

COURSE GUIDE

2025/26

Faculty

345 - Faculty of Engineering - Bilbao

Cycle

.

Degree

ININD902 - Master in Industrial Engineering

Year

First year

COURSE

503907 - Chemical Process Design

Credits, ECTS: 3

COURSE DESCRIPTION

Se enseña cómo funcionan las unidades que conforman una planta química (reactores y unidades de separación) y a realizar balances de materia y energía en diagramas de flujo capacitando para valorar alternativas en el esquema de los procesos a

COMPETENCIES/LEARNING RESULTS FOR THE SUBJECT

COMPETENCIAS DE LA ASIGNATURA

TI4. Capacidad para el análisis y diseño de procesos químicos

RESULTADOS DE APRENDIZAJE DE LA ASIGNATURA

Theoretical and Practical Contents

Chapter 1. Material and Energy Balances in Process Flowsheets:
Apply material and energy balances in process flowsheets including the degree of freedom analysis.

Chapter 2. Separation Processes:
Principles of how the most common unit operations in the chemical industry work and are designed.

Chapter 3. Chemical Reactors:
Principles of how the main industrial chemical reactor types work and are designed.

Chapter 4. Chemical Process Analysis and Synthesis:
Design of processes, based on the outcomes of previous chapters, selecting the most appropriate configuration.

Evaluation

Ordinary call

According to the University (UPV/EHU) regulations, mixed assessment has been selected, combining both continuous and final assessments.

-Practical work. 30 %

-Written test. 70 %

Requisites to pass the subject:

1. Pass the practical work (continuous evaluation).
2. A written test mark of 5 or higher is compulsory (final assessments).

In order to do an average mark among the continuous and final assessment evaluation the student must achieve the previous requirements. If student does not achieve these conditions, the maximum mark will be 4 or less than this value.

Attendance to assessment tests:

Under any circumstance that prevents students to attend the written tests, this fact will follow the the University(UPV/EHU) applicable regulations.

Exam complaint process:

After the publication of each exam mark, students wishing a review of their exam should be inscribed in a list in the department secretariat. The dead line will be the day before to the revision date. Complaints of students not included in the above mentioned list, or of students not present in the formal act, will not be attended.

Extraordinary call

Only a final assessment will be developed. Final mark will be an average mark among the continuous mark and this final assessment mark if the ordinary call requirements are achieved. Continuous marks are only valid for one academic course; therefore this mark is not valid for the following academic courses.

METODOLOGIA (ACTIVIDADES FORMATIVAS)

Actividad Formativa	Hours	Porcentaje presencialidad
Seminars	16	37 %
Computer practicals	24	37 %
Lectures	35	43 %

TYPES OF TEACHING

Types of teaching	M	S	GA	GL	GO	GCL	TA	TI	GCA
Hours of face-to-face teaching	15	6			9				
Horas de Actividad No Presencial del Alumno/a	20	10			15				

Legend:

M: Lecture-based
GL: Applied laboratory-based groups
TA: Workshop

S: Seminar
GO: Applied computer-based groups
TI: Industrial workshop

GA: Applied classroom-based groups
GCL: Applied clinical-based groups
GCA: Applied fieldwork groups

Evaluation tools and percentages of final mark

Denominación	Ponderación mínima	Ponderación máxima
Written examination	70 %	70 %
Practical tasks	30 %	30 %

ORDINARY EXAMINATION PERIOD: GUIDELINES AND OPTING OUT

EXTRAORDINARY EXAMINATION PERIOD: GUIDELINES AND OPTING OUT

MANDATORY MATERIALS

Balances de materia y energía. G. V. Reklaitis. Nueva Editorial Interamericana, 1986.

Elements of Chemical Reaction Engineering. (4ª Ed.) Fogler. Prentice-Hall, 2005 (existe una version en castellano).

Chemical Engineering Kinetics (3ª Ed.). J.M.Smith. Ed. Mc.Graw-Hill, 1981.

BIBLIOGRAPHY

Basic bibliography

Introduction to Chemical Processes: Principles, Analysis, Synthesis. R. Murphy. Ed. McGraw-Hill, 2005.

Chemical Engineering Design, Coulson & Richardson's Chemical Engineering. R K Sinnott, 2005.

Chemical Reaction Engineering (3ª Ed.) O. Levenspiel. Wiley, 1999 (existe traducción al castellano de 3ª edición: Ingeniería de las reacciones químicas. Levenspiel. E. Reverté, 2004).

Analysis, Synthesis, and Design of Chemical Processes (2ª Ed.). Turton, R., Bailie, R.C., Whiting, W.B., Shaeiwitz, J.A. Ed. Prentice Hall PTR, 2003.

Chemical Engineering Kinetics (3ª Ed.). J.M.Smith. Ed. Mc.Graw-Hill, 1981.

Detailed bibliography

Introducción a la Termodinámica en Ingeniería Química (7ª Ed.). J. M. Smith, H. C. Van Ness y M. M. Abbot. Ed. McGraw-Hill, 2001.

Principios de Ingeniería Química (6ª Ed.). D. Himmelblau. Ed. Prentice-Hall, 1996.

Heterogeneous Catalysis in Industrial Practice (3ª Ed.). C.N. Satterfield. Krieger Publishing Company, 1996.

Chemical Process: Design and Integration. Robin M. Smith. Ed. Wiley, 2005.

Journals

Web sites of interest