Universidad Zaragoza

Academic Year/course: 2021/22

29930 - Chemical Process Control

Syllabus Information

Academic Year: 2021/22
Subject: 29930 - Chemical Process Control
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
Degree: 330 - Complementos de formación Máster/Doctorado
435 - Bachelor's Degree in Chemical Engineering
ECTS: 6.0
Year: 435 - Bachelor's Degree in Chemical Engineering: 4
330 - Complementos de formación Máster/Doctorado: XX

Semester: First semester
Subject Type: 435 - Compulsory
330 - ENG/Complementos de Formación
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 will take place at several levels: lectures, practical problems (cases) and tutored projects, increasing the level of student participation. On the practical problems and tutored projects, the students will work in small groups of two or three people.

Students are expected to participate actively in the class throughout the semester.

Classroom materials will be available via Moodle. These include a repository of the lecture notes used in class, the course syllabus as well as other course-specific learning materials.

Further information regarding the course will be provided on the first day of class.

4.2. Learning tasks

This is a 6 ECTS/150 h course organized as follows:

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 groups (20 h Non-contact). Groups of two and three students will be formed throughout the semester. The groups will work on ≈ 2 practical cases supervised by the teacher. Tutoring sessions will be scheduled for the resolution of doubts.

Individual study (67 hours). Students perform autonomous work and 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.

4.3. Syllabus

The course will address the folllowing topics:

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.

4.4. 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		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(16 h), T3	3 h
13. Controllability and observability. Multivariable control.	3h + 0 h		3h
Total	45 h + 15 h	20 h	67 h

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course will be provided on the first day of class or please refer to the EINA webpage: eina.unizar.es

4.5. Bibliography and recommended resources

http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=29930