Universitat Autònoma de Barcelona

2023/2024

Separation and Purification Processes

Code: 100959
ECTS Credits: 6

Degree	Type	Year	Semester
2500253 Biotechnology	OB	3	1

Contact

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Teaching groups languages

You can check it through this link. To consult the language you will need to enter the CODE of the subject.
Please note that this information is provisional until 30 November 2023.

Prerequisites

It is recommended to have the foundations of bioprocess engineering achieved

Objectives and Contextualisation

The study of the different separation processes used in biotechnology, its theoretical basis, the dimensioning of the equipment and the development of the strategies and the sequences to be applied according to the product to obtain.

Competences

- Design and implement a complete protocol for obtaining and purifying a biotechnological product.
- Learn new knowledge and techniques autonomously.
- Read specialised texts both in English and one's own language.
- Reason in a critical manner
- Search for and manage information from various sources.
- Use ICT for communication, information searching, data processing and calculations.
- Use the fundamental principles of mathematics, physics and chemistry to understand, develop and evaluate a biotechnological process.
- Work individually and in teams

Learning Outcomes

1. Describe the various processes of separation at different scales.

2. Design and execute a protocol for purifying a biotechnological product.
3. Learn new knowledge and techniques autonomously.
4. Read specialised texts both in English and one's own language.
5. Reason in a critical manner
6. Search for and manage information from various sources.
7. Solve problems in different key aspects of bioindustrial processes.
8. Use ICT for communication, information searching, data processing and calculations.
9. Work individually and in teams

Content

1. Introduction.

2. Filtration.

3. Centrifugation and sedimentation.

4. Cell disruption.

5. Liquid-liquid extraction.

6. Adsorption.

7. Chromatography.

8. Membrane separation processes.

9. Precipitation.

10. Crystallization.

11. Drying.

Methodology

Theoretical lectures:
The basic concepts of the syllabus will be introduced. Whenever possible, audiovisual and interactive material to help understand concepts will be used. This material will be available in Moodle before the theoretical sessions are held

Practical excercises:
The teacher and the students will solve problems related to the subject exposed in the theory classes. The problems will be proposed by the teacher from the proposed problems available in a collection of exercises available in Moodle. The latter will also allow autonomous student learning through the autonomous resolution of exercises out of the seminar sessions.

Tutories:
Individual sessions or small groups for the resolution of doubts related to the subject.

Homework:
Knowledge will be achieved through autonomous learning by students based on literature searches and the realization of a homework in group

Informative note: the teaching staff will allocate about 15 minutes of some class to allow that the students can answer the surveys of evaluation of the educational performance and of the asignatura

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.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Practical exercises	15	0.6	8, 6, 2, 7
Theoretical lectures	30	1.2	6, 1, 2, 4
Type: Supervised			
Seminars	5	0.2	8, 6, 1, 2, 4, 7
Soving practical exercises and correction	18	0.72	8, 6, 2, 7
homeworks	15	0.6	8, 6, 1, 2, 4, 7
Type: Autonomous			
Resolution of practical exercises	21	0.84	8, 6, 2, 7
Studi	33	1.32	8, 6, 1, 2, 4, 7
Tutories	4	0.16	7

Assessment

A) Continuous evaluation:

- Three partial exams that will count 84% of the final mark

- A group homework that will count 16% of the final mark

The scheduling of the assessment activities will be given on the first day of the subject and will be made public through the web of the faculty of biosciences.

B) Recovery test:

The group homework is not recoverable.

The student can submit to recovery test whenever it has been presented to a set of activities that represent a minimum of two thirds of the total grade of the subject. Of these, students who have an average qualification of all the activities of the subject superior to 3,5 on 10 will be able to present to the recovery final test.

Only students who fail the continuous evaluation can submit the recovery test.

The synthesis exam (recovery) includes the entire contents of the subject.

C) Procedure for the revision of the qualifications:

For each assessment activity, a place, date and time of revision will be indicated in which the student will be able to review the activity with the teacher. In this context, claims can be made about the activity note, which will be evaluated by the teachers responsible for the subject. If the student does not submit to this review, this activity will not be reviewed later.

D) Qualifications:

The MH qualification is a decision of the lecturers responsible for the subject. The regulations of the UAB indicate that MH can only be awarded to students who have obtained a final grade of 9.00 or more. It can be granted up to 5% of MH of the total students enrolled.

A student will be considered non-evaluable (NA) if it has not been presented in a set of activities whose weight equals to a minimum of two thirds of the total grade of the subject.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Homework	16% of final mark	0	0	3, 8, 6, 4, 5, 7, 9
Three partial exams	84% of final mark	9	0.36	1, 2, 5, 7

Bibliography

- Francesc Recasens."Processos de separació en biotecnologia industrial". Iniciativa Digital Politècnica, Barcelona, 2015

- Belter, P.A., Cussler, E.L., Wei-Shou Hu. "Bioseparations: Downstream Processigng for Biotechnology". John Wiley and Sons, New York, 1988.

- Verrall, M.S., Hudson, M.J. Eds. "Separations for Biotechnology". Ellis Horwood Limited, UK, 1987.

- Gòdia, F., López, J. Eds. "Ingeniería Bioquímica", 1998, Editorial Síntesis, Madrid.

- Blanch, H.W., Clark, D.S. "Biochemical Engineering", 1996, Marcel Dekker, New York.

- Bailey, J.E., Ollis, D.F. "Biochemical Engineering Fundamentals", 2ª Ed., 1986, McGraw Hill Book Company, New York.

E-Books (UAB):

Biochemical Engineering - A Textbook for EngineersChemists and Biologists

By: Shigeo Katoh; Fumitake Yoshida.

WILEY-VCH Verlag GmbH & Co. KGaA John Wiley & Sons Incorporated.

ISBN: 978-3-527-32536-8, 978-1-282-45667-9, 978-3-527-62764-6, 978-3-527-62765-3.

http://web.b.ebscohost.com/pfi/detail/detail?vid=5&sid=52c4511f-c253-40f5-9394-357379fdd89e%40pdc-v-sessn

Procesos de separación de biotecnología industrial

By: Recasens, Francesc.

Universitat Politècnica de Catalunya.

ISBN: 978-84-9880-696-0.

http://web.a.ebscohost.com/pfi/results?vid=3&sid=2ec26e13-9d3f-498e-93a6-767b1a34d436%40sessionmgr400

Bioseparations Science and Engineering; Roger G. Harrison ... Et Al.

By: Roger G. Harrison; Demetri P. Petrides; Scott R. Rudge; Paul W. Todd.

Oxford University Press.

ISBN: 978-0-19-539181-7, 978-0-19-021373-2, 978-0-19-021374-9, 978-0-19-756276-5, 978-1-68015-865-6.

http://web.b.ebscohost.com/pfi/results?vid=1&sid=46411d38-83d3-44b0-9f40-f97fcfbb5184%40sessionmgr102&l

Software

No software