

27115 - Chemical Engineering

Información del Plan Docente

Academic Year	2016/17
Academic center	100 - Facultad de Ciencias
Degree	446 - Degree in Biotechnology
ECTS	9.0
Course	3
Period	Annual
Subject Type	Compulsory
Module	---

1. Basic info

1.1. Recommendations to take this course

Basic courses on Mathematics and Physical-Chemistry are necessary.

1.2. Activities and key dates for the course

For students enrolled in the subject, places, times and dates of lectures and practical sessions will be public via Bulletin Board advertisements of the grade on the platform Moodle at the University of Zaragoza , <https://moodle2.unizar.es/add/>, and in the moodle page for the course. These routes will be also used to communicate enrolled students their distribution by groups of practical sessions, which will be organized by the coordination of degree. Provisional dates will be available on the website of the Faculty of Sciences in the corresponding section of the Degree in Biotechnology : <https://ciencias.unizar.es/grado-en-biotecnologia> .

In this web there will be also available the dates of exams.

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

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5. Activities and resources

5.1. General methodological presentation

The learning method is as follows:

The basic concepts of the matter and examples will be explained during the lectures. In addition, examples to be made at home will be given. The solution of these examples will be discussed later in the classroom. The lectures will be with participation of the students and time for personal meeting between lecturers and students will be allocated.

5.2. Learning activities

The program offered to the students includes:

Theoretical lectures, **which will be mainly participative lectures**

Solutions of problems, in which the participation of the students will be higher than in theoretical lectures.

5.3. Program

- 1- Mass and energy balances. Mass balances and atomic balances. Steady and unsteady state. Recirculation and purge.
2. Introduction to transport phenomena. Transport equations. Transport inside a fluid. Transport between phases. Application to mass transfer in fermentation reactors.
3. Heat transfer. Mechanisms for heat transfer. Heat transfer in solids. Design of equipments for heat transfer.
4. Transport of fluids. Bernoulli equation. Pressure drop in pipes. Pumps.
5. Introduction to Separation Units. Types of contact. Design of equipment for contact by stages.
6. Liquid-liquid extraction. Principles. Types of equipments. Design of equipment by stages.
7. Other separation units: leaching, filtration and separation with membranes.
8. Introduction to Chemical Reaction Engineering. Classification of ideal reactors. Design of ideal reactors for simple and homogeneous reactions.

5.4. Planning and scheduling

Schedules of lectures and problems will coincide with the officially established and will be available at:
<https://ciencias.unizar.es/grado-en-biotecnologia> .

The places, calendar and groups for training and practical sessions will be established in coordination with the rest of matters at beginning of course. The Coordinator will produce the groups of students for these activities at beginning of course to avoid overlaps with other subjects.

5.5. Bibliography and recommended resources