

60803 - Analysis and Design of Chemical Processes

Información del Plan Docente

Academic Year	2017/18
Subject	60803 - Analysis and Design of Chemical Processes
Faculty / School	110 - Escuela de Ingeniería y Arquitectura
Degree	532 - Master's in Industrial Engineering
ECTS	4.5
Year	
Semester	Half-yearly
Subject Type	Compulsory
Module	---

1.General information

1.1.Introduction

1.2.Recommendations to take this course

1.3.Context and importance of this course in the degree

1.4.Activities and key dates

2.Learning goals

2.1.Learning goals

2.2.Importance of learning goals

3.Aims of the course and competences

3.1.Aims of the course

3.2.Competences

4.Assessment (1st and 2nd call)

4.1.Assessment tasks (description of tasks, marking system and assessment criteria)

5.Methodology, learning tasks, syllabus and resources

5.1.Methodological overview

The methodology followed in this course is oriented towards achievement of the learning objectives. Its purpose is to provide the students with the skills for the design and analysis of chemical processes through mass and energy balances, and the design of the most representative chemical industry equipments. Among them, chemical reactors and separation units, as distillation and absorption columns, can be highlighted.

60803 - Analysis and Design of Chemical Processes

A wide range of teaching and learning tasks are implemented, such as lectures, case studies, problem-solving, computer lab sessions, autonomous work and study.

5.2.Learning tasks

The course includes the following learning tasks:

- **Lectures (25 hours).** Whole group sessions. Presentation of the main theoretical contents combined with problem-solving tasks.
- **Practice sessions (10 hours).** Small group activities where active methodologies could be used, as cases resolution, problems, puzzles, etc.
- **Computer lab sessions (10 hours).** 5 sessions of computer tasks with a commercial process simulator in reduced groups.
- **Autonomous work.** Study of the course and preparation of assignments. This activity is essential in the learning process and to overcome the course. A collection of problems will be given to the students.
- **Tutorials.** Teacher's office hours for students to review and discuss class contents and the follow-up of the learning process of each student.
- **Complementary activities.** If possible, visits to chemical industries or lectures with professional engineers could be scheduled.

5.3.Syllabus

The course will address the following topics:

1. Introduction. Basic concepts of the analysis and design of chemical industry equipment.
2. Stream properties. Estimation of thermodynamical properties and phase equilibrium.
3. Selection of separation operations.
4. Separation of binary mixtures by distillation: batch distillation, flash distillation and tray tower distillation.
5. Absorption. Mass transfer fundamentals. Simplified design methods.
6. Desing of chemical reactors. Ideal reactors design equations: batch reactor, continuous stirred tank reactor and plug flow reactor. Combination of reactors. Thermal effect.

5.4.Course planning and calendar

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course, will be provided on the first day of class or please refer to the EINA website.

5.5.Bibliography and recommended resources

- Felder, Richard M.. Principios elementales de los procesos químicos / Richard M.Felder, Ronald W. Rousseau ; [colaboradora en la traducción, María Teresa Aguilar Ortega de Sandoval ; revisión, Enrique Arriola Guevara] . - 3ª ed., [reimp.] México [etc.] : Limusa Wiley, cop. 2012
- Levenspiel, Octave. Ingeniería de las reacciones químicas / Octave Levenspiel ; [con la colaboración en la traducción de Juan A. Conesa ; revisión técnica, Enrique Arriola Guevara] . - 3ª ed. México : Limusa Wiley, cop. 2004
- Seader, J. D. Separation process principles : chemical and biochemical operations / J. D. Seader, Ernest J. Henley, D. Keith Roper . 3rd ed. Hoboken, New Jersey : John Wiley & Sons, cop. 2011
- Fogler, H. Scott. Elements of chemical reaction engineering / H. Scott Fogler . - 4th ed. Upper Saddle River [New Jersey] : Pearson Education, cop. 2006
- McCabe, Warren L.. Operaciones unitarias en ingeniería química / Warren L. McCabe, Julian C. Smith, Peter Harriott ; revisor técnico René Huerta Cevallos ; [traductor, Alejandro Carlos Piombo Herrera] . - 7ª ed. México D. F. : McGraw-Hill Interamericana, cop. 2007

60803 - Analysis and Design of Chemical Processes

- Sinnott, Ray K.. Diseño en ingeniería química / Ray Sinnott, Gavin Towler Barcelona : Reverté, 2012