Universidad Zaragoza

Academic Year/course: 2022/23

29931 - Industrial Chemistry

Syllabus Information

Academic Year: 2022/23
Subject: 29931 - Industrial Chemistry
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

2. Learning goals

3. Assessment (1st and 2nd call)

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The learning process that is designed for this course is based on the following:

For the design of the learning process, it has taken into account that this is a subject of theoretical and practical nature. Therefore, the learning process takes place on several levels: theory classes, classes of problems, projects and a final exam. It also should be added to the individual study effort by the student

4.2. Learning tasks

The program offered to students to assist in achieving the expected results includes the following activities:

Class activities (60 hours), distributed in:

- Lectures (40 hours). There will be sessions of exposure, explanation and discussion of the theoretical basis that will allow to analyze and integrate knowledge and to know, critically, the most important industrial chemical processes. The methodology will consist of case studies of chemical processes.

- Classes of problems (20 hours). Problems of mass and energy balances, both in the steady and unsteady state will be solved. The aim is to allow the student to achieve the learning outcome number 3.

Works (20 hours). During the course, students will be proposed carrying out work for implementing the concepts studied. These works will be delivered in the form of documents to be corrected and evaluated.

Individual study (64 hours). Continuous work of the student is encouraged. The student can count teacher tutoring time.

Exam (6 hours). Besides having a qualifying function, evaluation is also a tool with which the student checks the degree of understanding and assimilation of knowledge and skills acquired.

4.3. Syllabus

The program of the course is subdivided into theoretical lectures and problem-solving classes.

The aim of the theoretical classes is to present and analyze case studies of chemical processes.

The selection of processes has been carried out according to the following criteria:

a) they are processes of industrial importance;

b) they allow to know the possibilities of use of different raw materials or production of products of industrial interest;

c) they allow to analyze and apply the knowledge acquired in the different subjects to the industrial reality.

The theory and processes are divided into six main blocks, which are schematically:

- Block 1. Introduction. The course will be presented and the structure of the chemical processes and raw materials and most important resources will be described (Topic 1).
- Block 2. Gas-solid catalytic processes (Topics 2, 3 and 4).
- Block 3. Hydrogen production (Topic 5).
- Block 4. Oil refinery (Topics 6 and 7).
- Block 5. Petrochemical industry (Topic 8).
- Block 6. Biotechnological processes (Topics 9, 10 y 11)

The agenda of theory and approximate distribution of the duration of the different subjects (a total of 40 hours) is as follows:

- Topic 1. Introduction (1 h).
- Topic 2. Production of sulfuric acid (5 h).
- Topic 3. Production of ammonia (4 h).
- Topic 4. Production of nitric acid (2 h).
- Topic 5. Hydrogen production (2 h).
- Topic 6. Refining of petroleum (1 h).
- Topic 7. Processes for obtaining and improving the quality of gasoline (7 h).
- Topic 8. Petrochemical industry. Obtaining and use of olefins (7 h).
- Topic 9. Enzymatic and microbial reactions and industrial bioreactors (4h).
- Topic 10. Industrial enzymatic processes (3 h).
- Topic 11. Industrial microbial processes (4 h).

As regards the resolution of problems, it is planned the following time distribution:

1. problems of mass and energy balances in steady-state (11 h).

2. problems of mass and energy balances in unsteady-state (9 h).

4.4. Course planning and calendar

The course syllabus is divided into the corresponding lectures and problem-solving classes. They will be held according to the schedule established by the School of Engineering and Architecture (EINA). In addition, each professor will inform of his hours of tutoring. Works will take place throughout the semester.

It is a course of 6 ECTS credits, which is equivalent to 150 hours of student work. The 150 hours of student work will be divided into activities as follows:

- 40 hours of theory class, in which the necessary theoretical content will be presented.
- 20 hours of solving material and energy balance problems. They correspond to learning outcome number 3.
- 20 hours of work, which will consist of carrying out development tasks, expansion, documentation and resolution of cases proposed by the professor. These works will be distributed during the course and will be carried out individually or in small groups. They will be reflected in deliverables and will be evaluated by the teacher.
- 64 hours of personal study and resolution of proposed problems, distributed throughout the semester.
- 6 hours of control tests carried out in the exam periods.

4.5. Bibliography and recommended resources

http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=29931