UAB
Universitat Autònoma de Barcelona

Introduction to the Control of Bioprocesses

Code: 107536
ECTS Credits: 6

2025/2026

Degree	Type	Year
Biotechnology	OP	4

Contact

Name: Maria Dolors Benaiges Massa

Email: mariadolors.benaiges@uab.cat

Teaching groups languages

You can view this information at the end of this document.

Prerequisites

It is recommended to have some knowledge of:

Bioprocess Engineering and Bioreactors

Objectives and Contextualisation

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

Learning Outcomes

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

Content

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.

Activities and Methodology

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

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

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Oral presentation of instrumentation	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
Simulation work	15	0	0	CM32, KM35, SM32

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.

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 thestudent 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 applyed

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

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

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.

Student's assessment may experience some modifications depending on the restrictions health authorities

Bibliography

Stephanopoulos G.

"Chemical Process Control: An introduction to theory and practice"

Prentice-hall (New Jersey), 1984

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"

Síntesis (Madrid), 1998

Romagnoli J.A., Palazoglu A.

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Taylor & Francis Group (Boca Raton), 2006

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

"Process Dynamics and Control"

J. Wiley (NY), 1989

Gòdia F., López-Santín J.

"Ingeniería Bioquímica"

Síntesis (Madrid), 1998

Corriou Jean-Pierre

"Process Control Theory and Applications"

Springer (London), 2018

https://bibcercador.uab.cat/permalink/34CSUC_UAB/15r2rl8/cdi_askewsholts_vlebooks_9783319

Software

MATLAB

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this link. To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn

(PLAB) Practical laboratories	441	Catalan	second semester	afternoon
(SEM) Seminars	441	Catalan	second semester	afternoon
(TE) Theory	44	Catalan	second semester	morning-mixed