Universitat de Lleida

DEGREE CURRICULUM

BIOREACTORS

Coordination: GARVIN ARNES, ALFONSO

Academic year 2019-20

BIOREACTORS 2019-20

Subject's general information

<table>
<tr><td>Subject name</td><td>BIOREACTORS</td></tr>
<tr><td>Code</td><td>101620</td></tr>
<tr><td>Semester</td><td>1st Q(SEMESTER) CONTINUED EVALUATION</td></tr>
<tr><td>Typology</td><td>
<table>
<tr><th>Degree</th><th>Course</th><th>Character</th><th>Modality</th></tr>
<tr><td>Bachelor's Degree in Biotechnology</td><td>3</td><td>COMPULSORY</td><td>Attendance-based</td></tr>
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<tr><td>Course number of credits (ECTS)</td><td>6</td></tr>
<tr><td>Type of activity, credits, and groups</td><td>
<table>
<tr><th>Activity type</th><th>PRAULA</th><th>TEORIA</th></tr>
<tr><td>Number of credits</td><td>2.1</td><td>3.9</td></tr>
<tr><td>Number of groups</td><td>2</td><td>1</td></tr>
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<tr><td>Coordination</td><td>GARVIN ARNES, ALFONSO</td></tr>
<tr><td>Department</td><td>FOOD TECHNOLOGY</td></tr>
<tr><td>Teaching load distribution between lectures and independent student work</td><td>Contact hours: 60
Non-contact hours: 90</td></tr>
<tr><td>Important information on data processing</td><td>Consult this link for more information.</td></tr>
<tr><td>Language</td><td>Catalan: 80
Castilian: 20</td></tr>
<tr><td>Office and hour of attention</td><td>Office: 2.2.15 Office hours: Request
Phone: 973702907</td></tr>
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BIOREACTORS 2019-20

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
GARVIN ARNES, ALFONSO	alfonso.garvin@udl.cat	8,1	

Subject's extra information

Subject/matter in the overall curriculum

A great number of biotechnological processes have one or more steps of chemical reactions. Studying the chemical reactions allow to deepen in the bio-reactors design. From a technological point of view, enzymatic and microbial reactions are specially important. It is important to know the reaction rate concept and to use chemical kinetics to study not only the ideal bio-reactos but also the real reactors with a non-ideal flow.

Requirements for the subject

Pre-requirements: NO

Co-requirements: NO

Learning objectives

The student, after passing the subject, should be able to:

- Know all the ideal bio-reactors.
- Know the reaction rate concept and the different types of kinetic equations.
- Know how to get and solve the mathematical model of ideal bio-reactors, using the approach of mass and energy balances for any kinetic equation.
- Know how to use any kinetic equation in multiphase reactors.
- Know enzymatic and microbial reactions and how to obtain and solve the mathematical model in a bio-reactor.
- Know how to use immobilized bio-catalyst.
- Know the most important non-conventional bio-reactors.
- Know how to obtain the flow model in a real reactor and its difference from ideal reactors (stirred tank and plug flow).
- Know how to use the flow model for a real reactor to obtain the conversion, average time and useful volume. Know how to justify the deviation from the ideality.

Competences

This subject is not taught in English. Please, check the available information in Catalan or Spanish. In case you need information in English, please contact the teaching staff of the subject.

Subject contents

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Methodology

This subject is not taught in English. Please, check the available information in Catalan or Spanish. In case you need information in English, please contact the teaching staff of the subject.

Development plan

This subject is not taught in English. Please, check the available information in Catalan or Spanish. In case you need information in English, please contact the teaching staff of the subject.

Evaluation

This subject is not taught in English. Please, check the available information in Catalan or Spanish. In case you need information in English, please contact the teaching staff of the subject.

Bibliography

Basic bibliography

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Further Bibliography

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Lee JM. 1991. *Biochemical Engineering*. Ed. Prentice Hall

Van't Riet, Tramper J. 1991. *Basic Bioreactor design*. Ed. Marcel Dekker, New York