

**COURSE DATA****Data Subject**

|                      |                                         |
|----------------------|-----------------------------------------|
| <b>Code</b>          | 43818                                   |
| <b>Name</b>          | Physical pollution: noise and radiation |
| <b>Cycle</b>         | Master's degree                         |
| <b>ECTS Credits</b>  | 3.0                                     |
| <b>Academic year</b> | 2019 - 2020                             |

**Study (s)**

| <b>Degree</b>                       | <b>Center</b>         | <b>Acad. year</b> | <b>Period</b> |
|-------------------------------------|-----------------------|-------------------|---------------|
| 2227 - M.U. en Ingeniería Ambiental | School of Engineering | 2                 | First term    |

**Subject-matter**

| <b>Degree</b>                       | <b>Subject-matter</b>                | <b>Character</b> |
|-------------------------------------|--------------------------------------|------------------|
| 2227 - M.U. en Ingeniería Ambiental | 6 - Optatividad para especialización | Optional         |

**Coordination**

| <b>Name</b>              | <b>Department</b>          |
|--------------------------|----------------------------|
| SECO TORRECILLAS, AURORA | 245 - Chemical Engineering |

**SUMMARY**

Professors UPV: Antonio Uris Martínez, Constanza Rubio Michavila, Pilar Candelas Valiente

The aim of this course is to ensure that all students acquire enough knowledge on both environmental acoustics and electromagnetic radiation to be able to carry out comprehensive studies in these fields. The course syllabus includes several subjects, such as sound propagation, measurement and control of noise, environmental acoustic regulations, electromagnetic spectrum and measurement and control of electromagnetic radiation.

**PREVIOUS KNOWLEDGE**



### Relationship to other subjects of the same degree

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

### Other requirements

No previous knowledge needed.

## OUTCOMES

### 2172 - M.U. en Ingeniería Ambiental

- Students should apply acquired knowledge to solve problems in unfamiliar contexts within their field of study, including multidisciplinary scenarios.
- Students should be able to integrate knowledge and address the complexity of making informed judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities associated with the application of their knowledge and judgments.
- Students should communicate conclusions and underlying knowledge clearly and unambiguously to both specialized and non-specialized audiences.
- Students should demonstrate self-directed learning skills for continued academic growth.
- Students should possess and understand foundational knowledge that enables original thinking and research in the field.
- Identify and apply technologies, tools and techniques in the field of environmental engineering.
- Assume with responsibility and ethics the Environmental Engineer role in a professional context.
- Adapt to changes, being able to apply the principles of Environmental Engineering to unknown cases and use new and advanced technologies and other relevant developments, with initiative and entrepreneurial spirit.
- Identify, declare and entirely analyze environmental problems.
- Carry out theoretical analyzes of environmental systems, both natural and artificial, and develop and apply mathematical models for their simulation, optimization or control.
- Design and calculate engineering solutions to environmental problems, comparing and selecting technical alternatives and identifying emerging technologies.
- Understand and apply environmental national and international legislation, adapting environmental solutions to these regulations.
- Apply standard methodologies for the analysis and evaluation of environmental risks.
- Evaluate the environmental quality of the air from a global point of view, especially when there is a risk to public health.
- Be able to characterize the emissions to air, coming from the anthropogenic activity.



- Evaluate the treatment of emissions to the atmosphere to assess different alternatives and obtain the required information for the design of the selected treatment processes.
- Design and manage wastewater treatment and treatment systems for atmospheric emissions.

## LEARNING OUTCOMES

- 1 Link the physical concepts of wave motion with the physical magnitudes of sound
- 2 Determine the values of hearing threshold and sound pain
- 3 Apply the concepts prior to the definition of sound levels
- 4 Deduce the fundamental aspects of the spectral analysis
- 5 Distinguish between the objective assessment of sound and subjective sound sensation
- 6 Enter the weighting networks
- 7 Classify the different rates of evaluating noise
- 8 Recognize the importance of acoustic instrumentation in sound measurement
- 9 Know the main aspects of the operation of the sound instrumentation
- 10 Identify and locate regulations and legislation that refer to acoustic aspects
- 11 Develop the mathematical procedures of sound propagation
- 12 Assess the importance of noise maps in acoustic analysis.
- 13 Apply techniques for the development of control techniques

## DESCRIPTION OF CONTENTS

### 1. Wave motion and propagation phenomena.

### 2. Sound measurement.

### 3. Measurement equipment and techniques.

### 4. Sound propagation in the free field.

### 5. Sources of environmental noise.



6. Control techniques and noise maps.

7. Noise regulations.

8. Fundamentals on electromagnetic radiation.

9. Electromagnetic spectrum. Ionizing and non-ionizing radiation.

10. Physical magnitudes and source identification.

11. Instrumentation. Radiation measurement equipment.

12. Measurement procedures at low and high frequencies.

13. Regulations on electromagnetic radiation.

## WORKLOAD

| ACTIVITY                                     | Hours        | % To be attended |
|----------------------------------------------|--------------|------------------|
| Theory classes                               | 18,00        | 100              |
| Classroom practices                          | 9,00         | 100              |
| Theoretical and practical classes            | 3,00         | 100              |
| Development of individual work               | 5,00         | 0                |
| Study and independent work                   | 10,00        | 0                |
| Preparation of evaluation activities         | 15,00        | 0                |
| Preparing lectures                           | 5,00         | 0                |
| Preparation of practical classes and problem | 10,00        | 0                |
| <b>TOTAL</b>                                 | <b>75,00</b> |                  |



## TEACHING METHODOLOGY

The training activities will be developed according to the following distribution:

- Theoretical activities.

Description: In the theoretical classes the topics will be developed providing a global and integrating vision, analyzing in greater detail the key aspects and of greater complexity, promoting, at all times, the participation of the student.

- Practical activities.

Description: They complement the theoretical activities with the aim of applying the basic concepts and expanding them with the knowledge and experience that they have, acquiring during the realization of the proposed works. They comprise the following types of face-to-face activities:

- Classes of problems and questions in the classroom
- Discussion and problem solving sessions and exercises previously worked by the students
- Laboratory practices
- Oral presentations
- Conferences
- Programmed tutoring (individualized or in groups)
- Realization of individual evaluation questionnaires in the classroom with the presence of the teacher.
- Work • Personal work of the student.

Description: Realization (outside the classroom) of monographic works, directed bibliographic search, issues and problems, as well as the preparation of classes and exams (study). This task will be carried out individually and tries to promote autonomous work.

- Evaluation.

Description: Realization of individual evaluation questionnaires in the classroom with the presence of the teacher.

The e-learning platform (Virtual Classroom of the Universitat de València and / or PoliformaT of the Polytechnic University of Valencia) will be used as a communication support with the students. Through it you will have access to the didactic material used in class, as well as the problems and exercises to solve.



## EVALUATION

The continuous assessment will be carried out through two written exams with open questions about practical cases with a 100% weight.

## REFERENCES

### Basic

- - Acustica Arquitectónica y Urbanística (Jaime LLinares Galiana, Ana Llopis Reyna, Javier Sancho Vendrell)
- Handbook of Acoustics (Malcolm J. Crocker)
- Bioelectromagnetismo. Ciencia y salud (José Luis Baldasano y Alonso de Santa Cruz)
- Contaminación electromagnética. Las radiaciones y sus efectos sobre la salud (Raúl de la Rosa)
- Human exposure to electromagnetic fields (D. Poljak)

## ADDENDUM COVID-19

This addendum will only be activated if the health situation requires so and with the prior agreement of the Governing Council

**English version is not available**