

Degree programme	Type	Course
Biotechnology	OP	4

Contact lecturer

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Prerequisites

It is recommended to have some knowledge of:

Bioprocess Engineering and Bioreactors

Group languages

You can consult this information at the [end](#) of the document.

Objectives

To know different basics types of process control. Analysis of dynamic behavior of a process with and without control.

Learning outcomes

- CM32 (Plan a process for obtaining biotechnological products.) Plan a process for obtaining biotechnological products.
- KM35 (Explain the bases of design, instrumentation and monitoring of biotechnological processes.) Explain the bases of design, instrumentation and monitoring of biotechnological processes.
- SM32 (Apply safety standards both in the laboratory and in the design of biotechnological plants.) Apply safety standards both in the laboratory and in the design of biotechnological plants.

Contents

Lesson 1: Introduction.

Lesson 2: Mathematical models development

Lesson 3: Analysis of dynamic behavior of a process.

Lesson 4: Feedback control.

Lesson 5: Other control systems.

Lesson 6: Physical elements in a control system.

Learning activities and methodology

Title	Hours	ECTS	Learning outcomes
Study of the basic concepts and resolution of the typical problems of control	80	3.2	CM32, KM35, SM32
Preparation oral presentation of instrumentation	10	0.4	CM32, KM35, SM32
Process simulation work	6	0.24	CM32, KM35, SM32
Theory and problems lectures	35	1.4	CM32, KM35, SM32
Process simulation seminars	9	0.36	CM32, KM35, SM32
Seminar on case studies	3	0.12	CM32, KM35, SM32
Oral exhibitions of instrumentation	3	0.12	CM32, KM35, SM32

Theory and problems lectures: As you progress in the syllabus, problems of the subject will be considered and resolved.

Oral presentations of instrumentation: At the beginning of the course, instrumentation work will be assigned. The work will be done in groups with an oral presentation towards the end of the course.

Practical case seminar: An intensive seminar to solve problems and / or practical cases will be held.

Process simulation seminar: Three seminars will be held simulating processes using Simulink of the MATLAB software. Subsequently, a work carried out in a group will be presented, with the discussion of the results obtained.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

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Assessment

Continuous assessment activities

Title	Weight	Hours	ECTS	Learning outcomes
Simulation work	15	0	0	CM32, KM35, SM32
Partial test 1	35	2	0.08	CM32, KM35, SM32
Partial test 2	35	2	0.08	CM32, KM35, SM32

Oral presentation of instrumentation	15	0	0	CM32, KM35, SM32
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Partial 1: Dynamic Process Behavior.

Partial 2: Dynamic behavior of processes with control. Instrumentation

Oral presentations of instrumentation: It will be evaluated on-site according to some barems that the student will have previously (required assistance).

Simulation work: The work of the discussion of the results obtained in the simulation seminar will be evaluated (required assistance).

Retake exam: If the resultant qualification of the tests carried out is less than 5/10, students can do a second exam of the the partial ones that have not been passed. To participate in the retake exam, the students must have previously been evaluated in a set of activities whose weight equals to a minimum of two thirds of the total grade of the subject. Therefore, students will obtain the "Not Evaluable" qualification when the assessment activities carried out have a weighting of less than 67% in the final grade.

A special distinction (MH) can be given from the 9/10 qualification with the limitation of up to 5% of MH of the total number of students enrolled.

Without prejudice to other disciplinary measures that may be considered appropriate, the irregularities (copy, plagiarism, deception, letting copy, etc.) committed by the students that may lead to a variation of the qualification of an evaluation activity will lead to suspend them with a zero. Also this may lead to initiation of a disciplinary process.

The repeating students will have the same system of continuous evaluation.

For each evaluation activity, a place, date and time of review will be indicated. If the student does not appear, it will not be reviewed later.

Single evaluation:

Students who follow this kind of evaluation will have the same evaluation activities that others, with the same percentages. Nevertheless, they can do the partial 1 together partial 2 at the scheduled day and hour for the partial 2.

The same retake exam system used in continued evaluation will be applied

The same grade of "Not Evaluable" used in continued evaluation will be applied

The same review qualification procedure used in continued evaluation will be applied

In the assessment activities of this subject, the use of Artificial Intelligence (AI) technologies is not allowed and will be considered a lack of academic honesty, leading to a partial or total penalty in the grade of the activity.

Bibliography

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https://www.academia.edu/37141836/Chemical_Process_Control_An_Introduction_to_Theory_and_Practice_-_Ge

Ollero de Castro P., Fernández E.

"Control e instrumentación de procesos químicos"

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Seborg D.E., Edgar T., Mellichamp D.A.

"Process Dynamics and Control"

J. Wiley (NY), 2017

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"Ingeniería Bioquímica"

Síntesis (Madrid), 2010

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"Process Control Theory and Applications"

Springer (London), 2018

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Software

MATLAB

Course groups and languages

The information provided is provisional until November 30. After this

date, you will be able to consult the language of each group through this [link](#). To access the information, you will need to enter the course CODE

Type of teaching	Group	Language	Semester	Shift
(TE) Theory	44	Catalan	second semester	morning-mixed
(PLAB) Practical laboratories	441	Catalan	second semester	afternoon
(SEM) Seminars	441	Catalan	second semester	afternoon