

60644 - Equipment for Chemical Processes

Información del Plan Docente

Academic Year	2016/17
Academic center	100 - Facultad de Ciencias
Degree	540 - Master's in Industrial Chemistry
ECTS	6.0
Course	1
Period	First semester
Subject Type	Compulsory
Module	---

1. Basic info

1.1. Recommendations to take this course

1.2. Activities and key dates for the course

2. Initiation

2.1. Learning outcomes that define the subject

2.2. Introduction

3. Context and competences

3.1. Goals

3.2. Context and meaning of the subject in the degree

3.3. Competences

3.4. Importance of learning outcomes

4. Evaluation

5. Activities and resources

5.1. General methodological presentation

The learning process for this matter is as follows:

The matter includes 6 ECTS, 4 ECTS devoted to lectures on theory and examples and 2 ECTS to the solution of problems given as homework.

The expected 150 hours of work by the students are distributed as follows:

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- 40 hours of lectures on theory and exposition of examples of problems.
- 20 hours for the exposition and discussion in the group of examples previously proposed for homework.
- 85 hours of personal work.
- 5 hours for the final exam, corresponding to a written exam at the time assigned by the Faculty of Sciences.

5.2.Learning activities

The program includes the following activities:

Lectures on theory and problems will be given according to the timetable given by the Faculty of Sciences. In addition each professor will inform about the timetable for tutorial.

5.3.Program

The program is as follows:

- Mass and energy balances: General conservation principles. Macroscopic balances in continuous contact processes with equilibrium stages. Microscopic balances in continuous differential contact. Transport coefficients
- Chemical Reactors: Homogeneous reactors. Complex Reactions: series, parallel and series-parallel. Reactor optimization. Heterogeneous gas-solid catalytic and non-catalytic. Effectiveness factor and Thiele modulus. Fixed and fluidized bed reactors. Biochemical Reactors.
- Separation unit operations: Material Separation Agent and Energy Separation Agent. Advantages and disadvantages. Examples. Rectification of binary mixtures. Design of rectification towers by the McCabe-Thiele method. Effectiveness factor. Liquid-Liquid extraction. Fundamentals and calculations methods.
- Heat transfer equipment: Heat transfer in fluids with and without phase change. Empirical correlations. Shell-tubes heat exchangers. Multiple passes. Single effect and multiple effect evaporators.
- Flow of fluids: Bernoulli equation. Fluid of non-compressible fluids in tubes. Friction factor and pressure drop. Transport of fluids: tubes, valves, pumps and compressors.
- Auxiliary services: heating and refrigeration, water, compressed air and electricity.

5.4.Planning and scheduling

The place and timetable for lectures will be established at the beginning of each course and published in the web page of the Faculty of Sciences. This matter is given in the first semester (September-February).

5.5.Bibliography and recommended resources