

**COURSE DATA****Data Subject**

Code	42936
Name	Laboratory of food analysis
Cycle	Master's degree
ECTS Credits	3.0
Academic year	2023 - 2024

Study (s)

Degree	Center	Acad. year	Period
2109 - M.D. in Experimental Techniques in Chemistry	Faculty of Chemistry	1	Annual

Subject-matter

Degree	Subject-matter	Character
2109 - M.D. in Experimental Techniques in Chemistry	2 - Integrated laboratory of experimental techniques in chemistry	Obligatory

Coordination

Name	Department
LERMA GARCIA, MARIA JESUS	310 - Analytical Chemistry

SUMMARY

Subject of laboratory in which apply techniques and methodologies learned in the subjects of the matter I to the particular case of food analysis, with particular attention to the use of official methods of analysis and/or methods proven in this area, as well as the selection of the most appropriate analytical problem method specifically.

PREVIOUS KNOWLEDGE**Relationship to other subjects of the same degree**



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

Other requirements

Prior knowledge of chemistry and experimental work in the laboratory of chemistry taught in the degrees indicated in the recommended income profile for the student of the master's degree are required.

OUTCOMES

2109 - M.D. in Experimental Techniques in Chemistry

- Saber aplicar los conocimientos adquiridos y ser capaces de resolver problemas en entornos nuevos o poco conocidos dentro de contextos más amplios (o multidisciplinares) relacionados con su área de estudio.
- To acquire basic skills to develop laboratory work in biomedical research.
- Be able to access the information required (databases, scientific articles, etc.) and to interpret and use it sensibly.
- Ser capaces de seleccionar y optimizar las variables instrumentales para obtener los mejores parámetros analíticos en las técnicas experimentales estudiadas.
- Ser capaces de emplear las herramientas básicas para el tratamiento de datos experimentales en el laboratorio.
- Realizar las labores propias de su profesión, tanto en empresas privadas como en organismos públicos, llevando a cabo estudios basados en el uso de técnicas experimentales, en distintos ámbitos tales como: medioambiental, agroalimentario, sanitario (farmacéutico y clínico), cosmético y en general de la industria del sector químico y afines.
- Realizar estudios relacionados con el análisis y/o la caracterización de sustancias químicas tales como: control de calidad, diseño de protocolos de trabajo para laboratorios, diseño e implementación de procesos de acreditación y validación, diseño y desarrollo de proyectos I+D+I, emisión de informes, certificaciones y/o dictámenes, etc.
- Ser capaces de planificar y gestionar los recursos disponibles de un laboratorio químico, teniendo en cuenta los principios básicos de la calidad, prevención de riesgos, seguridad y sostenibilidad.
- Seleccionar la instrumentación química comercializada apropiada para el estudio a realizar y de aplicar sus conocimientos para utilizarla de manera correcta.
- To prepare a clear and concise memory of the results of your work and the conclusions obtained.

LEARNING OUTCOMES

At the end of the teaching-learning process, the student should be able to:



1. Solve analytical problems that involve the analysis of complex samples of food.
2. Use different bibliographic sources to carry out a correct planning of the analysis of complex samples.
3. Select the most appropriate methods to solve analytical problems (physicochemical parameters, sample treatment, calibration methods, etc.)
4. Describe the analytical techniques commonly used to detect alterations and adulterations in food.
5. Describe the high resolution techniques employed in analysis of food as well as benefits of the same.
6. Describe the experimental methodology for the optimization of a procedure for evaluating contaminants in food.
7. Regarding the Sustainable Development Goals (SDGs), it is expected that students will be able to know in this subject how to apply the knowledge learned to guarantee an inclusive, equitable, and quality education and promote learning opportunities for everyone (SDG 4), to acquire a special sensitivity for sustainable management of water (SDG 6), raw materials and energy sources (SDG 7), as well as for an environmentally friendly and sustainable development (SDGs 11, 12, 13, 14 and 15), in addition to being able to design, select and/or develop efficient products, chemical processes, and analytical methodologies (SDG 7) that minimize their impact on the environment (SDGs 14 and 15), using alternative raw materials and reducing wastes (SDG 11).

DESCRIPTION OF CONTENTS

1. Control of food quality by official or proven warranty methods of analysis: evaluation of physical and chemical parameters.

- Conventional spectrophotometric determination of K-indices in olive oils.
- Identification of impurities and determination of methanol in high alcoholic beverages by gas chromatography.

2. Development of analytical methodologies for the evaluation of pollutants (Food Safety)

- Determination of mycotoxins in wines by liquid chromatography - fluorescence detection.
- Evaluation of pesticide residues in fruits and vegetables by gas chromatography mass spectrometry.

