

27228 - Fast-response Analytical Methods

Syllabus Information

Academic year: 2023/24

Subject: 27228 - Fast-response Analytical Methods

Faculty / School: 100 - Facultad de Ciencias

Degree: 452 - Degree in Chemistry

ECTS: 5.0

Year: 4

Semester: Second semester

Subject type: Optional

Module:

1. General information

The subject and its expected results respond to the following approaches and objectives:

- To provide the student with an overview of the commercial devices available to perform rapid analytical control
- To develop the analytical skills and criteria necessary to choose the most appropriate one in specific cases.
- To understand the fundamentals, the most common experimental modalities, the effect of experimental and instrumental parameters on the quality of results and the range of application of screening techniques.

These approaches and objectives are aligned with the following Sustainable Development Goals (SDGs) of the United Nations Agenda 2030 (<https://www.un.org/sustainabledevelopment/es/>): 3, 4, 6, 7, 9, 12 and 13.

2. Learning results

- Knows the main types of "fast methods", their characteristics, performance and application conditions. Relates and matches the solution of analytical problems with the answer of the methods.
- Knows the analytical techniques and instrumentation related to these methods.
- Designs, prepares, develops a method of analysis and delivers the result with the required analytical quality. Interprets the results obtained by these methods.
- Knows the areas of application.
- Handles scientific and commercial bibliography and legal provisions that apply and develop them.

3. Syllabus

1. Definition and concept of Rapid Method of Analysis. Objectives. Types of methods. Type of information. Criteria of quality. Validation and evaluation.
 2. Rapid response methods based on spectroscopic, electrical and separation techniques.
 3. Chemical sensors and biosensors. Definition and types of sensors.
 4. Laser contributions to rapid response analytical methods. Laser Induced Breakdown Spectroscopy (LIBS).
 5. Other rapid response analytical techniques.
- Laboratory **practices** related to rapid response analytical methods.
 - **Visits to** companies and institutions that have implemented rapid analysis methods.

4. Academic activities

- Activity 1: Acquisition of knowledge on rapid methods of analysis (3.5 ECTS). Methodology: master classes.
- Activity 2: Preparation and performance of laboratory practices (1 ECTS). Methodology: individual study of the preparatory material, execution of the laboratory practice, and preparation of the results report.
- Activity 3: Tutored group work based on real cases of rapid methods of analysis. Methodology: classroom presentation.
- Activity 4: External visits (0,5 ECTS)
- Activity 5: Participation in the subject's blog.

5. Assessment system

Activities of CONTINUOUS Evaluation of the learning process:

1- Controls and exercises: resolution of theoretical-practical questions throughout the term (**65 %**).

2- Group work, of which a report must be presented and will be presented orally to the rest of the students of the subject **(20 %)**.

3- Laboratory practices and external visits, of which the quality of the work and the report of the activity carried out will be evaluated **(15 %)**.

To pass the continuous evaluation it will be necessary to obtain a minimum grade of 5 points (out of 10) in each of the activities.

Those students who have not passed the continuous evaluation will take a global test, including a practical test, where they will be evaluated for all those activities they have not passed satisfactorily. The percentage of each activity will be the same as that considered in the continuous evaluation. The corresponding global test will be held on the dates of the official calls.