Centre	**University College of Engineering of Vitoria-Gasteiz**
Name of subject	**26089 – Simulation and Optimisation of Chemical Processes**
Qualification	**Degree in Industrial Chemical Engineering**
Type	**Compulsory**
Credits	**6 ECTS**
Year	**3**
Term(s)	**2nd**
Department	**Chemical and Environmental Engineering**
Language	**Spanish**

Outcomes / Objectives

OUTCOMES.
Ability to carry out the analysis, design, simulation and optimisation of processes and products. Module outcome TEQI2.

Ability to design, manage and operate chemical process simulation, control and instrumentation procedures. Module outcome TEQI4.

Apply the strategies of scientific methodology: analyse the problem situation qualitatively and quantitatively; propose hypotheses and solutions to solve chemical engineering problems. Module outcome TEQI8.

Work efficiently in multidisciplinary environments integrating capabilities and knowledge to make decisions in the field of industrial engineering in their specialty. Module outcome TEQI10.

BRIEF DESCRIPTION.
Model and modelling: conceptual framework and application to chemical processes.

Optimisation: fundamentals and application to processes and equipment in chemical engineering

Computer simulation of chemical processes.

OBJECTIVES.
Have knowledge of the concepts of model and modelling in the field of chemical engineering.

Have knowledge of the fundamentals of linear and non-linear optimisation, and acquire abilities to solve chemical process optimisation problems.

Acquire abilities to propose and solve simple chemical process, unit operation and control system models in the chemical industry.

Ability to develop simple chemical process simulators using commercial software.

Syllabus

THEMATIC BLOCK I: FUNDAMENTALS OF MODELLING AND SIMULATION

Unit 1. Model and modelling: an approach to systems and processes in chemical engineering.

Unit 2. Computer simulation of chemical processes

THEMATIC BLOCK II: OPTIMISATION.

Unit 3. Optimisation overview

Unit 4. Graphical treatment of optimisation problems.

Unit 5. Liner optimisation.

Unit 6. Introduction to non-linear optimisation. Non-restricted optimisation.
Unit 7. Restricted non-linear optimisation

THEMATIC BLOCK III: MODELLING AND SIMULATION IN CHEMICAL ENGINEERING: METHODOLOGY AND CASE STUDIES.

Unit 8. Introduction to computer chemical process modelling and simulation. Software description.

Unit 9. Process modelling and simulation in chemical engineering: methodology.

Unit 10. Chemical process modelling and simulation in chemical engineering: case studies.

Methodology

Teaching Method

Face-to-Face Teaching Hours								
Lectures	**Seminars**	**Classroom practice**	**Lab. practice**	**Computer sessions**	**Clinical practice**	**Workshops**	**Industrial workshops**	**Field practice**
30		15	15					
Student Hours of Non Face-To-Face Activities								
Lectures	**Seminars**	**Classroom practice**	**Lab. practice**	**Computer sessions**	**Clinical practice**	**Workshops**	**Industrial workshops**	**Field practice**
45		23	22					

Assessment System

General criteria

→ Written essay exam
→ Practical tasks (exercises, case studies or problems)
→ Individual assignments
→ Group assignments

Clarification regarding assessment

→ Exam score: 60%
→ Deliverables: 10%
→ Report: 30%

Bibliography

Basic Bibliography

Books:

➢Modelado, simulación y optimización de procesos químicos. Autor-Editor:Scenna, N. J.

Manuals:

➢CX-Supervisor Guia Introductoria

➢CX-Supervisor Script

➢CX-Supervisor Manual de Usuario

In-depth Bibliography

➢CP1H: CPU Unit Programming Manual. Omron, 2006.

➢CPM1/CPM1A/CPM2A/CPM2C/SRM1(-V2) Programmable Controllers, Programming Manual, 2008.

➢CX-Supervisor Getting Started, Omron, 2001.

➢CX-Supervisor User Manual, Omron, 2001