Environmental Technology

Academic Year: (2023 / 2024) **Review date: 25-04-2023**

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

Coordinating teacher: SERRANO GARCIA, DANIEL

Type: Compulsory ECTS Credits : 3.0

Year : 2 Semester : 1

SKILLS AND LEARNING OUTCOMES

CB1. Students have demonstrated possession and understanding of knowledge in an area of study that builds on the foundation of general secondary education, and is usually at a level that, while relying on advanced textbooks, also includes some aspects that involve knowledge from the cutting edge of their field of study
CB2. Students are able to apply their knowledge to their work or vocation in a professional manner and possess the competences usually demonstrated through the development and defence of arguments and problem solving within their field of study.
CG1. Ability to solve problems with initiative, decision-making, creativity, critical reasoning and to communicate and transmit knowledge, skills and abilities in the field of Industrial Engineering.
CG4. Knowledge and ability to apply current legislation as well as the specifications, regulations and mandatory standards in the field of Industrial Engineering.
CG7. Knowledge and ability to analyse and assess the social and environmental impact of technical solutions, and to apply environmental and sustainability technologies.
RA1. Knowledge and understanding: Have basic knowledge and understanding of science, mathematics and engineering within the industrial field, as well as knowledge and understanding of Mechanics, Solid and Structural Mechanics, Thermal Engineering, Fluid Mechanics, Production Systems, Electronics and Automation, Industrial Organisation and Electrical Engineering.
RA2. Engineering Analysis: To be able to identify engineering problems within the industrial field, recognise specifications, establish different resolution methods and select the most appropriate one for their solution
RA3. Engineering Design: To be able to design industrial products that comply with the required specifications, collaborating with professionals in related technologies within multidisciplinary teams.
RA5. Engineering Applications: To be able to apply their knowledge and understanding to solve problems and design devices or processes in the field of industrial engineering in accordance with criteria of cost, quality, safety, efficiency and respect for the environment.
RA6. Transversal Skills: To have the necessary skills for the practice of engineering in today's society.

OBJECTIVES

By the end of this course, 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;
t characterize industrial installations.
- Applying green engineering principles.

-The identification of the relevant environmental information that characterize industrial installations.
-Applying green engineering principles.

DESCRIPTION OF CONTENTS: PROGRAMME

This is a course oriented to the selection, analysis and evaluation of waste treatment facilities. The program is divided into the following blocks:

INTRODUCTION. General concepts about environment, sustainability, pollution and wastewater treatment.

PART ONE: Atmospheric pollution: atmosphere, meteorology, pollutant dispersion, types of pollutants and pollution control.

PART THREE: Water pollution: water treatment, nutrient removal, reuse and disposal.

LEARNING ACTIVITIES AND METHODOLOGY

The teaching methodology will include:

Presentation of the knowledge that students must acquire through class notes and basic reference texts that will allow them to complete and deepen in those topics in which they are more interested.

Proposal of problems and simple examples to be solved in class on the concepts exposed in class in relation to the specific skills that students should develop.

Resolution of exercises and test questions by the students to self-evaluate their knowledge and acquire the necessary skills.

Development of assignments, preparation of reports and presentation.

ASSESSMENT SYSTEM

The evaluation (continuous) will be based on the following criteria:

- Self-assessment test at the end of each session (10%)
- Group work on a topic of environmental interest (20%)
- Problem solving on pollutant dispersion (10%)
- Practice on pollutant emissions (10%)
- Practice on life cycle assesment (10%)
- Partial exercise of the introductory and atmospheric pollution blocks (20%)
- Partial exercise of the water pollution block (20%)

In ORDINARY CALL, the evaluation will be totally by continuous evaluation.

A MINIMUM GRADE of 4 is required in each of the partial exercises of the subject in order to pass the course.

% end-of-term-examination:	0
% of continuous assessment (assigments, laboratory, practicals…):	100

BASIC BIBLIOGRAPHY

- Carmen Orozco Barranetxea, Antonio Pérez Serrano, Mª Nieves González Delgado, Francisco J. Rodríguez Vidal, José Marcos Alfayate Blanco Contaminación ambiental : una visión desde la química , Paraninfo, 2003

- Daniel Vallero Fundamentals of Air Pollution, Academic Press, 2008

- Dr.Salah M. El-Haggar, PE, PhD Sustainable Industrial Design and Waste Management, Elsevier Ltd., 2007

- George Tchobanoglous, Franklin L. Burton, H. David Stensel Wastewater Engineering. Treatment and reuse, McGraw-Hill, 2003

- Gerard Kiely Ingenieri¿a ambiental : fundamentos, entornos, tecnologi¿as y sistemas de gestio¿n, McGraw-Hill, 1999

- John H. Seinfeld, Spyros N. Pandis Atmospheric chemistry and physics, John Wiley & Sons, 2006

- N.F. Gray, Ph.D., Sc.D Water Technology (Third Edition):An Introduction for Environmental Scientists and Engineers, Elsevier Ltd., 2010

ADDITIONAL BIBLIOGRAPHY

- Janick F. Artiola, Ian L. Pepper and Mark L. Brusseau Environmental Monitoring and Characterization, Elsevier Inc., 2004

- Stephen T. Holgate, Jonathan M. Samet, Hillel S. Koren and Robert L. Maynard Air Pollution and Health , Elsevier Ltd., 1999