

60463 - Sustainable chemistry and catalysis

Syllabus Information

Academic year: 2024/25

Subject: 60463 - Sustainable chemistry and catalysis

Faculty / School: 100 - Facultad de Ciencias

Degree: 543 - Master's in Molecular Chemistry and Homogeneous Catalysis

ECTS: 2.0

Year: 1

Semester: Second semester

Subject type: Optional

Module:

1. General information

Specialized training is provided in the field of sustainable chemistry, introducing the principles and tools of this discipline, as well as its practical application in chemical processes so that chemistry is increasingly part of the solution and not part of the problem. The use of renewable raw materials, "green" solvents and catalysts, as well as the optimization of energy resources is highlighted. Tools are provided to assess compliance with these principles.

Schedules, calendar and exams: <https://ciencias.unizar.es/calendario-y-horarios> and <http://masterqmch.unizar.es>.

Teaching materials: <https://moodle2.unizar.es/add/>

2. Learning results

1. To know the principles of sustainable chemistry and its practical application to the design of chemical processes.
2. To know the main types of renewable raw materials, their properties and applications.
3. To identify the importance of catalysis in sustainable development.
4. To assess and compare the physicochemical and toxicological properties of conventional and non-conventional solvents.
5. To become familiar with low environmental impact reaction methods and their applications.
6. To assess the degree of compliance with the postulates of sustainable chemistry in a given chemical process.

3. Syllabus

Topic 0. Presentation of the subject

Topic 1. Basic concepts of sustainable chemistry.

Topic 2. Sustainable energies.

Topic 3. Reactions activated by unconventional means.

Topic 4. Renewable raw materials.

Topic 5. Alternatives to conventional organic solvents.

Topic 6. Catalytic processes and industrial applications of green chemistry.

Note: The order may change, depending on teaching and organizational needs.

4. Academic activities

Expository-participative classes. Theoretical contents and practical examples will be presented (1.5 ECTS).

Problem solving and seminars may be given by professionals (0.5 ECTS).

Directed work (individual or group), on a topic related to the subject, agreed with the teachers, which will require the consultation of specialized bibliography. According to the schedule that will be announced in advance, a presentation will be made to the students and teachers, followed by a debate-discussion.

Small group or personalized **tutoring**.

Teaching and assessment activities are to be carried out in a face-to-face mode, except in the event that the competent authorities issue provisions indicating otherwise.

5. Assessment system

This subject follows the continuous assessment method. However, there is also the option of taking the global test (two official exams). The use of these calls will be in accordance with the Rules of Permanence in Master's Studies and the Rules for the

Continuous assessment:

1. Individual or group completion of directed work (20%).
2. Performance of a written test consisting of the solving of theoretical-practical questions (80%). For the realization of the same the student will be able to consult the bibliography in paper format that they deems appropriate.

The subject will be considered as passed if the weighted average of the grades according to the indicated percentages is equal to or higher than 5.

Students who wish to improve their grade may do so in the global test and the final grade will be the most favourable.

Global assessment:

Students who do not opt for continuous assessment or who do not pass the subject by this procedure may take a global test, which will account for 100% of the final grade, both in the first and in the second call. The global test will consist of a written test related to the contents of the subject and the learning activities. On this occasion NO bibliography can be consulted.

6. Sustainable Development Goals

- 4 - Quality Education
- 7 - Affordable and Clean Energy
- 8 - Decent Work and Economic Growth