from a gender perspective.

Know how to apply the main analytical methodologies (physical, chemical and sensory) appropriate to the object and purpose of the analysis proposed.

Poseer y comprender los conocimientos en el área de Ciencia y Tecnología de los Alimentos.

DESCRIPTION OF CONTENTS

1. General aspects of food analysis

1. INTRODUCTION. Description of the subject. Related courses. Subject guidelines.
2. ANALYSIS OF FOOD. Purpose and types of analysis.
3. PROTOCOL OF ANALYSIS. Type of samples and sampling. Sample preparation. Validation of analytical methods.
4. ANALYTICAL TECHNIQUES COMMONLY USED IN FOOD ANALYSIS.

2. Analysis of food components of nutritional interest

5. WATER. Determination of water content. Water activity.

6. CARBOHYDRATES AND DIETARY FIBER. Methods of determination. Dietary fiber: concept and determination.

7. LIPIDS. Determination. Study of the composition of the fat fraction. Determination of the quality status of the fat fraction.

8. PROTEINS. Direct and indirect methods. Amino acid analysis. Indices of protein quality.

9. MINERALS. Methods of determination. Speciation.
10. VITAMINS. Water- and fat-soluble vitamins: extraction, separation and determination.

3. Analysis of other food components of interest

11. ORGANIC ACIDS. Analysis of low molecular weight acids.

12. COMPONENTS GENERATED BY THE PROCESSING. Analysis of acrylamide, hydroxymethylfurfural and furan.

13. CONTAMINANTS AND RESIDUES in food. Identification and determination by chromatography.
14. FOOD ADDITIVES. Colorants, preservatives and sweeteners qualitative and quantitative analysis.
15. COMPOUNDS WITH ANTIOXIDANT ACTIVITY. Analysis of the total antioxidant power and phenols in matrices of food interest.

16. OMIC TECHNIQUES. Fundamentals of transcriptomics, proteomics and metabolomics. Food analysis applications.

4. Laboratory sessions

- Determination of the centesimal composition of a food product. Elaboration of a label.
- Oils and fats identification by gas chromatography.
- Infrared spectrophotometry in drinks.
- Colorants in carbonated drinks by chromatographic techniques.
- Determination of antioxidant capacity: polyphenols in foods and dietary supplements.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Tutorials	2,00
Theory	38,00
Seminar	2,00
Laboratory	15,00
Total hours	**57,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	14,00
Independent study and work	62,00
Preparation of lessons	4,00
Preparation for assessment activities	10,00
Resolution of case studies	0,00
Total hours	**90,00**

TEACHING METHODOLOGY

Theoretical classes: explanatory sessions and/or demonstration of contents, with a total of 38 hours/term. Classes are taught using audio-visual technical equipment and materials available on the online platform beforehand. At the end of each item, ICT tools might be used by the teacher in order to reinforce the most relevant aspects. Additionally, throughout the semester, students will be provided of activities and resources in order to facilitate the study of the subject available in open-access educative platforms.

Seminars: students gain insight through interaction and activities. One coordinated seminar will take place on topics related to the course and will be provided by the teacher following the guidelines on coordinated seminars available at the web page of the Degree. The development of the seminar will be monitored

through tutorials, to be agreed upon between the teacher and the students.

Practical lessons (laboratory): there will be four hands-on lab sessions, i.e. three of four hours and one of three hours. Practice exercises will be done in pairs.

At the beginning of each lab session, students should complete individually a test through a Moodle questionnaire and deliver a scheme of the experimental procedure related to the assays to be performed during the session. At the end of the lab sessions, students must fill in, in pairs, the report available on the online platform, and it must be delivered daily through this platform.

Tutorials: students can attend tutorials either individually or in a group. Two tutorials of one hour each will take place. Several activities, literature reading, and short questions will be dealt per groups and delivered on the online platform.

Continuous assessment activities: Three continuous assessment activities will be distributed throughout the semester. The topics of these activities raised by the teachers will be part of the contents theoretical and practical of the subject. If necessary, students could be provided with the basic bibliography and resources to work on the knowledge they are intended to acquire.

Individual or group work and study: individual and in-group learning capacity will be developed.

During the activities, both theoretical and practical, examples of the applications of the subject's contents in relation to the Sustainable Development Goals (SDG) will be indicated. By doing this, it is intended to provide knowledge, skills and motivation to the students in order to understand and address these SDGs, while promoting reflection and criticism.

EVALUATION

The acquisition of knowledge, competence and skills will be assessed continuously throughout the semester.

Measurable parameters considered are:

a) **Written test** which will assess the degree of general knowledge of theoretical and practical concepts and procedures presented for each item.

b) **Completion of questionnaires** (continuous assessment activities, lab sessions and tutorials) and elaboration of seminars.

c) The activities of laboratory sessions, tutorials and seminars are of mandatory attendance, and,

therefore, **are not recoverable**.

The assessment will be performed as follows:

1. Acquisition of theoretical/practical concepts and way of their expression through written tests (65%). The exam matters will include the topics covered in the theoretical and practical sessions and continuous assessment activities. There will be a written test by call (2 h length) with questions of open-ended and short answers, or of alternative response (true-false) with reasoning; in the case of including multiple choice questions, wrong answers will be penalized; this test will also include numerical resolution of practical cases and short answers from the laboratory sessions (fundamentals, purpose of used reagents, etc.). The correction in the expression of concepts (including spelling) and the terminology used will be taken into account for the mark. **Students must reach 5 out of 10** to be added up with the rest of marks obtained and thus pass the subject.

