

## 28956 - Agricultural chemical analysis

### Syllabus Information

**Academic year:** 2023/24

**Subject:** 28956 - Agricultural chemical analysis

**Faculty / School:** 201 - Escuela Politécnica Superior

**Degree:** 583 - Degree in Rural and Agri-Food Engineering

**ECTS:** 6.0

**Year:** 4

**Semester:** Second semester

**Subject type:** Optional

**Module:**

### 1. General information

This subject aims to provide an overview of the Methods and Techniques of Analysis that can be developed and applied in an agri-food laboratory, as well as the interpretation of analytical results. The aim is to acquire a global vision of Analytical Chemistry as a science that generates information for the resolution of agri-food problems. The analytical procedures involved in the determination of the most relevant analytical parameters in the various media of interest (soil composition, irrigation water quality, fertilizers, plants, food (quality control)) should be studied.

These approaches and objectives are aligned with the Sustainable Development Goals (12 and 13) of the 2030 agenda (), specifically Goals 12.4 and 13.3.

### 2. Learning results

- . Be able to differentiate and describe the different stages of a general analytical process, as well as the methods to carry them out (sampling techniques, sample treatment methods, calibration methods).
- . Be able to describe the main analytical techniques (volumetric and instrumental), explain the theoretical basis of and their agro-food applications (analysis of food, soil, plant material, water).
- . Be able to solve numerical problems on quantitative analysis and interpret analytical data both qualitative and quantitative.
- . Be capable of handling the basic equipment and instrumentation of an agri-food analysis laboratory to carry out the application of an analytical method.
- . Be able to prepare reports of the practical cases expressing adequately the analytical method, the procedure, the results obtained and the interpretation of the same.
- . Be able to know the danger of the reagents used in laboratory practices and therefore, the environmental risks derived from their use.

### 3. Syllabus

Block 1. Introduction to chemical analysis. Classification of analytical methods.

Block 2. Sampling and chemical treatment of the sample

Block 3. Volumetric methods.

Block 4. Instrumental methods. Calibration. Spectrophotometric and chromatographic techniques.

Block 5. Agri-food applications: water, soil, fertilizer, food analysis.

### 4. Academic activities

**Theory classes (20h).** The theoretical contents of the subject and the planning of the practices will be explained.

**Problem classes (10h).** Problems on quantitative analysis will be solved similar to those performed in the practicals.

**Practical classes (30h).** Laboratory practices distributed in thematic blocks (quality parameters of irrigation water, nutrients in soils, fertilizer composition, food quality) will be carried out in order to strengthen the theoretical knowledge acquired on analytical methodologies and numerical calculations.

**Personal study (86h).**

**Evaluation tests (4h).**

### 5. Assessment system

The assessment system is global and consists of two tests:

- **Exhibit 1.** Written exam (50% of the grade, minimum 5 out of 10). Theoretical and practical questions and problem solving.

Evaluation criteria: mastery of the contents, adequacy of the answers, clarity in the written presentation, ability to interrelate the concepts, interpretation of analytical results and reasoning in solving the problems.

- **Exhibit 2.** Presentation of results and/or memory reports of the different blocks of practices (50% of the grade, minimum 4.5 out of 10). It is recommended to present them throughout the semester.

Evaluation criteria memory: presentation, understanding of the methods and techniques used, accuracy of the results obtained and discussion of the same and mastery of the risk and danger of the chemical reagents used. Active participation and interest of the student in the work developed in the laboratory will be positively valued.

**The detailed definition of the assessment system will be explained in the presentation of the subject.**

The success rates for the subject in the last three years are: 2019/20: 100%; 2020/21: no students; 2021/22: 100%