

SUBJECT TEACHING GUIDE

1050 - Design of Processes and Products Based on Better Available Techniques

Master's Degree in chemical engineering

Academic year 2024-2025

1. IDENTIFYING DATA					
Degree	Master's Degree in chemical engineering			Type and Year	Compulsory. Year 1
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Obligatory Subjects				
Course unit title and code	1050 - Design of Processes and Products Based on Better Available Techniques				
Number of ECTS credits allocated	4,5	Term	Semester based (2)		
Web					
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. INGENIERIAS QUIMICA Y BIOMOLECULAR				
Name of lecturer	ANA MARIA URTIAGA MENDIA				
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Other lecturers	MARIA JOSE RIVERO MARTINEZ MARCOS FALLANZA TORICES GABRIEL ZARCA LAGO FERNANDO PARDO PARDO				

3.1 LEARNING OUTCOMES

- 1. To learn the desing of new products, taking into account functionality and chemical risks minimization criteria.
- 2. To be able to select the best available techniques for the chemical and process industry , in the context of waste and emission minimization, as well as soil contamination prevention, within the framework of the European regulations.

4. OBJECTIVES

The objectives of the subject are divided into two groups:

1. To learn how to design new products, taking into account criteria of functionality and minimization of chemical risks. This objective includes first understanding the elements for the registration, evaluation, authorisation and restriction of chemicals and mixtures, and their application to a substance substitution case under REACH. The product design objective extends through case studies to the design of new products aimed at both the consumer, and to their use in new processes.
2. To learn how to select the best available techniques for the process industry in the context of emissions and waste minimisation and soil contamination, in the context of the European regulatory framework. Application of THE BREF to the main sectors of chemical and related manufacturing, and use of specific software for risk analysis

6. SUBJECT PROGRAM

CONTENTS

1	PART I. PRODUCT DESIGN. Chapter 1. Environmental criteria for process design. 1.1 Elements for registering, evaluation, autorization and restriction of chemical substances and their mixtures. 1.2. Practical exercise on the substitution of chemical substances in the framework of REACH application.
2	PART I. PRODUCT DESIGN. Chapter 2. Product design to satisfy the users needs. 2.1. Fundamental concepts. 2.2. Case study: Design of a product aimed at the use of the final consumer. 2.3. Case study: Design of a product aimed at the process development.
3	PART II. BEST AVAILABLE TECHNIQUES Chapter 3. Evaluation and management of contaminated soils. 3.1. Management systems fo r the risk control due to contaminated soils. 3.2. Application of the software tool CSOIL for the evaluation of the risks for human health due to contaminated soils.
4	PART II. BEST AVAILABLE TECHNIQUES. Chapter 4. Reference documents of best availables techniques (BREFs). 4.1 Structure, developement and revision of BREF documents.. 4.2. BREF Petroleum and Gas industry. BREF ferreous metals industry. 4.4. BREF surface treatment industry. 4.5 BREF Inorganic chemical industry. Solids and others.

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Reports on the case studies and technical visit	Work	No	Yes	60,00
Test of Multiple choice questions.	Written exam	No	Yes	40,00
TOTAL				100,00
Observations				
The continuous evaluation takes into account the portafolio and the test. Both parts can be recovered in the final evaluation process. Th portafolio is formed by 5 reports: 4 reports with the results of the case studies developed in the practical lessons and 1 report on the technical visit. Should a health alert make impossible to perform the in-person exam, the evaluation will be adpated to the available telematic channels.				
Observations for part-time students				
In accordance with article 24 of the REGULATION OF the EVALUATION PROCESSES OF THE UNIVERSITY OF CANTABRIA, the specific procedures that guarantee in each case the evaluation of the same knowledge and competences to be acquired by students full-time will be established				

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

Chemical Product Design, 2nd edition. E.L. Cussler y G.D. Moggridge. Cambridge University Press, 2011.
Documents BREF y actualizaciones, <http://www.prtr-es.es/>