

| Degree | Type | Year |
|------------------------|------|------|
| Environmental Sciences | OB | 3 |

Contact

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Teachers

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Teaching groups languages

You can view this information at the [end](#) of this document.

Prerequisites

Having studied and passed the 1st year subjects of Fundamentals of Chemistry and Fundamentals of Physics, as well as Tool I: Statistical data processing.

Objectives and Contextualisation

The main objective of the subject is to recognize the different types of pollution agents that affect the environment, both chemical and physical, determining their origin as well as their impact on health.

Learning Outcomes

1. CM37 (Competence) Present proposals for the prevention and mitigation of the impact on the physical environment of natural or anthropogenic action, including that based on green chemistry.
2. KM46 (Knowledge) Identify the most important chemical and geological processes in the different environmental compartments (hydrosphere, soil and atmosphere).
3. KM47 (Knowledge) Recognise the way in which human activity has an impact on the function of physical vectors (water, soil, oceans, atmosphere) in the natural environment.

4. KM48 (Knowledge) Compare the basic principles of science (hydrology, marine sciences, climatology, soil sciences, etc.) that constitute the basis for the study of the Earth system from an environmental perspective.
5. SM44 (Skill) Characterise the main consequences of pollution in the natural environment and associated transport mechanisms.
6. SM45 (Skill) Apply basic mathematical tools and models to describe the dynamics of environmental processes.

Content

UNIT 1: TRANSPORT OF POLLUTANTS: Diffusion and convection processes. Diffusion and thermal pollution. Odor pollution. Olfactory scales. Radiation contamination. Radioactive dose.

UNIT 2: ACOUSTIC AND LIGHT POLLUTION: Wave phenomena: intensity of a wave. Acoustic and radiance scales. Quality measurement systems and maps.

UNIT 3: INTRODUCTION TO ANALYTICAL INSTRUMENTATION: Identification of different instrumental techniques for the determination of organic and/or inorganic contaminants.

UNIT 4: TOXICOLOGY PRINCIPLES

UNIT 5: Organic POLLUTANTS: Classification of organic pollutants. Pesticides: insecticides, herbicides, dioxins. Other toxic organic pollutants.

UNIT 6: INORGANIC POLLUTANTS: Metals/semimetals and other inorganic compounds as contaminants. Toxic, essential and therapeutic metals. Other toxic inorganic compounds.

Activities and Methodology

| Title | Hours | ECTS | Learning Outcomes |
|--|-------|------|-------------------|
| Type: Directed | | | |
| Laboratory practices | 7 | 0.28 | |
| Master classes | 29 | 1.16 | |
| Practical examples (problem solving classes) | 12 | 0.48 | |
| Type: Supervised | | | |
| Project preparation | 6 | 0.24 | |
| Type: Autonomous | | | |
| Project preparation | 38 | 1.52 | |
| Study work | 50 | 2 | |

Teaching methodology and training activities

The training activities are divided into three sections: theory classes, problem classes, and laboratory practices, each with its specific methodology.

Theory classes

The teaching staff will explain the content of the syllabus with the support of audiovisual material that will be available to students on the subject's Virtual Campus. These expository sessions will constitute an important part of the theory section.

Under the guidance of the teaching staff and through communication through the Virtual Campus, the knowledge of some selected parts of the syllabus will have to be searched and studied through autonomous learning by the students. In order to facilitate this task, information about locations will be provided in textbooks, web pages, etc.

Problem solving classes

The number of students in the problem group(s) depends on the teaching plan programmed by the Departments of Physics and Chemistry to which the teaching work of this subject is requested.

The dossiers of problem statements of the subject by topics will be delivered through the Virtual Campus, which will be solved during some of the face-to-face problem sessions (programmed on the timetable from the Coordination of the Environmental Science Degree). In these sessions, the problem's teachers will explain the experimental and calculation principles necessary to work on the problems raised, explaining the guidelines for their resolution.

