Biotechnological Plant Projects

Code: 100964
ECTS Credits: 6

2025/2026

Degree	Type	Year
Biotechnology	OP	4

Contact

Name: Francisco Valero Barranco

Email: francisco.valero@uab.cat

Teaching groups languages

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

Prerequisites

It is necessary to choose the option of bioprocess in the bachellor.

Objectives and Contextualisation

Learning the methodology to make a design project of an industrial biotechnological plant. Planning and organization of a project. Structure and material included in a project report. To know the use of a design and plant analysis simulator applied to a bioprocess plant.

Learning Outcomes

1. CM32 (Competence) Plan a process for obtaining biotechnological products.
2. CM33 (Competence) Design the different stages necessary to obtain products by biotechnological means.
3. CM34 (Competence) Design all the stages of obtaining biotechnological products or derivatives taking into account ethical and sustainable development aspects.
4. KM35 (Knowledge) Explain the bases of design, instrumentation and monitoring of biotechnological processes.
5. KM36 (Knowledge) Describe the bases of the design of a biotechnological production process, as well as its environmental implications.
6. SM32 (Skill) Apply safety standards both in the laboratory and in the design of biotechnological plants.

Content

1. Project Management
    1. Project definition. Project Life cycle. Engineering, construction, Operation.
    2. Planning fundamentals. Objectives, product definition, market, reports, economical analysis.
    3. Project planning, Planning tools.
    4. Design variable analysis.

5. Planning batch operation
6. Flux diagrams. Simulation programs
7. Process economics
8. GMP, PAT i QbD.
9. Project plant design.
    1. Basic information, specifications, other information.
    2. Graphic information. Process, Engineering (P&I), Layout, services.
    3. Plant services: water, air, heating and cooling, CIP, SIP.
    4. Sizing of equipments: Equipment list, Control schemes.
    5. Layout.
    6. Safety, Environmental, Operational and procedures.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Collaborative work in seminars	12	0.48	
Computer center	13	0.52	
Theoretical classes	27	1.08	
Type: Supervised			
Preproject of bioprocess plants	95	3.8	

In addition to the theoretical classes, sessions will be held in the computer classroom to learn and master the bioprocess simulator SuperproDesigner and seminars sessions where the development of the advanced project of an industrial plant of some bioprocess. All these classes and sessions are specified in the subject schedule.

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.

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Final Examn	25%	2	0.08	CM32, CM33, CM34, KM35, KM36, SM32
Memory of the project of the design of a plant of bioprocesses	40%	0	0	CM32, CM33, CM34, KM35, KM36, SM32
Presentation of a design guide of an equipment of a Biotechnological plant	5%	0.5	0.02	CM33

Presentation of the project of the design of a plant of bioprocesses	30%	0.5	0.02	CM32, KM36

Individual final written examination: 25% of note.

Continued evaluation of seminar sessions and progress of bioprocess plant: 40% of note.

Advocacy in public session of the bioprocess plant project: 30% of the note.

Presentation of a guide to design a team of a biotechnology plant: 5% of the note.

A student will be considered not to be evaluated (NA) if he has not performed any of the training activities.

For each assessment activity, a place, date and time of review will be indicated where the student can review the activity with the faculty. In this context, complaints can be made about the activity note, which will be evaluated by the teacher responsible for the subject. If the student does not show up for this review, this activity will not be reviewed later.

Honorary tuition (MH). The award of an honorary degree is decided by the faculty responsible for the subject. The UAB regulations state that MH may only be granted to students who have obtained a final grade equal to or greater than 9.00. Up to 5% of all enrolled students can be awarded MH.

A student shall be deemed not to be assessable (NA) if he has not submitted to any of the assessment activities.

Without prejudice to any other disciplinary measures deemed appropriate, irregularities committed by the student which may lead to a change in the rating of an assessment act shall be classified as zero. Therefore, copying, plagiarism, cheating, copying, etc. in any of the evaluation activities will mean suspending it with a zero.

This subject/module does not include a single assessment system.

Bibliography

- E. Heinzle, A. Biwer, C. Cooney "Development of Sustainable Bioprocesses". Wiley (2006).

- R. Turton et al.: "Analysis, Synthesis, and Design of Chemical Processes" 3rd ed. Prentice Hall (2009)

- Sinnott R.K. " Coulson&Richardson Chemical Engineering. Volume 6: Design". Elsevier Butterworth-Heinemann (2005).

- H.C. Vogel, C.L. Todaro. "Fermentation and Biochemical Engineering Handbook" Noyes (1997).

- B. Atkinson, F. Mavituna "Biochemical Engineering and Biotechnology

- Handbook" Macmillan (1991).

- Rudd D.F. Watson Ch.C. "Estrategia en Ingeniería de Procesos" Alhambra (1976).

Software

Programa Superpro Designer. Plant design version 8.5

Excel. Economic analysis.

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	first semester	afternoon
(SEM) Seminars	441	Catalan	first semester	morning-mixed
(TE) Theory	44	Catalan	first semester	morning-mixed