60803 - Analysis and Design of Chemical Processes

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 of this subject is based on:

The goal of this subject is to provide the student with the skills for the design and analysis of chemical processes, through the mastering of 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.

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To get the proposed knowledge, in the learning process initially basic knowledge is laid out in theoretical expositions with the participation of the students and activities is small groups in which practical cases are faced, as well as with the resolution of problems.

The subject's timing will, approximately, be: 25 h of theoretical lessons were theoretical concepts will be explained in a participative way, 10 h of problem and simple cases resolution and 10 h (five two-hour sessions) of computer practice with a commercial process simulator in reduced groups. Alternatively, if possible, visits to chemical industries or lectures with professional engineers could be scheduled.

Personal work and study of the student is essential to reach the learning objectives previously shown.

5.2.Learning activities

The program offered to the student to get the foreseen learning results included the following activities...

Presential lessons , to be imparted to the whole group, in which the basic principles of the subject and selected problems will be explained.

Small group activities . In these activities, active methodologies could be used, as cases resolution, problems, puzles, laboratory practices, ...

Student's autonomous work , studying the subject and applying the theory to problem resolution. This activity is essential in the learning process and to overcome the evaluation activities. A collection of problems will be supplied to the students.

Tutorial classes. Tutorial classes allow a more personalized frame with the student and, consequently, a better adaptation to the particular circumstances of each individual, and the tracing of the learning process of each student.

The above mentioned activities will serve to strengthen the subject contents needed to face the study of an industrial process were chemical processes are involved, whether with or without chemical reaction.

5.3.Program
1. Introduction. Basis 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.

These contents will be developed in the theoretical classes and in the problem and case resolution sessions, as has been commented previously.

5.4.Planning and scheduling

The School stablishes the theoretical lessons and on-site activities schedule, which is published before the start of the academic year.

Each teacher will inform about the timetable for tutorial classes.

5.5.Bibliography and recomended resources