

25240 - Environmental chemistry

Información del Plan Docente

Academic Year	2018/19
Subject	25240 - Environmental chemistry
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.Aims of the course

1.2.Context and importance of this course in the degree

1.3.Recommendations to take this course

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

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

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

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as lectures, laboratory sessions, problem-solving, assignments and autonomous work and study.

4.2.Learning tasks

This course is organized as follows:

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- **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.
- **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.
- **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. The proposed problems may be discussed in group.
- **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 supervisor will give the student regular feedback on progress. In addition, the project requires the student to construct logical arguments to communicate effectively.
- **Complementary activities** (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.
- **Autonomous work and study.**
- **Assessment tasks.**

4.3.Syllabus

This course will address the following topics:

Lectures

- Topic 0. General issues about the course.

Section I. Environmental chemistry.

- Topic 1. Environmental performance of pollutants: Transportation and/or accumulation.
- Topic 2. Abiotic transformation and biotransformation of pollutants.
- Topic 3. The impact of the chemical industry on the environment.
- Topic 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.

Section II. Sustainable chemistry.

- Topic 5. Basic principles and tools of Sustainable chemistry.

Laboratory sessions

- Practice 1. Acid-base nature of organic compounds.
- Practice 2. Preparation of biodiesel and comparison of residues generating biodiesel combustion against those of a more typical fuel.
- Practice 3. Biotransformation.
- Practice 4. Preparation of biodegradable polymers.
- Practice 5. Comparison of reactions occurring either with or without solvent.

4.4.Course planning and calendar

The student must dedicate 150 hours (6 ECTS) including 60 hours (aprox.) of classroom teaching activities, and 90 hours of autonomous work. Those are schedule as follows:

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Activity/Week	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total	
Face-to-face activities																					59
Presentation																					0,5
Lecture	2	1,5	2	1	2,5	1,5	2	2			1	1		1						19,5	
Seminars/ Problems	1	1,5	2	1,5		1,5	1,5	2						1							12
Lab sessions											3	3	3	3	3						15
Academic project	0,5	0,5	0,5	2																	4
Visit					4																4
Evaluation																4					
Autonomous work																					91
Individual work	3	3	3	4		5	6	4	8	5	4	5	5	5	5	5	8	8			84
Work in group	1	1	2	2	1																7
TOTAL	8	8	9	9	8	8	8	8	8	8	8	8	9	9	9	9	8	8			150

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course will be provided on the first day of class or please refer to the EPS website and Moodle.

4.5. Bibliography and recommended resources

25240 - Environmental chemistry

- BB** Domènech, Xavier. Química verde / Xavier Domènech Barcelona : Rubes, 2005
- BB** Martínez Grau, María Angeles. Técnicas experimentales en síntesis orgánica / M^a Angeles Martínez Grau, Aurelio G. Csáková . [1^a reimpr.] Madrid : Síntesis, D.L. 2001
- BB** Mestres, Ramón. Química sostenible . Madrid : Síntesis, D.L. 2011
- BB** Schwarzenbach, René P.. Environmental organic chemistry / René P. Schwarzenbach, Philip M. Gschwend, Dieter M. Imboden . New York...[etc.] : John Wiley & Sons, cop.1993
- BB** Sierra, Miguel Ángel. Principios de química medioambiental / Miguel Á. Sierra, Mar Gómez Gallego . [reimp. de la ed. de 2007] Madrid: Síntesis, 2008
- BC** Baird, Colin. Química ambiental / Colin Baird ; versión española por Xavier Domènech Antúnez . Ed. en español, reimpr. (2004) Barcelona [etc.] : Reverté, D.L. 2004
- BC** Domènech Antúnez, X. (2014). Fundamentos de Química ambiental. Madrid: Síntesis
- BC** Hites, Ronald A.. Elements of environmental chemistry / Ronald A. Hites . Hoboken : John Wiley-Interscience, cop. 2007
- BC** Manahan, S.E.. Green chemistry and the ten commandments of sustainability. 3a. ed. Chem Char Research, 2011
- BC** Manahan, Stanley E.. Environmental chemistry / Stanley E. Manahan . - 8th ed. Boca Raton [etc.] : CRC, cop. 2005
- BC** Manahan, Stanley E.. Fundamentals of environmental chemistry / Stanley E. Manahan . 2nd ed. Boca Raton [etc.] : Lewis Publishers, cop. 2001

The updated recommended bibliography can be consulted in:
<http://psfunizar7.unizar.es/br13/egAsignaturas.php?id=2203>