

Course Unit	Environmental Quality Laboratory II	Field of study	Environmental Protection Technologies
Master in	Environmental Technology	School	School of Agriculture
Academic Year	2023/2024	Year of study	1
Type	Semestral	Semester	2
Level	2-1	ECTS credits	6.0
Code	1076-809-1203-00-23		
Workload (hours)	162	Contact hours	T - TP - PL - TC - S - E - OT - O -

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s) Manuel Joaquim Sabença Feliciano, Margarida Maria Pereira Arrobas Rodrigues

### Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:

1. know and understand physical, chemical and biological soil quality parameters;
2. Apply standard methodologies in the determination of soil quality parameters;
3. Use appropriate monitoring methodologies of airborne pollutants and use processing methods of atmospheric data;
4. Develop and execute programs of air quality monitoring;
5. Evaluate the noise descriptor within the aim of EIA in accordance with standards and legislation;
6. Assess the legal compliance of environmental noise, to evaluate workers exposure to occupational noise and to assess building acoustics quality.

### Prerequisites

Before the course unit the learner is expected to be able to:  
Basic knowledge in mathematics, chemistry and biology

### Course contents

Module I: Soil Contamination 1. Techniques of soil sampling for analysis. 2. Evaluation of physical parameters. 3. Evaluation of chemical parameters. 4. Evaluation of biological parameters. Module II: Air Quality 1. Introduction to air quality monitoring. 2. Processing and analyses of atmospheric data 3. Ambient and indoor air monitoring 4. Air emissions monitoring. Module III: Acoustics 1. Environmental noise assessment. 2. Noise assessment in the workplace. 4. Building acoustics assessment.

### Course contents (extended version)

1. Module I: Soil Contamination
  - Fundamentals on protection of soil contamination.
  - Techniques of soil sampling for analysis.
  - Evaluation of physical parameters.
  - Evaluation of chemical parameters.
  - Evaluation of biological parameters.
2. Module II: Air Quality
  - Introduction to air quality monitoring
  - Processing and analyses of atmospheric data
  - Ambient air monitoring
  - Monitoring of indoor air quality
  - Air emissions monitoring
3. Module III: Acoustics
  - Basics on noise.
  - Environmental noise in EIA: legal and normative framework, evaluation methodology, case studies.
  - Noise mapping: methodology, calculation procedures, modelling softwares.
  - Noise at work: basics, legal and normative framework, evaluation methodologies, evaluation reports
  - Building acoustics: basics, legal and normative structure, reverberation time and sound insulation

### Recommended reading

1. Sparks, D. L. 1996. Methods of Soil Analysis. Part 3 Chemical Methods. SSSA, Inc. Madison, Wisconsin, USA.
2. Page, A. L. 1982. Methods of soil analysis. Part 2: Chemical and microbiological properties. SSSA, Inc. Madison, Wisconsin, USA.
3. Winegar, E. ; Keith, L. (1993): Sampling and analysis of airborne pollutants, Lewis
4. Foreman J. E. K. , 1990. Sound analysis and noise control. Van Nostrand Reinhold. USA.
5. Patrício J. 2003. Acústica dos edifícios. 2ª Edição.

### Teaching and learning methods

Conventional lectures with oral presentation of subjects. Labs are based upon development of exercises, laboratorial and field experiments. In tutorial classes, students receive further assistance in ongoing research activities.

### Assessment methods

1. Alternative 1 - (Regular) (Final, Supplementary, Special)
  - Practical Work - 50% (The evaluation is done per module. Modules with equal weight in the final evaluation of the course.)
  - Final Written Exam - 50% (The evaluation is done per module. Modules with equal weight in the final evaluation of the course.)
2. Alternative 2 - (Student Worker) (Final, Supplementary, Special)
  - Practical Work - 50%
  - Final Written Exam - 50%

### Language of instruction

Portuguese, with additional English support for foreign students.

## Electronic validation

Manuel Joaquim Sabeça Feliciano, Margarida Maria Pereira Arrobas Rodrigues	Artur Jorge de Jesus Gonçalves	Manuel Joaquim Sabeça Feliciano	Maria Sameiro Ferreira Patrício
22-01-2024	01-02-2024	01-02-2024	01-02-2024