# 29928 - Experimentation in Chemical Engineering I

## Syllabus Information

**Academic Year:** 2019/20
**Subject:** 29928 - Experimentation in Chemical Engineering I
**Faculty / School:** 110 - Escuela de Ingeniería y Arquitectura
**Degree:** 435 - Bachelor's Degree in Chemical Engineering
**ECTS:** 6.0
**Year:** 3
**Semester:** Second semester
**Subject Type:** Compulsory
**Module:** ---

# 1.General information

## 1.1.Aims of the course

## 1.2.Context and importance of this course in the degree

## 1.3.Recommendations to take this course

# 2.Learning goals

## 2.1.Competences

## 2.2.Learning goals

## 2.3.Importance of learning goals

# 3.Assessment (1st and 2nd call)

## 3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

# 4.Methodology, learning tasks, syllabus and resources

## 4.1.Methodological overview

**The learning process that has been designed for this subject is based on the following:**

In each laboratory session, students will work in groups of two or three people. The students will know in advance the lab work to be performed and must have read its script before the session.

Once in the laboratory, students will conduct the experimental work assigned. They will discuss the results and write one or more report covering the work done (results, calculations, graphical representations...), with a proper presentation.

Finally, students must make an individual written exam that aims to demonstrate the knowledge acquired on the subject.

## 4.2.Learning tasks

**The program offered to students includes the following activities:**

A 1-hour lecture in the classroom or laboratory, where the teacher explains to all groups the theoretical concepts corresponding to practice 9 of the Chemical Engineering Department (see paragraph 4.3).

Laboratory sessions: 21 practices distributed as follows: (I) Knowledge Area of Chemical Engineering (4 ECTS): 13 sessions of 3 hours, (II) Knowledge Area of Thermal Systems (1 ECTS): 4 sessions of 2.5 hours. (III) Knowledge Area of Fluid Mechanics (1 ECTS): 4 sessions of 2.5 hours.

## 4.3.Syllabus

**The sessions program can be grouped according to the area, as follows:**

I) Knowledge Area of Chemical Engineering (4 ECTS): 13 sessions of 3 hours. Some sessions may change depending on the availability or proper functioning of the required equipment

Session 1. Kinetics of a catalyzed homogeneous reaction

Session 2. Kinetics of a homogeneous reaction in a continuous reactor

Session 3. Kinetics of an enzymatic reaction

Session 4. Absorption with chemical reaction

Session 5. Determination of the equilibrium curve and differential distillation

Session 6. Ion exchange

Session 7.  Continuous stirred-tank and plug flow reactors (CSTR and PFR)

Session 8. Leaching

Session 9. Fluidization. Determination of fixed bed porosity and calculation of minimum fluidization velocity

Session 10. Distillation with reflux

Session 11. Continuous stirred-tank battery

Session 12. Adsorption isotherm

Session 13. Permeation of gas through porous membranes

(II) Knowledge Area of Thermal Systems (1 ECTS): There will be 4 sessions of 2.5 hours each. Practices will be the following:

Session 1. The thermal efficiency of a boiler.

Session 2. Evaluation of the performance of an evaporative cooler

Session 3. Internal combustion engines

Session 4. Thermal turbomachinery

(III) Knowledge Area of Fluid Mechanics (1 ECTS): 4 sessions of 2.5 hours each will be held.

Session 1. Disassembling and selection of pumps

Session 2. Pump testing and cavitation

Session 3.  Pressure losses in systems. Valve characterization.

Session 4. Fan testing

## 4.4.Course planning and calendar

### Sessions and presentations scheduling

Laboratory sessions are given following the schedule established by the Centre before the beginning of the current academic year (available at Http:\\eina.unizar.es). They will be planned according to the number of students and will be announced in advance. Every teacher will inform the students about the individual tutorial schedule. In addition to the recommended bibliography, the set of scripts of the laboratory sessions will be available at the EINA copy service or ADD (Moodle).

## 4.5.Bibliography and recommended resources

http://biblos.unizar.es/br/br_citas.php?codigo=29928&year=2019