**WORKLOAD**

ACTIVITY	Hours	% To be attended
Laboratory practices	30,00	100
Development of individual work	6,00	0
Study and independent work	15,00	0
Readings supplementary material	6,00	0
Preparation of evaluation activities	6,00	0
Preparation of practical classes and problem	6,00	0
Resolution of case studies	6,00	0
TOTAL	75,00	

TEACHING METHODOLOGY**Presential Activities**

Laboratory classes will begin with seminars in which Professor will perform a brief introduction of the objective, fundamentals and experimental practices methodology to perform.

The teacher will held in the laboratory the necessary explanations on operation of the instruments to be used in each practice prior to their use by students and will supervise its use during practices, to enhance knowledge on the techniques used (CE4)

Students will carry out the practice following the corresponding manual of practices (CG1, CG4).

Classroom activities performed in the laboratory, presentations and exhibitions of works will be part of the ongoing evaluation of the student (formative activities AF2 of verifica and teaching methodology MD1 of verifica)

Written examinations of the subject will be carried out on the date specified in the programming of the assessment tests (formative activities AF4 of verifica and teaching methodology MD1 of verifica).

The competences to acquire from the presential activities will be:

- Generals: CB7, CG1 and CG3
- Specific: CE2, CE3, CE4, CE5 y CE6

Non-presential activities

Students will conduct the non-presential activities requested by the teacher (memoirs, reports of practices, etc.) and they will deliver them on the specified date.



The competences to acquire from the presential activities will be:

- Specific: CE7

EVALUATION

1. -Continuous evaluation of the student in classes and seminars (previous preparation, participatory assistance, manipulation of material and equipment, organization of work, understanding and use of the practical script, calculation, teamwork, etc.)

Preparation of the practice before starting the laboratory session by completing questionnaires. During the sessions, focused on solving practical cases, the attendance and participation of the students will be evaluated individually (either by answering orally or in writing to the questions raised by the teacher, or by asking questions whose answer is relevant to the rest of the group). Among others, these questions will include the design of work protocols, the selection of variables and the tools for data processing (verifica skills CE2, CE3, CE5 and CE6). The practical sessions will be carried out in working groups (verifica skills CG1).

Skills to evaluate: Specific: CE1, CE2, CE3, CE4, CE5 and CE6

WEIGHT 40 %

2.- An assessment of non-classroom-based activities (memories and/or reports of practices delivered)

The reports performed by the students will include the main conclusions extracted from the laboratory work (working protocols, variable selection and data treatment; verifica competences CE2, CE5, CE6 and CE7) and it will be done by couples to improve the group working (consensus decision making: verifica competences CG1 and CE7)

WEIGHT 30 %

3. -Written examinations (Based on the results of learning the content and on the specific objectives of each subject)

The exam will consist in the resolution of questions and practical examples related to the studied techniques (verifica competences: CE2, CE4, CE5 and CE6).

WEIGHT 30 %



The minimum grade obtained in each of evaluated parts must be equal to or greater than 4.5 in order to average between them.

The minimum overall grade to pass the course is 5.0.

REFERENCES

Basic

- Diario Oficial de la Unión Europea, Reglamento 1831/2003, de 19 de Diciembre de 2003, de la Comisión, por el que se fija el contenido máximo de determinados contaminantes en los productos alimenticios, 2003.
http://www.cdt-alimentacion.net/metodos_oficiales.php (Métodos oficiales de análisis de algunos alimentos en España)
<http://www.aesa.msc.es/aesa/web/AesaPageServer?idpage=58>. (Monográficos sobre seguridad alimentaria y legislación de alimentos).
<http://www.mapa.es> (Normas de calidad de alimentos del Ministerio de Agricultura, Pesca y Alimentación)
<http://www.panreac.es> (Manuales descargables de los métodos oficiales de análisis de algunos alimentos)
- Matissek, R., Schnepel, F.M., Steiner, G. Análisis de los alimentos: Fundamentos, métodos, aplicaciones, Acirbia, Zaragoza, 1999.
- Métodos oficiales de análisis de alimentos, Mundi-Prensa. Madrid, 1994.
- Ministerio de Agricultura, Pesca y Alimentación, Métodos Oficiales de Análisis en la Unión Europea. Madrid, 1998.
- Ministerio de Agricultura, Pesca y Alimentación. Métodos Oficiales de Análisis, Madrid, 1993-94.
- Nollet, L.M. Handbook of Food Analysis. Vol. 1, 2 y 3, Marcel Dekker, Nueva Cork, 2004.
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- Unión Europea, Libro Blanco sobre Seguridad Alimentaria, 2000.