This type of problem class will be combined with problem classes aimed at the guided preparation of a project, as well as the presentation of the project.

Laboratory practices

Two laboratory practices are scheduled, one from each area of the subject (Physics and Chemistry) (programmed in the schedule from the Coordination of the Environmental Sciences Degree). The Scripts of each practice will be delivered through the Virtual Campus, as well as all related information of interest.

Material available on the subject's Virtual Campus

Teaching guide

Presentations used by teachers in theory classes

Dossiers of the problem classes

Scripts of laboratory practices

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continuous Assessment Activities

| Title | Weighting | Hours | ECTS | Learning Outcomes |
|--------------------------------------|-----------|-------|------|-------------------|
| Laboratory practices - Chemical part | 5% | 0.5 | 0.02 | KM48 |
| Laboratory practices - Physical part | 10% | 0.5 | 0.02 | KM47, SM44, SM45 |

| | | | | |
|--------------------------------------|-----|---|------|------------------------------|
| Project work in teams (presentation) | 10% | 3 | 0.12 | CM37, KM46, KM47, KM48 |
| 1st exam assesment | 35% | 2 | 0.08 | CM37, KM47, KM48, SM44, SM45 |
| 2nd partial assesment | 40% | 2 | 0.08 | CM37, KM46, KM47, KM48 |

The evaluation process follows the principle of continuous evaluation (continuous assesment). For the evaluation of the subject, the following will be carried out:

A) Two partial term on the dates indicated by the faculty (and marked on the schedule of the Environmental Sciences Degree), each corresponding to a part of the subject. Partial tests are individual.

B) Laboratory practices: The practices in each area are compulsory attendance, and will be evaluated and will have their own weight in the final grade of the subject. The evaluation mode will be notified through the subject's Virtual Campus. They will be done in pairs.

C) Project related to the part of the subject starting from unit 4 (part of the Chemistry field: organic and/or inorganic contaminants). Work will be done in groups of 4 people.

The final mark of the subject will be distributed with 35% of the Physics part, and 65% of the Chemistry part. To pass the subject, students must obtain a final grade equal to or higher than 5.0.

Each area distributes its grade as follows:

65% Chemistry: 10% will correspond to the grade of the Chemistry part of the 1st exam assesment; 40% will correspond to the grade of the 2nd exam assesment; 10% of the preparation of a project (in working groups); and 5% of the laboratory practice.

35% Physics: 25% will correspond to the grade of the Chemistry part of the 1st exam assesment; and 10% of the laboratory practice.

The grade for each partial must be equal to or higher than 3.5, to be able to calculate the final weighted grade taking into account the other qualifications achieved in the other scheduled activities. The average grade of these two exams must be at least 5.0 to be able to calculate the final grade with the rest of the assessment activities.

If the project is not presented or the two laboratory practices are not attended, the student will be classified as "NOT ASSESSABLE", regardless of the grade of the partial exams. On the other hand, students who do not appear in the 1st or 2nd exam assesments will also be classified as "NOT ASSESSABLE".

The student who does not pass the assessment of the partial tests in section (A) will have an extraordinary assessment, on the dates determined by the faculty (and marked in the schedule of the Environmental Sciences Degree). In order to be able to take the extraordinary exam, students must have participated in assessment activities throughout the course that are equivalent to 2/3 of the final grade.

To recover the grade in section (A), the student must present himself for each of the partials with a grade lower than 3.5. In the event that the average grade of the partials is lower than 5.0, and the partials have a grade higher than 3.5, the student can decide to take the extraordinary assessment of both partials or only the assessment extraordinary of that partial that has the lowest grade.

The grade of the recovery exam will replace the previous grade in the calculation of the final grade. To be able to average for the final grade, the partial grade must be equal to or higher than 3.5.

Only the grade referred to in section (A) can be recovered. Regarding recovery, the grades for sections (B) and (C) remain unchanged.

