Program	59SO – Sound and Image Engineering B.Eng.

Course code and name	
Code	595000137
Name	Environmental Acoustics
Semester	S8 [(February-June)]

Credits and contact hours	
ECTS Credits	4,5
Contact hours	45

Coordinator's name	Pedrero González, Antonio [antonio.pedrero@upm.es]

Specific course information	
Tuition language	Spanish

Description of course content

The main goal of the course is to provide the techniques and knowledge to deal with the evaluation of the environmental noise with quality guarantees. This is the reason for its two-part structure: a theoretical point of view which allows to make a global acoustic assessment through calculations and a practical way which provides the knowledges and practical skills necessary to address the checking tests with the guarantee of quality results.

List of topics to be covered

1. Introduction to environmental noise
2. Magnitudes and environmental noise indicators
    - 2.1. Assessment of the euphony of a noise
    - 2.2. Statistical analysis of the environmental noise signal
    - 2.3. Indexes used in the evaluation of environmental noise
3. Methodology used for the evaluation of environmental noise
    - 3.1. Introduction
    - 3.2. Definition of standardized basic quantities. ISO 1996-1
    - 3.3. Generic methodology to measure the environmental noise. ISO 1996-2 Accuracy
    - 3.4. Evaluation of the uncertainty of acoustic tests
4. Legislation on environmental noise
    - 4.1. Introduction. Legislative provisions and quality control
    - 4.2. Structured analysis of the legislation on environmental noise
    - 4.3. Classification according to the territorial scope. Competencies
5. Propagation of noise on the outside
    - 5.1. Approach and discussion about the basic equation of sound propagation
    - 5.2. Cumulative sound exposure level at a point from a distributed source

5.3. Assessment of the mechanisms that affect the propagation of outside sound
6. Noise Maps
6.1. Introduction
6.2. Types of noise maps
6.3. Elements that make up a prediction noise map
7. Acoustic Screens
7.1. Behavior of a semi-infinite screen in front of a point source
7.2. Behavior of a semi-infinite screen in front of a linear source
7.3. Finite screens.
7.4. Thick screens
7.5. Factors that modify the behavior of a screen

Prerequisites or co-requisites

- Sound and Image Fundamentals
- Acoustic Engineering

Course category in the program

☑ **R (required)**	☐ **E (elective)** *(elective courses may not be offered every year)*

Specific goals for the course

Specific outcomes of instruction

- RA56 - Ability to analyze the problems of acoustic diffraction and transmission of acoustic waves through several media.
- RA66 – To produce strategic noise maps and to validate them in all areas and situations.
- RA67 - Design of control solutions according to the needs.
- RA65 – To evaluate environmental noise with the rigor required by the regulations.

Further reading and supplementary materials

- Noise & Vibration Control. Leo Beraneck, MacGraw-Hill Inc,1988.
- Legislative rules: European Directive 2002/49/EC. Spanish Noise Law. Spanish RD 1367/2007. Spanish RD 1513/2005.
- Control de ruido. Gil Gonzalez, Constantino, ETSIST Printing.
- UNE ISO 1996-1:2005.
- UNE ISO 1996-2:20909.
- ISO 9613.
- SYMPHONIE (measure system), sound meter (RION), Software CADNA 4.1, digital signal recording (.wav), traffic counter, meter of environmental conditions.
- Moodle.