

Course guide

2500230 - GEA0230 - Atmospheric and Acoustic Pollution

Last modified: 01/10/2023

Unit in charge: Barcelona School of Civil Engineering
Teaching unit: 751 - DECA - Department of Civil and Environmental Engineering.

Degree: BACHELOR'S DEGREE IN ENVIRONMENTAL ENGINEERING (Syllabus 2020). (Compulsory subject).

Academic year: 2023 **ECTS Credits:** 6.0 **Languages:** Catalan

LECTURER

Coordinating lecturer: MARC BERENQUER FERRER

Others: MARC BERENQUER FERRER, DANIEL SEMPERE TORRES

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

- 14451. Apply the fundamental concepts of statistics and randomness of physical, social and economic phenomena, as well as uncertainty and decision-making techniques.
- 14457. Identify the fundamentals of structure theory, sustainable procedures for construction and dismantling of buildings and civil works; and describe the technology bases of the materials used in construction.
- 14460. Design and project treatment systems for purification and purification of water resources, and establish the basis for the management of waste generated, describe and assess desalination and reuse processes.
- 14461. Analyze, design, simulate and optimize processes and systems with environmental relevance, both natural and artificial, and their resolution techniques, as well as recognize techniques for analysis and evaluation of climate change.
- 14462. Design and project processes for the treatment of contaminated soils and aquifers.
- 14463. Prepare, implement, coordinate and evaluate urban and industrial solid waste management plans and resource recovery.
- 14464. Apply measures to prevent and control air quality, quantify noise pollution and its corrective measures and quantify odor emissions and corrective measures.

Generical:

- 14440. Identify, formulate and solve problems related to environmental engineering.
- 14441. Apply the functions of consulting, analysis, design, calculation, project, construction, maintenance, conservation and exploitation of any action in the territory in the field of environmental engineering.
- 14442. To use in any action in the territory proven methods and accredited technologies, in order to achieve the greatest efficiency respect for the environment and the protection of the safety and health of workers and users.
- 14443. Apply the necessary legislation during the professional practice of environmental engineering.
- 14444. Apply business management techniques and labor legislation.

TEACHING METHODOLOGY

The course consists of 2.3 hours per week of classroom activity (large size group) and 1.2 hours weekly with half the students (medium size group).

The 2.3 hours in the large size groups are devoted to theoretical lectures, in which the teacher presents the basic concepts and topics of the subject, shows examples and solves exercises.

The 1.2 hours in the medium size groups is devoted to solving practical problems with greater interaction with the students. The objective of these practical exercises is to consolidate the general and specific learning objectives.

The rest of weekly hours devoted to laboratory practice.

Support material in the form of a detailed teaching plan is provided using the virtual campus ATENEA: content, program of learning and assessment activities conducted and literature.

Although most of the sessions will be given in the language indicated, sessions supported by other occasional guest experts may be held in other languages.

LEARNING OBJECTIVES OF THE SUBJECT

The course provides the necessary knowledge to understand the processes of purification and emission of atmospheric pollutants, whether urban (transport) or industrial. Next, the transport of gases and particles in the atmosphere will be studied. Likewise, noise pollution and prevention and mitigation techniques will also be studied.

1. Know the techniques for monitoring and controlling air quality, and the measures for the prevention and control of emissions of gases and odors.
2. Quantify noise pollution and know how to apply corrective measures.

Atmospheric and Acoustic Pollution. The course provides the necessary knowledge to understand the processes of purification and emission of atmospheric pollutants, whether they are urban (transport) or industrial. Likewise, noise pollution and prevention or mitigation techniques will also be studied.

STUDY LOAD

Type	Hours	Percentage
Hours large group	30,0	20.00
Hours small group	15,0	10.00
Self study	90,0	60.00
Hours medium group	15,0	10.00

Total learning time: 150 h

CONTENTS

Introduction

Description:

Introduction

Full-or-part-time: 4h 48m

Theory classes: 2h

Self study : 2h 48m



Atmospheric pollutants

Description:

Atmospheric pollutants

Full-or-part-time: 9h 36m

Theory classes: 4h

Self study : 5h 36m

Concentrations and deposition

Description:

Concentrations and deposition

Full-or-part-time: 4h 48m

Theory classes: 2h

Self study : 2h 48m

The atmosphere and factors that affect the dispersion of pollutants

Description:

Concentrations and deposition

Full-or-part-time: 14h 23m

Theory classes: 6h

Self study : 8h 23m

Dispersion equations of pollutants in the atmosphere

Description:

Dispersion equations of pollutants in the atmosphere

Exercises

Spatial and temporal variability and complexity of atmospheric pollution

Full-or-part-time: 33h 36m

Theory classes: 11h

Practical classes: 3h

Self study : 19h 36m

Air quality models

Description:

Air quality models

Practical application

Full-or-part-time: 14h 23m

Theory classes: 4h

Practical classes: 2h

Self study : 8h 23m



Sources of pollutants and measurement of atmospheric pollution

Description:

Sources of pollutants and measurement of atmospheric pollution

Full-or-part-time: 14h 23m

Theory classes: 6h

Self study : 8h 23m

Air pollution control

Description:

Control technologies

Full-or-part-time: 14h 23m

Theory classes: 6h

Self study : 8h 23m

Noise pollution

Description:

Noise pollution

Exercises

Full-or-part-time: 19h 12m

Theory classes: 6h

Practical classes: 2h

Self study : 11h 12m

Evaluation

Full-or-part-time: 14h 23m

Laboratory classes: 6h

Self study : 8h 23m



GRADING SYSTEM

The grade of the course is obtained as the weighted arithmetic mean of the grades of the course assignments (exercises), and 2 exams. The weights for these elements are:

Course exercises: 10%

Mid-term exam: 45%

Final exam: 45%

The exams (evaluation tests) consist of several theory questions and exercises to apply the concepts and learning objectives of the course.

All students will be allowed to take the re-evaluation exam on the date set by the academic calendar, even if they have missed to submit some of the elements of the continuous evaluation.

The re-evaluation will consist of a single exam on the contents of the course. The maximum grade will be 5.0, and the final grade of the course will be the maximum between the grades of the continuous evaluation and the re-evaluation exam.

Those students not attending the re-evaluation exam on the day set in the academic calendar will not have the right to do the exam on a later date. Extraordinary tests will be allowed for students who cannot do a test of the continuous evaluation for force majeure causes. This will need to be certified and approved by the Director of studies, per the requirement of the professor responsible of the course.

EXAMINATION RULES.

If any of the laboratory or continuous evaluation activities are not submitted in the scheduled period, it will be considered as a zero score.

BIBLIOGRAPHY

Basic:

- Vallero, D.A. Fundamentals of air pollution. 4th ed. Oxford: Academic Press, 2007. ISBN 9780123736154.
- Tan, Zhongchao. Air pollution and greenhouse gases [on line]. Singapore: Springer, 2014 [Consultation: 02/10/2023]. Available on: <https://link-springer-com.recursos.biblioteca.upc.edu/book/10.1007/978-981-287-212-8>. ISBN 9789812872128.

Complementary:

- De Nevers, Noel. Ingeniería de control de la contaminación del aire. México, D.F. [etc.]: McGraw-Hill, 1998. ISBN 9701016823.