

25240 - Environmental chemistry

Información del Plan Docente

Academic Year	2017/18
Faculty / School	201 - Escuela Politécnica Superior
Degree	277 - Degree in Environmental Sciences
ECTS	6.0
Year	
Semester	Four-month period
Subject Type	Optional
Module	---

1.General information

1.1.Introduction

1.2.Recommendations to take this course

This subject is offered in the [English Friendly](#) form

1.3.Context and importance of this course in the degree

1.4.Activities and key dates

2.Learning goals

2.1.Learning goals

2.2.Importance of learning goals

3.Aims of the course and competences

3.1.Aims of the course

3.2.Competences

4.Assessment (1st and 2nd call)

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

5.Methodology, learning tasks, syllabus and resources

5.1.Methodological overview

The course involves the use the following teaching/learning methods and activities:

1. **Lectures** : The theoretical sessions consisting mainly in participatory lectures.
2. **Lab sessions** : During these sessions students learn to handle laboratory equipment to conduct experiments and to

25240 - Environmental chemistry

interpret and present the results.

3. **Problem seminars** : The proposed problems may be discussed in group. The participation of students will be promoted intensively.
4. **Academic project** : Students will work in group in a topic of interest for the subject under the supervision of the professor. Each group will have tutoring sessions in which they will present their progress and emerging difficulties to the professor. Finally, all groups will orally present the most important aspects of the work, opening a short discussion on the topic afterwards.
5. **Complementary activities** (when possible): visits to places of interest for the subject, videos viewing, debates, comment on articles and news, conduct seminars-conferences on specific issues of particular relevance, etc.
6. **Self-study and work**
7. **Evaluation**

5.2.Learning tasks

Learning methods and strategies designed for the subject include the following activities...

1. **Lectures**: The lectures are designed to provide the students with knowledge about the chemistry and evolution of different pollutants in the environment, as well as an introduction to Sustainable chemistry. It will be encouraged an interactive environment that will be used to discuss and reinforce the lecture contents.
2. **Lab sessions** : This activity requires self-study of the protocols and instructions for planned activities before going to the lab. Student will complete individual questionnaires just before starting in the lab.
3. **Problem seminars** : This activity complements the contents presented in lectures by problem-solving sessions. A very active participation of the students in the sessions will be promoted.
4. **Academic project** : This activity requires the student to work in a group of students on a topic related to the subject that extends the contents of lecture, and finally they will elaborate a written report and present orally the most relevant of it. The tutor will give the student regular feedback on progress. In addition, the project requires the student to construct logical arguments to communicate effectively.
5. **Complementary activities** (when possible): visits to places of interest for the subject, videos viewing, debates, comment on articles and news, conduct seminars-conferences on specific issues of particular relevance, etc.

5.3.Syllabus

Lecture

Lesson 0 . General issues about the course.

MODULE I. Environmental chemistry.

Lesson 1. Environmental performance of pollutants: Transportation and/or accumulation.

Lesson 2 . Abiotic transformation and biotransformation of pollutants.

Lesson 3. The impact of the chemical industry on the environment.

Lesson 4. Pollutants originating from the chemical industry and their environmental degradation, accumulation and effect; pesticides, hydrocarbons (petroleum), polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), dioxins (PCDD), dibenzofurans (PCDF), polybrominated diphenylethers (PBDE), polymeric materials, surfactants and metallic compounds.

25240 - Environmental chemistry

Visit				5																5
Evaluation																		4		4
Self-work																				89
Individual work	4	2	3	4	0	5	5	5	5	5	5	8	5	5	8	8	5			82
Work in group		2	2	3	0															7
TOTAL	8	8,5	9	8,5	12	8,75	8	9,25	9	9	9	8	9	9	8	8	9			150

Provisional schedule . For students enrolled in the subject, place and schedule of lectures and examinations will be available on the [EPS website](#) , and the course on [Moodle](#) at the University of Zaragoza.

Submission of academic projects will be held according to the schedule that will be announced in advance on [Moodle](#) . In addition, course materials and readings will be also available on the [website](#) for the course.

5.5. Bibliography and recommended resources

Basic literature

- Química sostenible. M. Mestres. Síntesis, **2011** .
- Química verde. X. Doménech. Rubes, **2005** .
- Principios de química medioambiental. M. A. Sierra, M. Gómez Gallego. Síntesis, **2008** .
- Environmental organic chemistry (2nd ed.). R. P. Schwarzenbach, P. M. Gschwend, D. M. Imboden. Wiley, **2003** .
- Técnicas experimentales en síntesis orgánica (2nd ed.). A. G. Csák, M. A. Martínez. Síntesis, **2008** .

Complementary literature

- Química ambiental. C. Baird. Reverté, **2001** .
- Fundamentals of environmental chemistry. S. E. Manahan. CRC Press LLC, **2001** .
- Environmental chemistry (9th ed.). S. E. Manahan. CRC Press, **2009** .
- Elements of environmental chemistry. R. A. Hites. Wiley, **2007** .
- Green chemistry and the ten commandments of sustainability (3rd ed.). S. E. Manahan. Chem Char Research, Inc., **2011** .
- Fundamentos de Química ambiental. X. Doménech Antúnez. Vols. I and II. Síntesis, **2014** .

The updated recommended bibliography can be consulted in:

25240 - Environmental chemistry

<http://psfunizar7.unizar.es/br13/egAsignaturas.php?id=2203>