



IDENTIFYING DATA

Instrumental Techniques for Agri-Food and Environmental Analyses

| | | | | |
|---------------------|---|----------|------|------------|
| Subject | Instrumental Techniques for Agri-Food and Environmental Analyses | | | |
| Code | 001M142V01109 | | | |
| Study programme | (*)Máster Universitario en Ciencia e Tecnoloxía Agroalimentaria e Ambiental | | | |
| Descriptors | ECTS Credits | Choose | Year | Quadmester |
| | 3 | Optional | 1st | 1st |
| Teaching language | Spanish French Galician English | | | |
| Department | | | | |
| Coordinator | Falqué López, Elena | | | |
| Lecturers | Falqué López, Elena | | | |
| E-mail | efalque@uvigo.es | | | |
| Web | | | | |
| General description | (*)O alumno coñecerá os fundamentos e perspectivas daquelas técnicas instrumentais de maior uso e aplicabilidade na análise de alimentos, produtos agroalimentarios e #ambiental. | | | |

Competencies

| | |
|------|--|
| Code | |
| A1 | |
| A2 | |
| B2 | (*)Que os estudantes sexan capaces de adquirir e aplicar habilidades e destrezas de traballo en equipo, sexan ou non de carácter multidisciplinar, en contextos tanto nacionais como internacionais, recoñecendo a diversidade de puntos de vista, así como o poso das distintas escolas ou formas de facer. |
| C1 | |
| C2 | |
| C5 | |
| C7 | |

Learning outcomes

| Expected results from this subject | Training and Learning Results |
|---|--|
| Be able to select and apply the analytical techniques more adapted for the analysis of the analites (raw materials, foods and environmental products) to determine their characteristics and can evaluate and control the food and environmental quality. | A1 A2 B2 C1 C2 C5 C7 |
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Treat, evaluate and interpret the results obtained in the determinations and train the student to become aware of the social responsibility of their reports and their impact on decision-making.

A2
B2
C1
C2
C5
C7

Contents

| Topic | |
|---|---|
| DIDACTIC UNIT I: Introduction to the Instrumental Analysis. | SUBJECT 1. Introduction to the instrumental methods of analysis for the investigation in the food and environmental fields. |
| DIDACTIC UNIT II: Optical Methods applied to the food and environmental investigation. | SUBJECT 2. Optical methods: Generalities. SUBJECT 3. Spectroscopy of molecular absorption UV-vis. SUBJECT 4. Atomic spectroscopy. |
| DIDACTIC UNIT III: Chromatographic Methods applied to the food and environmental investigation. | SUBJECT 5. Chromatography: Generalities. SUBJECT 6. High performance liquid chromatography. SUBJECT 7. Gas chromatography. |
| DIDACTIC UNIT IV: Electrochemical Methods in the food and environmental investigation. | SUBJECT 8. Electrodes. SUBJECT 9. Potentiometry. |
| DIDACTIC UNIT V: Other instrumental techniques. | SUBJECT 10. New instrumental techniques or coupled techniques. |

Planning

| | Class hours | Hours outside the classroom | Total hours |
|---------------------------------|-------------|-----------------------------|-------------|
| Lecturing | 5 | 10 | 15 |
| Laboratory practical | 4 | 8 | 12 |
| Problem solving | 0 | 5 | 5 |
| Mentored work | 0 | 40 | 40 |
| Problem and/or exercise solving | 1 | 0 | 1 |
| Objective questions exam | 2 | 0 | 2 |

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies

| | Description |
|----------------------|--|
| Lecturing | Exhibition by part of the professor, or of the student in his case, of the most important contents of the programme, theoretical bases and/or guidelines of the work, exercise or project to develop by the student. For the modality no-face-to-face will enable some special tutorial hours to suit between the student and the professor. |
| Laboratory practical | Activities (face-to-face), in groups of 2 or 3 people, in which it will ascertain the direct application of the theoretical knowledges developed in the master sessions. |
| Problem solving | Activity (of autonomous form) in which they formulate problems and/or exercises related with the main contents of the course. The student has to develop the suitable or correct solutions by means of the exercising of routines, the application of formulas or algorithms, the application of procedures of transformation of the available information and the interpretation of the results. |
| Mentored work | The student (of autonomous form) elaborates a document on concrete subject of the course, by what will suppose the research and collected of information, reading and handle of bibliography, edition, exhibition... |

Personalized assistance

| Methodologies | Description |
|-----------------|--|
| Problem solving | To the resolution of problems and exercises, the professor will indicate the guidelines or routines for the resolution of them. The student will have by anticipated, in the platform tem@, of the material employed in classes (so much theoretical, bulletins of problems, like scripts of the practices of laboratory). |
| Mentored work | In the supervised works, the final document, and in his case also the exhibition of the same, on the thematic, conference, summary of reading, investigation or memory developed will valued. |

