

25236 - Radioactive contamination, acoustic and vibration pollution

Syllabus Information

Academic year: 2024/25

Subject: 25236 - Radioactive contamination, acoustic and vibration pollution

Faculty / School: 201 - Escuela Politécnica Superior

Degree: 571 - Degree in Environmental Sciences

ECTS: 6.0

Year:

Semester: Second Four-month period

Subject type: Optional

Module:

1. General information

The aim is to introduce students to the problems of environmental pollution so that, during the exercise of their future professional activity, they will be able to identify (and in some cases, quantify) the environmental effects inherent to the radioactive, acoustic and vibration pollution. To this end, the aim is for students to know the causes and characteristics of these types of contamination, the damage they can cause, how they are detected and how it is possible to protect ourselves.

In order to achieve the proposed objectives, learning activities will be programmed to deal with the following contents: description of the physical and chemical principles causing radioactive, noise and vibration pollution, effects on man and the environment of these types of pollution and the measurement of the impact of these types of pollution on the environment.

These approaches and objectives are aligned with some of the Sustainable Development Goals, SDGs, of the Agenda 2030 (<https://www.un.org/sustainabledevelopment/es/>) and certain specific goals:

GOAL 3: Ensure healthy living and promote the WELL-BEING of all at all ages

Objective 3.4 By 2030, reduce premature mortality from noncommunicable diseases by one-third through prevention and treatment and promote mental health and well-being

Objective 3.9 By 2030, significantly reduce the number of deaths and illnesses from hazardous chemicals, air, water and soil pollution and contamination

2. Learning results

The student, in order to pass this subject, must demonstrate the following results...

1. Be able to identify energy transformation processes as pollutants
2. Be able to evaluate physical pollution from a socio-environmental point of view
3. -Be able to know and apply the methodologies of analysis and control of the level of environmental noise, electromagnetic fields and ionizing radiation
4. -Understand the biological effects and risks of exposure to certain levels of noise, electromagnetic fields and ionizing radiation
5. -Know the legislation and actions corresponding to noise, radioactive and vibration pollution
6. -Analyse and interpret environmental impact reports for physical contamination
7. -Handle instruments to measure the characteristic parameters of each type of physical contamination
8. -Planning the environmental management of nuclear facilities and radioactive waste
9. -Prepare and orally present reports corresponding to assigned work in a collaborative manner
10. -Work autonomously and cooperatively.
11. -Solve problems through the application of knowledge in practice, search for information and analyse data

Learning result 1 to 5 are aligned with Sustainable Development Goals 3, and more specifically with Objectives 3.4 and 3.9, indicated in the subject objectives. Upon passing the indicated learning results students will have acquired the theoretical and practical knowledge necessary to analyse the effects of physical pollutants, such as ionizing radiation, noise and vibrations, on human beings, and thus be able to reduce premature mortality from non-communicable diseases and air, water and soil pollution, while improving mental health and wellbeing.

3. Syllabus

Theory program

1. Radioactive contamination: Review of basic concepts of ionizing radiation emission and its interaction with matter; Radiological quantities and units; Techniques for measuring environmental radioactivity; Biological effects of

ionizing radiation; Radioactivity and the environment; Basic principles of radiation protection; Radiological impact of different radiation sources; Radioactive waste management.

2. -Noise pollution: Physical characteristics of noise; Sources and measurements of noise; Effects of noise on man and the environment

3. -Vibration pollution: Physical characteristics of vibrations; Sources of vibration production and their measurement; Effects of vibrations on man and the environment.

Practical program:

Sessions of measurements of physical contamination in the facilities of the Polytechnic School of Engineering

4. Academic activities

Master classes (30 h) for the development of the contents of the proposed topics.

Practical sessions (30 h) Sessions of measurements of physical contamination in the facilities of the Polytechnic School of Engineering.

Personal study (84 h).

Assessment tests (6 h).

5. Assessment system

The subject will be evaluated in the **global evaluation** modality by means of the following activities:

1. Evaluation of the individual work (50% of the final grade; minimum of 4 out of 10 points). Completion of two individual works on the subject of "Radioactive Contamination" (25% of the final grade) and "Contamination by Vibrations" (25% of the final grade). During the semester, the student will be able to submit the report on both assignments. The grade of the paper will be determined according to the quality of the written report and oral presentation, taking into account the following weights: 50% content, 30% presentation and defence, and 20% formal aspects. Students not evaluated in this activity - in the first or second call- will deliver the report and the presentation of the work through Moodle, with a deadline that will coincide with the official call. In justified cases, students may carry out the activity in the individual mode.

2. Evaluation of the cooperative work (30% of the final grade, minimum of 4 out of 10 points). During the last school days of the semester, the teams will be able to deliver the report of the work and make the oral presentation of the same during class time. The grade of the paper will be determined according to the quality of the written report and oral presentation, taking into account the following weights: 50% content, 30% presentation and defence, and 20% formal aspects. Students not evaluated in this activity - in the first or second call- will deliver the report and the presentation of the work through Moodle, with a deadline that will coincide with the official call. In justified cases, students may carry out the activity in the individual mode.

3. Evaluation of practical sessions. The student's skills in handling the measuring devices used in the practical sessions and attendance at the practical sessions will be evaluated (minimum of 80%). The grade will be pass or fail. If the grade of Pass is not obtained during the semester, a practical exam will be held on the day of the official call published on the EPS website.

In the event that any of the grades for Individual work or Cooperative work is less than 4 points or that the grade in the laboratory practices is FAIL, the final grade will be fail (2.5).

The detailed definition of the evaluation system will be explained in the presentation of the subject.

Success rates in previous years: 2019/20: without teaching; 2020/21: 100%; 2021/22: without teaching

6. Sustainable Development Goals

3 - Good Health & Well-Being