

28902 - Chemistry I

Syllabus Information

Academic year: 2023/24

Subject: 28902 - Chemistry I

Faculty / School: 201 - Escuela Politécnica Superior

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

ECTS: 6.0

Year: 1

Semester: First semester

Subject type: Basic Education

Module:

1. General information

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

To provide basic knowledge and principles of chemistry.

Study the main equilibria in solution and the parameters that influence them.

Training in the field of laboratory work.

Formulate and name inorganic compounds.

To know the fundamental principles of thermodynamics, applied to agricultural processes.

Differentiate the fundamental characteristics of each state of aggregation of matter and relate them to their properties.

The Sustainable Development Goals (SDGs) of the 2030 Agenda and specific targets that can be developed in this subject are:

Goal 6: Clean water and sanitation, Goal 7: Affordable and non-polluting energy, Goal 12: Responsible reproduction and consumption,

Goal 13: Climate action and Goal 15: Life of terrestrial ecosystems.

2. Learning results

To pass this subject, the student will be able to:

1. know the nomenclature and formulation of inorganic chemistry.
2. Know and understand the language applied to chemical reactions, being able to solve problems of basic chemistry.
3. Acquire skills in the handling of laboratory equipment and in performing basic operations.
4. Interpret what is observed in laboratory work in relation to the basics of chemistry.
5. search and manage bibliographic sources, evaluating the quality and scientific-technical rigor of , work in groups in a coordinated manner on a topic related to a specific aspect of chemistry and present in a clear and rigorous manner the fundamental aspects of the work.
6. Understand the environmental impact caused by the activity of the agricultural and livestock sector: Pesticides and wastes such as slurry. Atmospheric pollution due to gases from the sector such as methane and ammonia.
7. Learn the fundamentals of a more sustainable agriculture as opposed to traditional intensive agriculture: Use of native and less water-demanding crops against desertification, drought and soil degradation. The use of aromatic plants and their extracts.

3. Syllabus

THEORY

MODULE 1. PRELIMINARY CONCEPTS

Topic 1. Formulation and Nomenclature of Inorganic Chemistry.

Topic 2. Stoichiometry and chemical equations.

MODULE 2. STATES OF MATTER

Topic 3. The gaseous state.

Topic 4. The liquid state.

Topic 5 The solid state.

MODULE 3. THERMODYNAMICS AND CHEMICAL KINETICS

Topic 6. Thermodynamics.

Topic 7. Chemical kinetics.

MODULE 4. SOLUTIONS AND EQUILIBRIA

Topic 8. Dissolutions.

Topic 9. Chemical equilibrium.

Topic 10. Acid-base equilibria.

Topic 11. Solubility equilibria.

Topic 12. Redox equilibria.

PRACTICAL SESSIONS

Practice 1. Determination of water hardness.

Practice 2. Electrolyte conductivity. Kohlraush's Law.

Practice 3. Kinetics of a chemical reaction.

Practice 4. Dissolutions. Preparation of a solution. Concentration of solutions.

Practice 5. Distillation of a commercial wine. Determination of alcoholic strength.

Practice 6. Acid-base equilibria in solution. Indicators. Acid-base reactions.

Practice 7. Redox reactions.

4. Academic activities

The program offered to the student to help them achieve the expected results includes the following activities:

1. Theoretical and problem solving sessions and cases framed in the thematic modules of the program of the subject.
2. Experimental laboratory work posed by some of the most common practices in a chemistry laboratory.
3. Tutored works that will deal with various topics related to aspects of chemistry.

5. Assessment system

GLOBAL ASSESSMENT is carried out according to the EPS calendar for the two official examinations.

Assessment activities:

Test 1. Written exam that will deal with the concepts taught in the theoretical classes and will also include the resolution of problems and cases.

Test 2. Perform and present orally a tutored work on topics related to various aspects of basic chemistry.

Test 3. A theoretical-practical exam on the laboratory sessions and presentation of reports of practices carried out, as indicated by the faculty.

Test 4. A test of inorganic chemical formulation and nomenclature.

Each activity, 1, 2, 3 and 4, may be passed during the semester, without prejudice to the student's right to take the overall final exam at a date prior to the end of the semester set by the faculty.

Assessment criteria

The relative weighting of the Final Rating (CF) will be as follows:

- 70 % Written exam grade: test 1.
- 15 % Tutored group work, test 2.
- 15 % Laboratory practice, test 3.

$$CF = 0.7 * (\text{test score 1}) + 0.15 * (\text{test score 2}) + 0.15 * (\text{test score 3})$$

The grade of the formulation and nomenclature exam, test 4, does not compute in the CF, but a minimum of 5 points must be obtained to pass the subject. In other words, a CF greater than or equal to 5 does not result in a pass if you do not pass the exam at formulation, test 4.

The minimum grade for tests 1, 2 and 3 will be 4 points; therefore, a lower grade in one of these three tests will result in the failure of the subject, even if the CF is equal or higher than 5. In this case, the final grade that will be reflected in the minutes of the subject will be:

- If the final grade averaged, $CF > 4$, fail, 4.
- If final grade averaged, $CF < 4$, fail, CF obtained.

Success rates in the academic years 2019/20(51.5%), 2020/21(80%), 2021/22 (30%).