Environmental Technology

Academic Year: (2019 / 2020) **Review date: 27-04-2020**

Department assigned to the subject: Materials Science and Engineering and Chemical Engineering Department, Thermal

Coordinating teacher: PEREZ PRIOR, MARIA TERESA

Type: Compulsory ECTS Credits : 3.0

Year : 2 Semester : 2

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Chemical Basis of Engineering

OBJECTIVES

The aim of this course is to provide an overview of the environmental issues by presenting the origin of pollutants, their mechanisms and processes, as well as the effect that have the various pollutants on human health and on the biosphere. Highlight the global impact of local pollution and the interrelationships with other sources or natural cleansing and transport mechanisms, as well as the labour and health impact of the working environment. Bring relief to debate environmental degradation/development, in its most related to the industrial world. Point out the various industrial sources and their absolute and relative contribution.
The demand for products and services related to the environment as well as environmentally-friendly products, has created a new market that need to be considered, as it is necessary to consider the environmental variable in the new products as a factor more than competitiveness.
To achieve this objective the student must acquire a set of knowledge, skills and attitudes.
As far as knowledge is concerned, at the end of the course the student will be capable of:
-Handle the concepts of environment, sustainability, pollution and treatment.
-Identify and assess the root causes of water and air pollution.
-Know the basic technologies of the effluent treatment for the mitigation and prevention of water and air pollution.
-Acquire an overview of waste management.
In terms of the capabilities these them can be classified in two groups one of specific capabilities and other more generic capacities or skills.
In terms of specific capabilities, at the end of the course the student will be able of:
-Analysis of industrial and urban pollution.
-Selection of effluent decontamination systems.
-Analysis of sustainability and selection of best available techniques...
In terms of the General abilities or skills, during the course will work:
-The ability to analyze problems.
-The ability to search, to communicate and to discriminate is relevant information to characterize an installation from the environmental point of view.
-The ability to apply knowledge of sustainability to the resolution of a specific problem.

By the end of this content area, students will be able to have:
1. Knowledge and understanding of the key aspects and concepts of environmental pollution problem, sustainability and industrial waste treatment.
2. Awareness of the wider multidisciplinary context of engineering.
3. The ability to apply their knowledge and understanding of environmental technologies and sustainability to identify, formulate and solve engineering problems using established methods.
4. An understanding of different methodologies, and an ability to use them.
5. The ability to select and use appropriate equipment, tools and methods.
6. An understanding of applicable environmental and sustainability techniques and methods, and of their limitations.
7. An awareness of the non-technical implications of engineering practice.
8. Demonstrate awareness of the health, safety and legal issues and responsibilities of engineering practice, the impact of engineering solutions in a societal and environmental context, and commit to professional ethics, responsibilities and norms of engineering practice.

DESCRIPTION OF CONTENTS: PROGRAMME

The course addresses urban and industrial wastes, including the main pollutants appearing in air and wastewater systems. Several aspects such as pollutant origin (sources and formation mechanisms), dispersion processes, environmental and health impact, and risk assessment are covered. Special attention is given on green engineering and its close relation to sustainable development.
The program is divided into the following blocks:
I. General concepts about environment, sustainability, pollution and effluent treatment, and green chemistry.
II. Air pollution, its sources, analysis, treatment, transport and dispersion pollutants atmospheric, impact on health.
III. Water pollution, sources, analysis and treatment.
IV. Waste management and environmental impact assessment.

LEARNING ACTIVITIES AND METHODOLOGY

The teaching methodology will include:
1. Master classes, where will be the knowledge that students need to acquire. To facilitate its development students will receive the notes from class and will have basic texts of reference enabling them to complete and deepen the topics in which they are most interested.
2. Problem solving by student who will serve you to evaluate their knowledge and acquire the necessary capabilities. Implementation of the answers to the exercises and correction joint should serve to strengthen skills and develop the capacity to analyze and communicate the relevant information to solve problems. Also the implementation in common will facilitate exchange of views critical to both between teacher and students and among students.

ASSESSMENT SYSTEM

1. The evaluation will be based on the following criteria:
- Two partial exams: 40%
Individual exams proposed by the master class and tutorial class teachers. Dates will be notified at least one week before the exam.
- Practical laboratory session: 10%
- Project 10%
2. Final Exam: 40%
To pass the exam and consider the continuous assessment mark, the mark of the final exam must be above 4 points of 10.
In order to pass the lecture course the total mark must be at least 5.

% end-of-term-examination:	40
% of continuous assessment (assigments, laboratory, practicals…):	60

BASIC BIBLIOGRAPHY

- C. Baird, M Cann Environmental Chemistry, Reverté.
- S. E. Manahan Environmental Chemistry, CRC Press.
- S. E. Manahan Introducción a la Química Ambiental, Reverté.