Universidad Zaragoza

Year : 2020/21

30170 - Environmental engineering

Syllabus Information

Academic Year: 2020/21
Subject: 30170 - Environmental engineering
Faculty / School: 179 - Centro Universitario de la Defensa - Zaragoza
Degree: 563 - Bachelor's Degree in Industrial Organisational Engineering
ECTS: 4.5
Year: 2
Semester: Second semester
Subject Type: Compulsory
Module: ---

1.General information

1.1.Aims of the course

1. Provide students with the necessary knowledge to understand the current global environmental problems.
2. Train students in the identification and the minimization techniques of pollutants in water, atmosphere and caused by waste, enabling the students to apply measures to control the pollution.
3. Teach students the available techniques in the field of environmental management so that they will be able to apply environmental management systems at a basic level.
4. Teach students the general environmental regulations (European, state and regional).
5.

1.2.Context and importance of this course in the degree

Environmental engineering teach students of this degree with knowledge about environment which will enable them to take the responsibility to manage the environmental aspects of any organization. This subject gives a scientific and technological point of view about environment and its problems, focusing on the different types of existing pollutants and enabling students for the identification and evaluation of possible environmental impacts produced by the activity of any organization.

1.3.Recommendations to take this course

The usual recommendations for any other engineering degrees, mainly to have attended the scientific and technical studies in the high school and to have a basic knowledge of chemistry.

2.Learning goals

2.1.Competences

C04 - Ability to solve problems and take decisions with initiative, creativity and critical reasoning.

C08 - Ability to analyse and evaluate the social and ecological impact of technical solutions, behaving ethically, with professional responsibility and social commitment, always striving for quality and continuous improvement.

C22 - Basic knowledge and application of environmental technologies and sustainability.

2.2.Learning goals

After attending this subject, students will be able to:

- Recognize and assess the effect that the pollutants cause in the receptor medium: atmosphere, water and soil.
- Analyze any industrial activity and identify the environmental problems which could be generated by that activity.
- Plan a strategy to prevent and control the pollution produced in some specific cases.
- Select the proper technique for the control of the pollution in some concrete cases.
- Analyze the environmental impact of different industrial activities.
- Know the fundamentals of an environmental management system in an industrial activity.
- Know the basic normative related with the environment (wastewater, atmosphere, wastes, environmental impact and integrated pollution control) and the obligations derived from it.

2.3.Importance of learning goals

This subject offers a holistic perspective of the environment, giving a global view of environmental factors and their interrelations. Then, the learning goals of this subject provide students with a theoretical basis and some practical capacities in terms of diminishing and controlling the pollution, enhancing their working capacity for the prevention, minimization and remediation, either in the planification stage or in the development and management of projects in companies and institutions.

3.Assessment (1st and 2nd call)

3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

Theoretical-practical follow-up tests: different theoretical-practical follow-up tests (seminaries, theoretical-practical works, quizzes and partial exam) will be held during the course. The evaluation criteria of these tests will be based on the acquired knowledge, the results obtained and the analysis of the results, if it is possible. The mark obtained in the seminaries, theoretical-practical works and quizzes will represent the 20 % of the global qualification of the subject. It can also include the evaluation of the attitude of students in all the face-to-face activities of the subject. In the follow-up tests, a minimum mark of 4 has been stablished. The mark obtained in the partial exam will represent the 35 % of the global qualification of the subject.

Theoretical-practical final exam: it will be held at the date and time stablished by the Center. The exam will consist of questions about the concepts taught during the course. The mark obtained in this exam will represent the 45 % of the global qualification of the subject.

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

If this teaching could not be done in person for health reasons, it would be done telematically.

The learning process designed for this subject is based on the development of theoretical-practical activities focused on environment pollution. The particular contents described in the verified manuscript of the degree and the corresponded credits are patented in these activities. The aim of these activities is to provide student with the expected learning outcome and the habits which help them in their professional and personal life.

4.2.Learning tasks

The teaching methodology consist of next active learning activities: lectures, practical sessions, problem-based learning, seminars, questionnaires, exams and finals. These activities could be complemented with non-presential ones like problem solving tasks, mini-project work, lab reports redaction and the personal study.

Through the Moodle platform the professoriate makes the activities program accessible for the students with its corresponded username and password in the web site http://moodle.unizar.es.

Teaching materials

During the course, audio-visual and paper-based materials will be used. Materials necessary for the development of the course will be provided through the Moodle platform: http://moodle.unizar.es.

4.3.Syllabus

Topic 1. Engineering concepts applied to the environment

1.1. Introduction to engineering calculations.

1.2. Mass balances.

1.3. Fluid flow concepts.

1.4. Separation processes.

Topic 2. Water pollution

2.1. Introduction.

2.2. Pollutants and its characterization.

2.3. Depuration treatments.

Topic 3. Atmospheric pollution

3.1. The atmosphere.

3.2. Air pollution.

3.3. Atmospheric pollution control.

Topic 4. Waste pollution

4.1. General concepts.

4.2. Properties of the waste.

4.3. Waste treatments.

Topic 5. Environmental Management System (EMS)

5.1. Introduction.

5.2. EMS Planning.

5.3. EMS Implementation.

5.4. EMS Certification.

4.4.Course planning and calendar

Information about class calendars, class schedules and exam schedules will be published through the center website: http://cud.unizar.es.

Teachers will inform the students in person about the different activities that will be carried out during the course, all this information will be also available through the Moodle platform: http://moodle.unizar.es

Teaching materials or notes of the subject available in the Moodle Platform: http://moodle.unizar.es.

4.5.Bibliography and recommended resources

The recommended bibliography for this subject is available at this web address:

http://biblos.unizar.es/br/br_citas.php?codigo=30170&year=2020.