

Degree	Type	Year
Environmental Sciences	OP	4

Contact

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Teachers

Montserrat Roca Marti

Teaching groups languages

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

Prerequisites

You must have taken the Physics and Chemistry subjects in the lower years.

Objectives and Contextualisation

The main objectives of the subject are to recognize the Stages of the Analytical Procedure, which includes from the definition of the Problem (economic-social, and analytical) and the Analytical Object, through the Sampling stage (Sampling Plan), the Sample Pre-treatment (if applicable) to the Measurement-transduction of the analytical signal (electrical), as well as the Data Acquisition and Processing stage, Results obtained and the last stage of the Interpretation of these results.

Specifically, we will discover different Sampling Plans necessary in different areas (soils, sediments, waters and atmosphere), we will present different sample pre-treatments (dissolution, extraction), and we will see different instrumental techniques for the determination of different levels (molarity, ppm, ppb and ppt) of compounds of interest (both pollutants and non-pollutants, both organic compounds and metals/semimetals and other inorganic compounds).

Learning Outcomes

1. CM36 (Competence) Incorporate the use of environmental tracers or basic analytical techniques into the characterisation of specific processes of hydrology, oceanography, or pollutant dispersion.

2. CM39 (Competence) Transmit general scientific information associated with an environmental problem to a general audience appropriately.
3. KM46 (Knowledge) Identify the most important chemical and geological processes in the different environmental compartments (hydrosphere, soil and atmosphere).
4. 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.
5. KM49 (Knowledge) Recognise the techniques and tools for sampling, analysis and environmental tracers.
6. SM47 (Skill) Analyse changes in the physical environment caused by natural or anthropogenic action based on the data available.
7. SM48 (Skill) Apply the main stages of the analytical procedure, including the collection and analysis of samples, for the study of the physical environment.

Content

Unit 1: Introduction to the Analytical Procedure. Definition of concepts.

Unit 2: Sampling Plan. Application to soils, sediments, waters and atmosphere.

Unit 3: Sample pre-treatment: dissolution, extraction.

Unit 4: Instrumental techniques. Different techniques for different concentration levels (molarity, ppm, ppb and ppt). List of instrumental techniques for compounds to be determined: both pollutants and non-pollutants, both organic compounds and metals/semimetals and other inorganic compounds.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Field practices	4	0.16	CM36, KM49, SM48, CM36
Laboratory practices	8	0.32	CM36, KM49, SM48, CM36
Master classes	26	1.04	CM36, CM39, KM49, SM48, CM36
Practical examples (problem solving classes)	10	0.4	CM36, CM39, KM49, SM48, CM36
Type: Supervised			
Study case preparation	7	0.28	CM39, KM49, SM48, CM39
Type: Autonomous			
Case study preparation	40	1.6	CM36, KM49, SM48, CM36
Self study and self-study work	50	2	CM36, CM39, KM46, KM47, KM49, SM47, SM48, CM36

Teaching methodology and training activities

The training activities are divided into four sections: theory classes, problem classes, field practice and laboratory practices, each with its own 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 Virtual Campus of the subject. 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 can be searched and studied through autonomous learning by the students. In order to facilitate this task, information will be provided on locations in textbooks, websites, etc.

Problem solving classes

The dossiers of problem statements for the subject will be delivered through the Virtual Campus, which will be solved throughout some of the face-to-face problem sessions (scheduled in the schedule by the Coordination of the Degree in Environmental Sciences). In these sessions, the problem teaching staff will explain the experimental and calculation principles necessary to work on the problems posed, explaining the guidelines for their resolution.

This type of problem classes will be combined with problem classes aimed at the guided preparation of a Case Study.

Field practice

A field session is scheduled for the UAB Campus in order to carry out a guided sampling.