2.Student¿s attitude and participation in the lab sessions as well as previous preparation of practical classes (8%).

Student attitude will be assessed through the completion of Moodle questionnaires and the deliver of the experimental procedure schemes at the beginning of each lab session and the result report at the end of each session.

Assessment criteria:

- Attitude and participation during the lab sessions: Aspects like previous preparation of practical classes, active intervention in issues raised in the laboratory, the cooperative attitude, teamwork and the care and management of material will be considered.

- Application of acquired knowledge to resolve proposed questions and/or problems raised.

Attendance of the lab sessions and the daily delivery of the experimental procedure schemes and the result reports are compulsory to pass the subject.

3. Tutorials (5%): the solution of questions proposed through the online platform for each session will be assessed and they will have to be delivered by means of it. The evaluation will be carried out through a Moodle questionnaire (0.25 points/tutorial session) composed by test questions.

Attendance of tutorials is compulsory in order to pass the subject.

4. Seminars (10%): written work, presentation, defence and proposed activities will be taken into account for the assessment of the coordinated seminar according to the guidelines available at the web page of the Degree. The level of understanding of the contents as well as the skills for its presentation and discussion will be assessed.

Attendance of seminars is compulsory in order to pass the subject.

5. Continuous assessment activities (12%): the realization of the tasks proposed in each of the continuous assessment activities related to the contents of the subject will be assessed. The evaluation will be done through a Moodle questionnaire (0.4 points/activity) and by means of the delivery of proposed tasks.

Notes:

(i) Evidence of copying or plagiarism in any of the assessable tasks will result in failure to pass the subject and in appropriate disciplinary action being taken. Please note that, in accordance with article 13. d) of the Statute of the University Student (RD 1791/2010, of 30 December), it is the duty of students to refrain from using or participating in dishonest means in assessment tests, assignments, or university official documents. In the event of fraudulent practices, the ¿Action Protocol for fraudulent practices at the University of Valencia¿ will be applied (ACGUV 123/2020): https://www.uv.es/sgeneral/Protocols/C83sp.pdf
(ii) The subject will be considered as passed if the mark corresponding to the written theoretical/practical test reaches the established minimum and if a score equal or greater than 5.0 (out of 10) is numerically reached with the sum of the marks obtained in the evaluable activities of the subject.adjetivo

(iii) Attendance of laboratory sessions, seminars and tutorials is compulsory to pass the subject.

(iv) The daily delivery of the experimental procedure schemes and results¿ report is compulsory to pass the subject.

(v) Students who in the first call do not pass the written test, will keep their marks corresponding to seminars, tutorials and report from lab sessions until the second call of the same year.

(vi) Students retaking the subject will keep their attendances and marks corresponding to seminars and tutorials. The attendance and marks corresponding to the laboratory sessions will be kept for the following two years after their completion. After this period, lab sessions will have to be retaken.

REFERENCES

The bibliography considered basic for the study and preparation of the subject is indicated in bold:

- Association of Official Analytical Chemists (AOAC), Official Methods of Analysis of AOAC International. Horwitz, W., Ed.
- Adrian, J., Potus, J., Poiffait, A., Dauvillier, P. Análisis nutricional de los alimentos. Ed Acribia. Zaragoza. 2003.
- Codony, R., Boatella, J., Rafecas, M., Guardiola, F. Anàlisi d'aliments. Ed. Universitat de Barcelona. 2002.
- Guardiola F. Pràctiques d'anàlisi d'aliments. Ed. Universitat de Barcelona. 2007 (for the preparation of practical lessons).
- Lees, R. Análisis de los alimentos: Métodos analíticos y de control de calidad. Ed. Acribia. 1991.
- Matissek, R., Schnepel, F.M., Steiner, G. Análisis de los Alimentos: Fundamentos, métodos, aplicaciones. Ed. Acribia. 1999.
- Nielsen, S.S.; Boff, J. M.; Bradley, R. L.; Bridges, A.R.; BeMiller, J.M.; 2008. Análisis de los alimentos. Ed. Acribia, Zaragoza (3rd edition traduction). E-book available: Nielsen, S. Suzanne. (Ed.). (2017). Food analysis (5th edition.). Springer, en: https://doi.org/10.

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- Nollet, L.M.L., Handbook of food analysis. Ed. Marcel Dekker. 2004 (vols. 1, 2 y 3)

- Peris Tortajada, M. Cuestiones y problemas de análisis de alimentos. Universidad Politécnica de Valencia. Valencia. 2017 (for the preparation of practical lessons). Available at en: https://lectura. unebook.es/viewer/9788490486528/1

- Picó Y. Chemical Analysis of Food: Techniques and Applications. Ed. Elsevier. 2012. Available at en: http://www.sciencedirect. com/science/book/9780123848628

- *Web pages from official organisms* : European Food Safety Authority (http://www.efsa.europa.eu/); Institute for Reference Materials and Measurements (https://ec.europa.eu/jrc/en/institutes/irmm); Association of Official Analytical Chemists (http://www.aoac.org/ American Chemical Society: http://www.acs.org/content/acs/en.html)

- *Journals* (access through UV databases): Alimentaria; Journal of food composition and analysis; Food science and technology international; Grasas y aceites.