Laboratory practical To the start of each session of laboratory, the professor will do an exhibition of the contents to develop by the students. Likewise, during the development of the practices of laboratory, the student has to elaborate a fascicle of laboratory where collect all the relative observations to the experiment realised, as well as the data and results obtained. The student will have by anticipated, in the platform tem@, of the material employed in classes (so much theoretical, bulletins of problems, like scripts of the practices of laboratory).

| Assessment | | | | | |
|----------------------|---|---------------|-------------------------------|----|----------------------|
| | Description | Qualification | Training and Learning Results | | |
| Lecturing | It will realise a Proof on theoretical questions of the course, in which it is necessary to obtain at least 5 (on 10). Likewise it is necessary to reach a minimum punctuation in each one of the Didactic Units. | 15 | A1 A2 | B2 | C1 C2 C5 C7 |
| Laboratory practical | The practices of laboratory will suppose until 30% of the final note, that includes the mandatory attendance to all the sessions, the realisation of all the practices and the preparation and delivery of the memory of practices. Also will take into account the attitude and participation of the student in classes. This part will have to be surpassed independently of the other to be able to surpass the course and be in conditions to add the assessment of the other activities. | 30 | A1 A2 | B2 | C1 C2 C5 C7 |
| Problem solving | It will realise a Proof of resolution of problems and/or exercises in which it is necessary to obtain at least 5 (on 10). | 15 | A2 | B2 | C1 C5 |
| Mentored work | The participation, attitude, as well as the work in himself (form to tackle the concepts to work, edition, presentation...Of the document written and exhibition, to be the case) will suppose until 40% of the final note. | 40 | A1 A2 | | C1 C2 C5 C7 |

Other comments on the Evaluation

For the modality of "attendance mode" will realise , therefore, an Examination in which they will describe the theoretical and practical knowledges purchased in the course, so that the part of the theory represents 50% of the note and the part of problems represents 50% remaining, having to obtain a minimum of 5 points on 10, so much in theory as in problems; besides, in theory will have to obtain a minimum punctuation in each Didactic Unit.

Will take into account, for the final evaluation, the assistance to the classes of theoretical explanation of the course.

The practical will be described by the professor in base to the assistance (compulsory), and to the attitude and aptitude of the students during the development of the same. Each group will have to deliver a memory of the practices where state all the calculations realised, as well as the discussion and justification of the final results.

In the second announcement of the course (July), the evaluation will carry out of the following way: Examination of all the theoretical and practical part of the course, having to surpass the minimum punctuation required foreach one of the distinct Didactic Units of the course. Will conserve the qualifications obtained in the practices of laboratory and/or works.

The form to evaluate to students in the modality of not-attendedance (workers or old students of this course or wiht similar contents) will be to choose between:

- To realise the practices of laboratory (although it will procure adapt to the schedule to the of the student) and the consequent practices' work , and the realisation of the examinations of the course.
- Realisation of a work on a technique (or group of analytical techniques that have not been included in the course (neither of the course of this Máster, neither of the course previously studied by the student).

Sources of information

Basic Bibliography

Olsen, E.D., **Métodos ópticos de análisis**, Reverté, S.A., 1986

Harris, D.C., **Análisis químico cuantitativo**, 2ª, Reverté, S.A., 2001

Harris, D.C., **Análisis químico cuantitativo**, 3ª, Reverté, S.A., 2007

Harvey, D., **Química Analítica moderna**, McGraw-Hill, Interamericana de España, 2002

Valcárcel, M. y Gómez, A., **Técnicas analíticas de separación**, Reverté, S.A., 1988

Hargis, L.G., **Analytical chemistry: principles and techniques**, Prentice Hall, 1988

Skoog, D.A., West, D.M., Holler, F.J. y Crouch, S.R., **Fundamentos de Química Analítica**, 8ª, Thomson-Paraninfo, 2011

Skoog D.A, Holler F.J., Crouch S.R., **Principios de Análisis Instrumental**, Cengage Learning, 2008

Complementary Bibliography

Recommendations

Contingency plan

Description

OFF-SITE MODALITY:

Methodology:

* Master lesson, laboratory practices and supervised work will be conducted through the Virtual Campus, with mandatory telematic presence. The student who is unable to attend must provide adequate justification.

Bibliography and additional information will be provided for self-learning.

* Tutorials: They will be done through the virtual office, prior appointment requested through the email.

* Evaluation: It will be conducted as indicated in the face-to-face modality and the exam will be conducted telematically.
