Universidad Zaragoza

Academic Year/course: 2024/25

29932 - Experimentation in Chemical Engineering II

Syllabus Information

Academic year: 2024/25
Subject: 29932 - Experimentation in Chemical Engineering II
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
Degree: 435 - Bachelor's Degree in Chemical Engineering
ECTS: 6.0
Year: 4
Semester: First semester
Subject type: Compulsory
Module:

1. General information

The purpose of the subject is to complement the student's training in Chemical Engineering, integrating concepts seen in subjects such as Reactor Design, Separation Operations, Industrial Chemistry and Process Control, which are studied in the third and fourth year of the Degree. . In this way, the aim is to integrate the knowledge of the students of Chemical Engineering, so that they are able to plan a complete process, and not only perform the analysis and design separately of each of the units that comprise it.

2. Learning results

- Obtain mathematical models of operations or processes, handling the appropriate programs for their simulation.
- Know how to analyze a complete process of the chemical industry, and is able to design and simulate a complete control system for it control system for it.
- Be able to integrate all this knowledge in the complete design of a process, including: equipment design, production line design, process control design, applying sustainability criteria.

3. Syllabus

20 classroom practices in laboratory distributed as follows:

I) **9 Practical** computer **simulations** of chemical processes, using the industrial chemical process simulator Aspen Hysys® Aspen Hysys®, including examples of different separation operations, synthesis of various compounds and process optimization studies .

II) **9 Practices of** chemical process **control**, including first and second order systems, determination of PID parameters and control of pressure, temperature and flow among others.

III) **2 Laboratory practices** of Chemical Reaction Engineering with catalyst deactivation and non-ideal flow studies.

Some practices may be replaced by company visits.

4. Academic activities

- Laboratory **practices**: 60 hours

Commercial process simulation software will be used for simulation practice (license available), and the necessary instrumentation will be used in the control labs, as well as in the chemical reaction engineering laboratory.

- **Study and personal work**: 84 hours
- **Assessment tests:** 6 hours

5. Assessment system

In this subject a continuous assessment system is considered (Art 9.4 of the assessment regulations of the University of Zaragoza)

Attendance to all laboratory sessions will be mandatory.

The grade obtained will be calculated according to the following expression:

Note = (Ns/Nt x Note simulation) + (Nc/Nt x Note chemical process control)+ (Nr/Nt x Note chemical reaction engineering).

Ns being the number of simulation practices, Nc the number of chemical process control practices, Nr the number of chemical reaction engineering practices and Nt the total number of practices

- The **chemical process simulation grade** will be obtained: 70 % in a test and 30 % through the delivery of a

simulation case solved individually or in group.

- The **chemical process control grade** will be obtained: 60 % in a test and 40 % of questionnaires answered during the practices.
- The **engineering of the chemical reactions grade** will be 100 % that of the written scripts once the practices are completed.

A minimum grade of 4 in each of the parts is required for averaging. In addition, a minimum of 4 points (out of 10) must be obtained in each of the part test (Control and Simulation) to be able to average in the corresponding part with the other partial grades. If both grades (test and average of each part) are not achieved, the student will be considered failed in that part.

In the second call, the student will be able to take the test of the part(s) not passed.

Failure to attend any of the practicals will lead, in addition to the test common to all students, to a laboratory assessment of the practical(s) not attended.

6. Sustainable Development Goals

7 - Affordable and Clean Energy
8 - Decent Work and Economic Growth
9 - Industry, Innovation and Infrastructure