COURSE DATA

DATA SUBJECT

Code: 33091
Name: Environmental pollution evaluation
Cycle: Undergraduate Studies
ECTS Credits: 6
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
1104 - Degree in Environmental Sciences	Facultat de Ciències Biològiques	2	Second quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1104 - Degree in Environmental Sciences	Evaluation of environmental pollution	COMPULSORY

COORDINATION

ESTELLES LEAL VICTOR

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SUMMARY

Pollution is one of the most important problems affecting our environment. In this area, provide the basics to meet air pollutants, water and soil and their main forms of assessment and examines the legal framework that limits their levels in the environment.

It introduces the main pollution problems affecting each of the matrices, atmosphere, soil, water and biota, and provides an overview of the mechanisms for assessing environmental pollution.
In relation to air pollution are studied pollutant dispersion models, analyzes the characteristics of noise as a pollutant, the major indices of noise built into the legislation and gives a glimpse of light pollution as a form of contamination of the atmosphere that is waking up today.

With regard to water, as for the other matrices, anthropogenic impacts result in the alteration of natural features, leading to processes of eutrophication, acidification, or in general, increased concentrations of pollutants, processes which are studied in an introductory unit. Subsequently, the main biological methods and physical-chemical evaluation of water pollution are analyzed, with emphasis on biological quality

elements designated in the Water Framework Directive, as well as common technical analytical indicators, both microbiological and physical-chemical.

On the other hand, the soil is one of the receiving of pollution more sensitive and vulnerable. Its proper functioning is essential for the maintenance of environmental quality. We will focus on the mechanisms of chemical degradation of the soil associated with polluting human activities and highlight the importance of maintaining soil quality in order to preserve their basic ecological functions.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

OTHER REQUIREMENTS

It is essential to have basic knowledge of the matters proposed by the first year in particular those that are integrated in the subjects Physics, Chemistry and Biology. It is also desirable to know a spreadsheet program such as Excel or statistical analyzer.

COMPETENCES / LEARNING OUTCOMES

1104 - Degree in Environmental Sciences

Capacidad de analizar la contaminación lumínica y acústica.

Capacidad de valorar la calidad del aire.

Capacidad de valorar la contaminación de suelos.

Conocer las técnicas de análisis y cuantificación de la contaminación.

Manejo de modelos de dispersión y redes de control de contaminantes

DESCRIPTION OF CONTENTS

1. INTRODUCTION TO ASSESSMENT OF ENVIRONMENTAL POLLUTION

Theme 1.- Assessment of Environmental Pollution. Course presentation. Concept of contamination. Environmental pollution. Units

2. Assessment of air pollution

Theme 2.- Classification of air pollutants and their sources. Classification of pollutants. The sources of air pollution.

Theme 3.- Air pollutants. Particulate matter. Sulfur Compounds. Carbon compounds. Nitrogen compounds. CFCs. Ozone. Metals and other pollutants. Reference measurement techniques. Legal framework.

Theme 4.- Atmospheric dispersion models. Dispersion models. Influence of meteorological processes in atmospheric pollution. Atmospheric stability. The Pasquill atmospheric stability classes. Box models. Gaussian air pollutant dispersion model for nonreactive pollutants. Plume rise equations. Practical examples.

Theme 5.- Physical and chemical processes in the atmosphere . Acid rain. Oxidation processes in the atmosphere. Photochemical smog. The loss of stratospheric ozone.

Theme 6.- Acoustic pollution: noise. Introduction: physical acoustics. Noise as a pollutant. Noise indices. Control of noise at workplace. Legal framework.

Theme 7 -. Light pollution. Light as a contaminant. Consequences of light pollution. Legal framework.

3. Assessment of water pollution

Topic 8.- Assessment of Water Pollution. General aspects. Polluting processes and their effects on aquatic ecosystems. Water Framework Directive and its development. Types of quality elements. Reference conditions and guideline values. Monitoring and control networks.

Topic 9.- Assessment of Water Pollution Using Biological Methods. Microbial indicators. Phytoplankton. Macrophytes. Benthic invertebrates. Fish fauna.

Topic 10.- Assessment of Water Pollution Using Physicochemical and Hydromorphological Methods. Physicochemical parameters measured in situ. Mineralization. Inorganic nutrients. Organic matter. Specific organic pollutants. Metals. Physicochemical indicators. Integrated indices. Hydromorphological assessment

4. Assessment of soil pollution

Theme 11.- Soil contamination. Soil and pollution. Origin, fonts and types of soil contamination. Main soil contaminants. Contaminant processes. Contaminants distribution in the soil. Mechanisms of contamination and soil-contaminant interactions. Inorganic contaminants. Organic contaminants. Biological contaminants. Effects of soil contamination.