Laboratory practices

Two laboratory practice sessions are scheduled in the field of Chemistry (scheduled in the schedule by the Coordination of the Degree in Environmental Sciences). The script for each practical session will be delivered through the Virtual Campus, as well as all related information of interest. In these laboratory sessions, attempts will be made to use the samples collected in the field practice.

Material available on the Virtual Campus of the subject

Teaching guide

Presentations used by teachers in theory classes

Dossiers of problem classes

Scripts for field practice and laboratory practices

Note: 15 minutes of a class will be reserved, within the calendar established by the center/degree, for students to complete the surveys to evaluate the performance of the teachers and the evaluation of the subject.

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

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Study case	35%	1	0.04	CM36, CM39, KM46, KM47, KM49, SM47, SM48
1st exam assesment	32.5%	2	0.08	CM36, KM49, SM48
2nd assesment	32.5%	2	0.08	CM36, KM49, SM48

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

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

B) Field practice: It will be carried out on the UAB campus. The script for the field practice will be delivered through the Virtual Campus. This part can be evaluated within one of the partials of the subject.

C) Laboratory practices: The two laboratory practice sessions are in the field of Chemistry, and attendance is mandatory. They will be carried out in pairs. And the practice script will be delivered via the Virtual Campus. This part can be evaluated within one of the partials of the subject.

D) Case study related to the subject topic. A problem or case study will be presented, and students, in teams of 4, will have to make an outline of the analytical procedure corresponding to the case, presenting a Sampling Plan, a proposal(s) for pre-treatment of the corresponding samples. They will also indicate the instrumental technique(s) to be used in order to solve the problem relating to the case study.

The final grade for the subject will be distributed as follows:

32.5% 1st part

32.5% 2nd part

35% Case study

The grade for each part must be equal to or greater than 3.5, in order to calculate the final grade weighted with the other grades achieved in the other scheduled activities. The average grade of these two tests must be, at least, 5.0 in order to calculate the final grade with the rest of the evaluation activities.

If the Case Study is not presented or the field practice and/or laboratory practice sessions are not attended, the student will be classified as "NOT EVALUABLE", regardless of the grade of the partial exams. On the other hand, students who do not present themselves for the 1st partial or the 2nd partial will also be classified as "NOT EVALUABLE".

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

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

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

Only the grade referred to in section (A) can be recovered. For the purpose of recovery, the grade of section (D) remains unchanged. The grade of section (D) must be higher than 5.0 in order to calculate the final grade with the rest of the assessment activities.

Assessment of repeating students

Students who repeat the subject will not have to repeat the field practice or laboratory practices (the grade will be kept for 2 consecutive exams). For the rest of the assessment activities, they will NOT be assessed differently from the rest of the students.

UNIQUE ASSESSMENT:

Students who have opted for the unique assessment modality must 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 continuous assessment students are assessed for the 2nd partial) the work related to the Case Study (which in this case will be individual), and will have a weighting of 25%. Field and laboratory practices are also mandatory.

If the final grade does not reach 5.0, the student will have another opportunity to pass the subject through the remedial exam that will be held on the same day as the remedial exam for the rest of the students. For the purpose of retake, the grade in section (D) remains unchanged (and must be greater than 5.0 to be able to calculate the final grade).

Irregularities: copying and plagiarism

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

Bibliography

1) Daniel C. Harris, Anàlisi química quantitativa, Traducció 6a ed, Ed. Reverté, 2006.

2) Daniel C. Harris, Quantitative Chemical Analysis, 9th ed, Ed. MacMillan Education, NY, 2016.

The bibliography list will be expanded at the beginning of the course.

Software

MS Word, MS Powerpoint and/or Adobe may be used for the preparation of the Case Study.

MS Word and Excel for the laboratory exercises.

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	second semester	morning-mixed
(PCAM) Field practices	1	Catalan	second semester	afternoon
(PLAB) Practical laboratories	1	Catalan	second semester	afternoon
(TE) Theory	1	Catalan	second semester	morning-mixed