

Syllabus Information

Academic year: 2023/24

Subject: 25263 -

Faculty / School: 201 - Escuela Politécnica Superior

Degree: 571 - Degree in Environmental Sciences

ECTS: 6.0

Year:

Semester: First Four-month period

Subject type: Optional

Module:

1. General information

The main objective of this subject is to provide students with an overview of the chemistry involved in the environment, especially for the understanding of how anthropogenic activities affect it. It also aims to make students aware of the principles of sustainable chemistry and its role as a source of solutions to environmental problems from a preventive point of view.

These approaches and objectives are aligned with the following Sustainable Development Goals (SDGs) of the 2030 agenda and certain specific targets (<https://www.un.org/sustainabledevelopment/es/>), contributing to some extent to their achievement: 4, 8, 12.

2. Learning results

In order to pass this subject, the students shall demonstrate they has acquired the following results:

1. Name and recognize the most important polluting chemical substances coming from human activity and, especially, from the Chemical Industry.
2. List, describe and quantify the different mechanisms of transport and accumulation in the environment of the most common chemicals resulting from human activity.
3. List, describe and quantify the most important chemical, photochemical and biological transformations that polluting substances can undergo.
4. Indicate the beneficial or detrimental effects on the environment of chemical, photochemical and biological transformations of chemicals released into the environment.
5. Identify and describe the principles and tools offered by sustainable chemistry to reduce the environmental impact of human activities.
6. Name and recognize the chemical substances that cause the greatest environmental impact and evaluate their possible replacement in order to develop more environmentally sustainable processes.
7. Identify and select the appropriate material for conducting experiments in the laboratory and use it correctly.
8. Collect and interpret in an organized and critical manner the results obtained in laboratory experiments.
9. Develop team work in which they independently collects and organizes information and presents it in an appropriate oral and written form.
10. Become familiar with the Sustainable Development Goals proposed by the United Nations in the 2030 Agenda, while identify existing relationships with the aspects covered in the subject.

Results from 1 to 6 and 9 to 10: SDG 4 (Education), Objective 4.7

Results 1, 5, 6, 10: SDG 8 (Economic Growth), Objective 8.4 and SDG 12 (Sustainable Consumption and Production), Objectives 12.2 and 12.5

Results 1, 4, 5, 6, 10: SDG 12 (Sustainable Consumption and Production), Objective 12.4

3. Syllabus

Theory

Topic 1. Environmental behaviour of pollutants: diffusion and/or accumulation.

Topic 2. Abiotic transformations and biotransformation of contaminants.

Topic 3. Impact of the Chemical Industry on the environment.

Topic 4. Pollutants derived from the chemical industry (environmental degradation, accumulation, effects): surfactants, metal compounds, hydrocarbons, polymers and pesticides.

Topic 5. Basic principles and tools of sustainable chemistry.

Practices

Practice 1. Acid-base character of organic compounds.

Practice 2. Preparation of biodiesel and comparison of waste generated by the combustion of biodiesel and that of a typical fuel.

Practice 3. Biotransformation.

Practice 4. Preparation of biodegradable polymers.

Practice 5. Comparison of a reaction carried out with or without solvent.

4. Academic activities

Master lecture - participative expository master classes given by the teacher. External experts may also intervene. 30 hours

Problem solving and case studies - problems and case studies to be solved individually or in groups: 10 hours **Laboratory practices** (in small groups): 15 hours

Special practices (field trips) - supervised visits to sites of interest (subject to the budget available for their realization): 3 hours

Completion of tutored work (preferably in groups) and oral presentation: 9 hours

Autonomous work (student): 80 hours

Assessment tests. 3 hours

5. Assessment system

Continuous evaluation is carried out; however, students will also have the option of taking the global test according to the PS exam calendar for the two official calls.

ASSESSMENT TEST:	Final grade value (CF) [1]	Particularities of the different assessment tests
1. Theory test (T)	30%	The same as the continuous[2] and global assessment
2. Test problems (P)	20%	The same as the continuous[2] and global assessment
3. Tutored work (TT)	25%	The same as the continuous and global assessment Work: 50% Oral presentation and discussion: 50%
4. Evaluation tests of the laboratory practices (PL)	25%	Continuous assessment: [3] Preliminary questions (30%) Final practical test (70%)[2] ----- Global assessment Laboratory practice test: 100%
5. Complementary activities (AC)		Voluntary (up to 1 point)

$$GC[4] = CF [0.30 NT + 0.20 NP + 0.25 NTT + 0.25 NPL + EXTRA GRADE (AC)]$$

[1] All tests are graded out of 10 points.

[2] Midterm exams that eliminate subject matter may be considered. The weighting of the midterm examinations will be adjusted to the matter for each test.

[3] If the continuous evaluation of the practices is chosen, at least 80% of them must be attended. Failure to attend one of them implies a grade of zero in the previous questions of the same.

[4] Overall grade (GC): sum of the FC and the possible extra points of the ACs. These will only add up if CF is equal to or greater than 4 (both calls).

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

Success rate during the last three years: 100%