Evaluation of students in 2nd or 3rd call ("repeaters")

Students who repeat the subject will not have to repeat the part of the laboratory practices (the grade for 2 consecutive calls will be saved). For the rest of the assessment activities, they will NOT be assessed differently from the rest of the students.

UNIQUE ASSESSMENT:

Students who have accepted the single assessment modality will have to take a final test, where the content of the entire subject will be assessed. The exam grade must be at least 5.0, and will have a weighting of 75%. On the same day of the exam (which will be held on the same day that the continuous assessment students are assessed for the 2nd partial) the Project for the field of Chemistry (which in this case will be individual) must be handed in, and will have a weighting of 10%. The practicals are also compulsory attendance and will have a weighting of 10% of the Physics part, and 5% of the Chemistry part.

If the final grade does not reach 5, the student has another chance to pass the subject through the extraordinary exam that will be held on the same day as everyone's extraordinary exam. Regarding this option, the grades for sections (B) and (C) will be the same.

Irregularities: copying and plagiarism

Without prejudice to other disciplinary measures that are deemed appropriate, irregularities committed by students that may lead to a change in the grade of an assessment act will be graded with a zero. Therefore, copying, plagiarism, deception, allowing copying, etc. in any of the assessment activities will involve failing it with a zero.

Bibliography

Basic literature

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Fundamentals of Heat, Light & Sound (<https://pressbooks.nsc.ca/heatlightsound/>)
D. Jou, J.E. Llebot, C. Pérez. Física para las Ciencias de la Vida. Mc Graw Hill (2009, 2a Ed)

Harris, Daniel C., ANÁLISIS QUÍMICO CUANTITATIVO.

Spanish version translated by Dr. Vicente Berenguer Navarro (High Professor of analytical chemistry at the *Universidad de Alicante*) and Dr. Ángel Berenguer Murcia (PhD in chemical sciences at the *Universidad de Alicante*), Editorial Reverté, 2016, Third edition (sixth original edition). ISBN 9788429194159 (PDF format). 9788429172256 (printed book). <https://elibro.net/es/ereader/uab/105686>

Advanced literature

S.P. Arya. Air Pollution Meteorology and Dispersion. Oxford Univ. Press (1998)
E. Boeker and R. van Grondelle. Environmental Physics: Sustainable Energy and Climate Change. Wiley (2011, 3rd Ed)

Casarett and Doull's. TOXICOLOGY. The Basic Science of Poisons, Ninth Edition. Editor Curtis D. Klaassen (University of Kansas), Mc Graw Hill, New York, 2019.

Manahan, Stanley E. Environmental Chemistry. Available from: VitalSource Bookshelf, (11th edition). Taylor & Francis, 2022.

Mark L. Brusseau, Ian Pepper, Charles Gerba. Environmental and pollution science. 3rd ed. Ed. Academic Press from Elsevier, London, 2019.

Software

MS Word and MS Powerpoint for the presentation of the Project.

MS Word and Excel for laboratory practices.

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this [link](#). To consult the language you will need to enter the CODE of the subject.

| Name | Group | Language | Semester | Turn |
|-------------------------------|-------|----------|----------------|---------------|
| (PAUL) Classroom practices | 1 | Catalan | first semester | morning-mixed |
| (PAUL) Classroom practices | 2 | Catalan | first semester | morning-mixed |
| (PLAB) Practical laboratories | 1 | Catalan | first semester | afternoon |
| (PLAB) Practical laboratories | 2 | Catalan | first semester | afternoon |
| (PLAB) Practical laboratories | 3 | Catalan | first semester | afternoon |
| (PLAB) Practical laboratories | 4 | Catalan | first semester | afternoon |
| (SEM) Seminars | 1 | Catalan | first semester | morning-mixed |
| (SEM) Seminars | 2 | Catalan | first semester | morning-mixed |
| (TE) Theory | 1 | Catalan | first semester | morning-mixed |