

Year : 2018/19

## 29930 - Chemical Process Control

### Syllabus Information

<b>Academic Year:</b>	2018/19
<b>Subject:</b>	29930 - Chemical Process Control
<b>Faculty / School:</b>	110 -
<b>Degree:</b>	330 - Complementos de formación Máster/Doctorado 435 - Bachelor's Degree in Chemical Engineering
<b>ECTS:</b>	6.0
<b>Year:</b>	330 - Complementos de formación Máster/Doctorado: XX 435 - Bachelor's Degree in Chemical Engineering: 4
<b>Semester:</b>	Half-yearly
<b>Subject Type:</b>	Compulsory, ENG/Complementos de Formación
<b>Module:</b>	---

### **General information**

#### **Aims of the course**

#### **Context and importance of this course in the degree**

#### **Recommendations to take this course**

#### **Learning goals**

#### **Competences**

#### **Learning goals**

#### **Importance of learning goals**

#### **Assessment (1st and 2nd call)**

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

#### **Methodology, learning tasks, syllabus and resources**

#### **Methodological overview**

The learning process will take place at several levels: lectures, practical problems (cases) and tutored projects, increasing the level of student participation. In the practical problems and tutored projects, the students will work in small groups of two or three people.

## Learning tasks

The program proposed to the student in order to achieve the expected results, includes the following activities:

Theoretical lectures (45 h). Dedicated to explain the different topics and solve some model problems.

Work in small groups (15 h). In these classes, problems will be solved by students supervised by the professor. Problems or cases will be related to the theoretical part explained in the lectures.

Practical cases in group (20 h Non-contact). Groups of two and three students will be formed throughout the semester. The groups will work on 3 practical cases supervised by the teacher. Tutoring sessions will be scheduled for the resolution of doubts.

Individual study (67 hours). Students perform individual study continuously throughout the semester.

Final Evaluation (3 h). A global test, where the theoretical and practical knowledge gained by the student will be evaluated.

## Syllabus

The topics covered in this subject are:

1. Introduction. Types of control.
2. The control loop.
3. Feedback control.
4. Industrial Instrumentation.
5. Selection of control variables.
6. Strategies for the control of key process variables (temperature, pressure, level, flow and composition).
7. Dynamic Modeling of processes. Controlled processes.
8. Control for safety. Effect of recycles on control: effect "snowball".
9. Strategies for controlling reactors.
10. Control of heat exchangers, and energy management.
11. Control of distillation columns.
12. Control of other process units
13. Controllability and observability. Multivariable control.

## Course planning and calendar

	Theoretical lectures + problems	Practical cases in groups.	Individual study
1. Introduction. Types of control.	3 h + 0 h		3 h
2. The control loop.	2 h + 0 h		3 h
3. Feedback control.	5 h + 2 h		6 h
4. Industrial Instrumentation.	3 h + 1 h	Case 1 (4 h), T1	5 h
5. Selection of control variables.	2 h + 1 h		6 h
6. Strategies for the control of key process variables (temperature, pressure, level, flow and composition).	4 h + 2 h		5 h
7. Dynamic Modeling of processes. Controlled processes.	5 h + 4 h		7 h
8. Control for safety. Effect of recycles on control: "snowball" effect.	2 h + 1 h		5 h
9. Strategies for controlling reactors.	4 h + 1 h	Case 2 (6 h), T2	3 h
10. Control of heat exchangers, and energy management.	4 h + 1 h		9 h
11. Control of distillation columns.	4 h + 1 h		9 h
12. Control of other process units.	4 h + 1 h	Case 3(10 h), T3	3 h
13. Controllability and observability. Multivariable control.	3h + 0 h		3h
<b>Total</b>	<b>45 h + 15 h</b>	<b>20 h</b>	<b>67 h</b>

## **Bibliography and recommended resources**