VNIVERSITAT DE VALÈNCIA

Course Guide
42937 Laboratory of industrial analysis

COURSE DATA

Data Subject	
Code	42937
Name	Laboratory of industrial analysis
Cycle	Master's degree
ECTS Credits	2.0
Academic year	2022 - 2023

Study (s)

Degree	Center	Acad. year	Period
2109 - Master's Degree in Experimental Techniques in Chemistry	Faculty of Chemistry	1	Annual

Subject-matter

Degree	Subject-matter	Character
2109 - Master's Degree in Experimental Techniques in Chemistry	2 - Integrated laboratory of experimental techniques in chemistry	Obligatory

Coordination

Name	Department
CARRASCO CORREA, ENRIQUE JAVIER	310 - Analytical Chemistry
TORRES LAPASIO, JOSE RAMON	310 - Analytical Chemistry

SUMMARY

Laboratory subject in which they are applied the techniques and methodologies learned in the subjects of matter I to the particular case of the industrial analysis, devoting special attention to the use of official methods of analysis and/or assurance methods contrasted in this area, as well as to the selection and implementation of the method most appropriate to a particular analytical problem

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.

COMPETENCES (RD 1393/2007) // LEARNING OUTCOMES (RD 822/2021)

2109 - Master's Degree 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 realacionados 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 arealizar 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 (RD 1393/2007) // NO CONTENT (RD 822/2021)

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

1. Explain the importance of the control of raw materials and finished products in the industry.
2. Integrate and apply chemical knowledge with analytical purposes applied to the industrial field
3. Explain in detail any representative analytical techniques for the control of raw materials.
4. Interpret and properly select the official methods of analysis according to the type of sample.
5. Assess and describe appropriate separation systems to isolate the different analytes from a sample in a process of industrial analysis.
6. Properly organize the results of experimental measurements and interpret data, tables, and graphics.
7. Apply correctly the results for the quality control of a product in time.
8. Manage the scientific and technical literature as a source of knowledge for the resolution of problems in the quality control laboratory.
9. 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. Experimental techniques for the analysis of macro and microconstituents in the agri-food industry

- Quality control in the agri-food industry by studying examples of determination of macro and microconstituents in commercial fertilizers and raw materials, according to the regulation issued by the European Parliament and Council.

2. Analytical techniques for raw materials in petrochemical industry

- Quality control of a raw material in the petrochemical industry, study of official standards.
- Manufacture and quality control of a biodiesel.
- Application of UNE standards.
- Development of a methodology to evaluate the biodiesel synthesis yield.

WORKLOAD

ACTIVITY	Hours	% To be attended
Laboratory practices	20,00	100
Development of group work	4,00	0
Development of individual work	4,00	0
Study and independent work	8,00	0
Readings supplementary material	4,00	0
Preparation of evaluation activities	4,00	0
Preparation of practical classes and problem	6,00	0
TOTAL	**50,00**	

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 methdology 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 (participatory assistance, material handling and equipment, organization of work, understanding and use of the screenplay of practices, performing calculations, team work, etc.)

Along the sessions, focus in the resolution of practical assays, the assistance and participation of the students will be evaluated individually (by oral answers or by writing questions planned by the professor, by planning questions which its answer will be relevant for all the group). Also, these questions will include the design of working protocols, the selection of variables and the tools for the data treatment (verifica competences CE2, CE3, CE5 and CE6). The competences to evaluate: specifics: 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 %

REFERENCES

Basic

- Camara C. et al., Toma y Tratamiento de muestras. Ed. Síntesis, 2002.
  Hibbert D.B. Quality Assurance in the Analytical Chemistry Laboratory, Oxfort University Press, 2007
  Vian Ortuño A., Introducción a la Química Industrial, Reverte, 1994.
  Maurí A., M. Llobat y R. Herráez, Laboratorio de Análisis Instrumental, Universitat de València-Reverté, Valencia, 2010
  Rouessac F., Rouessac A., Chemical Analysis. Modern Instrumentation methods and techniques, 2ª ed, Wiley, 2007
  Amoros J.L. et al. Manual para el control de calidad de materias primas arcillosas, Instituto de Tecnología Cerámica, Castellón, 1998
  Kent J.A. ed., Riegels Handbook of Industrial Chemistry, 9ª ed, Chapman and Hall, 1992.