Universidad Zaragoza

Academic Year/course: 2022/23

69768 - Suplementary Course in Chemistry

Syllabus Information

Academic Year: 2022/23
Subject: 69768 - Suplementary 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

1.1. Aims of the course

The *Chemistry Supplements* course allows to achieve the knowledge and skills on Chemistry necessary for the adequate follow-up of the compulsory and optional subjects of the Master's Degree in Circular Economy. These approaches and aims are aligned with Sustainable Development Goal (SDG) No. 12 (Responsible Consumption and Production) of the United Nations 2030 Agenda (https://www.un.org/sustainabledevelopment/es/), in such a way that the acquisition of the learning results of the subject provides training and competence to contribute to a certain extent to its achievement.

1.2. Context and importance of this course in the degree

The Chemistry Supplements subject is taught in the first months of teaching the Master's Degree in Circular Economy. In this course, students learn to correctly use the essential vocabulary about Circular Economy and to relate the fundamental concepts of this discipline. The subject is taught jointly by the University of Zaragoza and the University of Lleida.

1.3. Recommendations to take this course

Chemistry Complements is a very new course for Master's students with very little training in Chemistry. Regular use of the teaching platform and daily study of the concepts presented are recommended, with special emphasis on solving practical activities. Likewise, it is vital to consult the doubts and questions that pose difficulties in the teaching and learning process, for which personalised tutorials should be used.

2. Learning goals

2.1. Competences

BASIC COMPETENCES

CB6 - Have demonstrated knowledge and understanding that is founded upon and extends and/or enhances that typically associated with the first cycle, and that provides a basis or opportunity for originality in developing and/or applying ideas, often within a research context.

CB7 - Can apply their knowledge and understanding, and problem solving abilities in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study.

CB8 - Have the ability to integrate knowledge and handle complexity, and formulate judgements with incomplete or limited information, but that include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgements.

CB9 - Can communicate their conclusions, and the knowledge and rationale underpinning these, to specialist and nonspecialist audiences clearly and unambiguously.

CB10 - Have the learning skills to allow them to continue to study in a manner that may be largely self-directed or autonomous.

GENERAL COMPETENCES

CG1 - Obtain information in Spanish and English using information technologies efficiently

CG2 - Manage, critically analyse and synthesise information

CG3 - Critically reflect in a systemic way and using causal relationships

CG4 - Formulate, analyse, evaluate and compare in a multidisciplinary way new or alternative solutions for different problems

CG5 - Work in interdisciplinary groups

CG6 - Transmit information efficiently through information and communication technologies

CG7 - Develop management skills (decision making, goal setting, problem definition, design, and evaluation)

CG8 - Properly manage available resources on time

SPECIFIC COMPETENCES

CE1 - Manage the vocabulary and concepts necessary for learning the fundamentals of Circular Economy.

2.2. Learning goals

The student, passing this subject, achieves the following results:

1. Be able to recognise the states of aggregation of matter and the relationship with its structure.
2. Be able to relate microscopic properties and magnitudes with macroscopic ones.
3. Be able to characterise chemical reactions as transformations of some substances into others.
4. Know the control of kinetics and thermodynamics in chemical reactions, as well as the role of catalysts.
5. Be able to differentiate between pure substances and mixtures.
6. Be able to name and formulate simple inorganic compounds according to IUPAC standards.
7. Be able to represent simple organic molecules.
8. Be able to identify the main physical and chemical properties of an organic compound from its molecular structure.
9. Be able to name simple organic molecules.
10. Be able to recognise the main types of polymers and their properties.

2.3. Importance of learning goals

Obtaining the learning results is essential for proper monitoring of the compulsory and optional subjects of the Master's Degree in Circular Economy.

3. Assessment (1st and 2nd call)

3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

The course will be evaluated using two assessment methods (continuous and global), so that the student will be assigned the grade that is most beneficial to him. For this, the grades obtained in the following tests will be used:

- Two progressive assessment tests of learning using short questions (graded as T1 and T2).
- Final short, long and/or development answer test (scored as F).

The grades obtained by each student in the aforementioned evaluation activities will be weighted according to the following formulas:

Formula 1:

Final mark of the course: 0.25 × T1 + 0.25 × T2 + 0.5 × F

Formula 2:

Final grade for the course: F

The final grade for the course will be the best grade obtained in each case after applying formula 1 and formula 2.

The number of official exam sessions to which enrollment entitles (2 per enrollment) as well as the consumption of these calls will be adjusted to the Rules of Permanence in Master's Studies and the Rules of Learning Assessment of the University of Zaragoza (https://ciencias.unizar.es/normativas-asuntos-academicos). To this last regulation, the general criteria for the design of the tests and the grading system will also be adjusted, and according to the same, the time, place and date on which the review will be held when publishing the qualifications will be made public.

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

Learning in this subject is based on the combination of expository method and flipped classroom.

According to the expository method, the professor develops the presentation of the topics before the students present in the same classroom or other universities through videoconference. In addition, other teaching materials will be included in the Moodle platform that will allow dedicating some of the classes to interact with students, posing questions that allow relating

concepts.

The approach, methodology and evaluation of this guide are prepared to be the same in any teaching scenario. They will be adjusted to the socio-sanitary conditions of each moment, as well as to the indications given by the competent authorities.

4.2. Learning tasks

This is a 6 ECTS credits course organised as follows:

- Lectures (1.6 ECTS credits: 16 hours). Whole group sessions of 50 or 100 minutes each one will be taken. Lecturers explain the theoretical contents and solve representative applied problems. Learning materials will be available on the virtual platform Moodle (https://moodle.unizar.es/add/course/view.php?id=41784&lang=en). Regular attendance is highly recommended.
- Practice sessions (4.4 ECTS credits: 44 hours, including 8 face-to-face hours). Problem solving sessions will be carried out.
- Autonomous work and study (8.4 ECTS credits: 84 hours). Students are expected to study theory and solve problems.
- Assessment tasks (0.6 ECTS credits: 6 hours). A final written examination including short answer and problem-solving questions will be carried out.

4.3. Syllabus

1. States of aggregation: solids, liquids, gases. Phase change.
2. Atomic theory. Periodic table. Nomenclature of inorganic substances.
3. Stoichiometry. Mole. Solutions Concentration.
4. Chemical bond. Ionic bond. Covalent bond. Geometry and polarity of molecules. Intermolecular forces. Metallic bond.
5. Enthalpy, entropy, and free energy. Thermochemistry
6. Rate of reaction. Catalyst.
7. Chemical equilibrium.
8. Brønsted-Lowry theory of acids and bases.
9. Acid-base balance. pH concept.
10. Precipitation equilibrium.
11. Redox reactions.
12. Hydrocarbon chains. Functional groups. Nomenclature and formulation of organic compounds. Stereochemistry. Polymers.

4.4. Course planning and calendar

Information on schedules, calendar, and exams is published on the Master's page on the website of the Faculty of Sciences of the University of Zaragoza (https://ciencias.unizar.es/master-en-economia-circular). Further information on assessment dates and other details regarding this course will be provided on the first day of class and Moodle (https://moodle.unizar.es/add/).

4.5. Bibliography and recommended resources

http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=69768&Identificador=C74182