Theme 12.- Methods for contaminated soil characterization. Analytical methods and techniques for soil contaminants determination. Calculation of reference values. Sampling and sample treatment. National and international experiences. Techniques for analysis of soil contaminants. Sampling Experiences at national and international level.

Theme 13.- Assessment of soil contamination. Legal framework. Regulations. Definitions. Criteria for consideration of a contaminated soil. Exploratory research of the soil quality. Detailed characterization of the soil. Risks identification and quantification.

5. Laboratory

The following practical exercises are performed:
Practice 1.- Acoustic measurement. Calculation of noise indices.
Practice 2.- Pollution control network at the Valencian Community. Analysis of inmission levels of various pollutants
Practice 3 .- Comparative evaluation of contamination of various water samples.
Practice 4 .- Determining fixing capacity of heavy metals in soil: influence of soil properties.

6. Computer lab

Activity where exercises are performed related to pollutant dispersion models using spreadsheet software to solve them.

7. Tutorials

Resolve questions about issues or problems proposed to students related to the subject.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Tutorials	3,00
Theory	36,00
Laboratory	15,00
Computer classroom practice	6,00
Total hours	**60,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	25,00
Independent study and work	22,00
Preparation of lessons	24,00
Preparation for assessment activities	8,00
Resolution of case studies	11,00
Total hours	**90,00**

TEACHING METHODOLOGY

The course consists of several activities:

• Theory (Classroom lectures)

• Laboratory

• Tutorials

• Computer Classroom

For each follow a different development methodology, as described below:

Theory

Blackboard classes of theory and practical exercises on the topics that require it, in which the teacher introduces students to the fundamentals of the topics covered by the program area. In the lectures, the teacher teaches content based on materials (presentations, notes, pictures and diagrams) to be provided to students in the virtual classroom. For practical exercises, when themes require it, the student will be provided with a bulletin with the statements and the professor will explain some of them as examples in detail. The rest of the exercises of the bulletin will be solved autonomously by the students.

Laboratory

In the laboratory sessions, mandatory, the groups are approximately 16 students and they work in pairs. Practical work, associated with the themes developed in the theory sessions, will be done supervised by a teacher. Students will present a report for each of the practices done that reflects the activity and will be evaluated by the teacher. The laboratory is compulsory and, therefore, not recoverable, in accordance with the provisions of article 6.5 of the Evaluation and Qualification Regulations of the UV for Bachelor's and Master's degrees.

Computer Classroom

The computer classroom, mandatory, will be taught in groups of 32 students approximately and they work in pairs. In these sessions students, supervised by a teacher, do exercises in data processing of air pollution related to the use of atmospheric dispersion models using software for the processing of data

(spreadsheets). A report will be presented, which will be assessed by the teacher, with the collection of data and treatment used (errors, graphic settings), and the conclusions reached.

Tutorials

Tutorials, mandatory, are performed in subgroups of 16 students approximately. In them, the teacher monitors the work and progress of students and resolves the doubts raised. The teacher will review, correct and evaluate the exercises proposed in the lectures. Each student must submit the exercises, solved autonomously, for personalized assessment. The students will also show and discuss the previously assigned work.

EVALUATION

The assessment of the course will be carried out based on the following four sections:

A) Theory: 70%
A final written exam will be held. The exam may include theoretical questions, in any of their possible formats, as well as numerical exercises similar to those developed in the problem-solving classes for the topics that require them. The exam grade, considering the relative weight of the three parts that make up the course, will be:
Exam grade = 60% Atmosphere grade + 20% Water grade + 20% Soils grade
Each of the three parts must have a minimum score of 3 out of 10 in order to compensate for the other parts of the exam. The overall exam grade thus calculated must reach a value of 4 out of 10 to be able to compensate for the other parts of the course.

B) Laboratory: 25%
The reports submitted by the students on the laboratory practices will be assessed. These reports are mandatory, and submission within the deadline is essential to pass the course. The laboratory component must have a minimum score of 4 out of 10 in order to compensate for the other parts of the course.

C) Computer Lab: 10%
The exercises completed and submitted by the students will be assessed. Submission is mandatory, and delivering them within the deadline is essential to pass the course.

D) Tutorials: 5%
The problems or tasks proposed during the course (exercises, online quizzes, developed assignments) will be assessed. These must be completed in groups, pairs, or individually, depending on the nature of the task. To pass the course, they must be submitted within the established deadlines and in the manner indicated by the instructors.

The final grade will be obtained from the weighted sum of the grades in sections A, B, C, and D, provided the criteria for submission and minimum compensatory grades mentioned above are met.

If a student fails the course in the second exam session, the grades obtained in the laboratory, computer lab, and tutorials will be retained for up to two additional academic years. After this period, those components must be repeated if their validity has expired.

To request early examination (advance session) for this course, the student must take into account that they must have completed the mandatory activities indicated in this course guide

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