

69768 - Supplementary Course in Chemistry

Syllabus Information

Academic year: 2023/24

Subject: 69768 - Supplementary Course in Chemistry

Faculty / School: 100 - Facultad de Ciencias

Degree: 627 - Master's Degree in Circular Economy

ECTS: 6.0

Year: 01

Semester: First semester

Subject type: ENG/Complementos de Formación

Module:

1. General information

The subject *Complementary Chemistry* allows students to acquire the necessary knowledge and skills in chemistry to adequately follow the compulsory and elective subjects of the Master's Degree in Circular Economy. In this subject, students learn to correctly use the essential vocabulary of circular economy and to relate the fundamental concepts of this field. The subject is taught jointly by the University of Zaragoza and the University of Lleida.

It is aligned with Sustainable Development Goal (SDG) No. 12 (Responsible Production and Consumption) of the United Nations 2030 Agenda (<https://www.un.org/sustainabledevelopment/es/>), so that the acquisition of its learning results provides training and competence to contribute to some extent to the achievement of the Goal.

2. Learning results

- To be able to recognize the states of aggregation of matter and the relationship with its structure.
- To be able to relate microscopic properties and magnitudes to macroscopic ones.
- To be able to characterize chemical reactions as transformations of some substances into others.
- To know the control of kinetics and thermodynamics in chemical reactions, as well as the role of catalysts.
- To be able to differentiate between pure substances and mixtures.
- To be able to name and formulate simple inorganic compounds according to IUPAC standards.
- To be able to represent simple organic molecules.
- To be able to identify the main physical and chemical properties of an organic compound from its molecular structure.
- To be able to name simple organic molecules.
- To be able to recognize the main types of polymers and their properties.

3. Syllabus

Topic 1. States of aggregation: solids, liquids, gases. Phase change.

Topic 2. Atomic theory. Periodic table. Nomenclature of inorganic substances.

Topic 3. Stoichiometry. The mol. Dissolutions. Concentration.

Topic 4. Chemical bonding. Ionic bonding. Covalent bonding. Geometry and polarity of molecules. Intermolecular forces. Metallic bonding.

Topic 5. Enthalpy, entropy and free energy. Thermochemistry

Topic 6. Reaction speed. Catalyst.

Topic 7. Chemical equilibrium.

Topic 8. Brønsted-Lowry theory of acids and bases.

Topic 9. Acid-base balance. Concept of pH.

Topic 10. Precipitation equilibrium.

Topic 11. Redox reactions.

Topic 12. Hydrocarbon chains. Functional groups. Nomenclature and formulation of organic compounds. Stereochemistry. Polymers.

4. Academic activities

Master class: 16 hours

Group sessions of 50 minutes each. Teachers explain the theoretical contents and solve representative applied problems. The learning materials will be available on the Moodle virtual platform. Regular class attendance is strongly recommended.

Problem solving and case studies: 44 hours, including 8 face-to-face hours.

Students must solve problems.

Study and personal work: 84 hours

Students must study theory and prepare for the final test.

Assessment tests: 6 hours.

Students take a final short answer, long answer and/or open-ended questions test.

5. Assessment system

The subject is assessed by means of two evaluation methods (continuous and global), so that the student is assigned the grade that is most beneficial to them. For this purpose, the grades obtained in the following tests will be used:

- Two progressive learning assessment tests by means of short questions (graded as T1 and T2).
- Final short answer, long answer and/or open-ended question test (graded F). The test is held simultaneously in each university under conditions that guarantee the proper identification of students and the impossibility of fraud.

The grades obtained by each student in the above assessment activities are weighted according to the following formulas:

Formula 1:

Final grade: $0.25 \times T1 + 0.25 \times T2 + 0.5 \times F$

Formula 2:

Final grade: F

The final grade will be the best grade obtained in each case after the application of formula 1 and 2.