COURSE DESCRIPTION

COURSE DETAILS

Title (of the course): **REACTORES BIOLÓGICOS**
Code: 102257
Degree/Master: **GRADO DE CIENCIA Y TECNOLOGÍA DE LOS ALIMENTOS** Year: 4
Name of the module to which it belongs: OPTATIVIDAD / RECONOCIMIENTO
Field: OPTATIVIDAD
Character: OPTATIVA
ECTS Credits: 3.0
Face-to-face classroom percentage: 40.0%
Online platform: Moodle

Duration:
Classroom hours: 30
Study hours: 45

LECTURER INFORMATION

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PREREQUISITES AND RECOMMENDATIONS

Prerequisites established in the study plan

English B1 level certificate

Recommendations

A previous course on Industrial Fermentations is advisable

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INTENDED LEARNING OUTCOMES

CB2	To know how to apply knowledge to their work or vacation in a professional way. To have the skills that are usually demonstrated through the elaboration and defence of arguments and the resolution of problems within their area of study.
CB5	To develop the the skills necessary to undertake further studies with a high degree of autonomy.
CU2	To know and improve the user's level in the field of ICT.
CT2	Ability to resolve problems.
CT4	Ability to apply theoretical knowledge to your practice.
CT7	Ability to analyse and summarise.
CE1	To recognise and apply the basics of physics, chemistry, biology, physiology, mathematics, and statistics necessary for the comprehension and development of Science and Technology.
CE4	To recognise and apply the main basic operations of industrial processes to ensure the control of processes and food products intended for human consumption.
CE6	To know, understand and apply the classic methodology and the new technological processes aimed at improving the production and treatment of food.
CE16	To put into practice the principles and methodologies that define the professional profile of the food scientist and technologist, demonstrating in an integrated way the acquisition of the skills and competencies that are looked at throughout the degree.

OBJECTIVES

Many food industries, in the context of their production processes, include microbial biotransformation operations. These operations are carried out using bioreactors; the type and mode of operation of this equipment have an important effect on the results obtained. Therefore, in a food science and technology degree, an introduction to the study of this type of equipment is considered necessary:
- To highlight the importance of this equipment.
- To know the main types of bioreactors.
- To make an introduction to the basic aspects necessary for their analysis and design.

CONTENT

1. Theory contents

Topic 1.- Bioreactors in Food Industries.
Topic 2.- Type of bioreactors.
Topic 3.- Design and modelling of bioreactors.
Topic 4.- Kinetics.
Topic 5.- Example of batch process
Topic 6.- Example of semi-batch process.

2. Practical contents

Numerical problems
Laboratory bioreactors
Visiting industrial plants

COURSE DESCRIPTION

SUSTAINABLE DEVELOPMENT GOALS RELATED TO THE CONTENT

Unrelated

METHODOLOGY

Methodological adaptations for part-time students and students with disabilities and special educational needs

The specific rules laid down by the Faculty will be followed. Additionally, special circumstances must be weighted up in each case.

Face-to-face activities

Activity	Large group	Medium group	Total
Examinations	3	-	3
Excursions	3	-	3
Lab practice	-	4	4
Lectures	12	-	12
Seminar	-	8	8
Total hours:	***18***	***12***	***30***

Off-site activities

Activity	Total
Exercises	20
Information search	5
Self-study	20
Total hours	***45***

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WORK MATERIALS FOR STUDENTS

Dossier
Exercises and activities
Lessons summary
References

EVALUATION

Intended learning	Debate	Exams	Laboratory Practice	Resource Bank
CB2	X	X		
CB5		X		X
CE1	X	X		X
CE16		X	X	X
CE4		X	X	X
CE6		X	X	
CT2		X	X	X
CT4	X	X	X	X
CT7	X	X		X
CU2				X
Total (100%)	***10%***	***70%***	***10%***	***10%***
Minimum grade	***0***	***4***	***0***	***0***

(*)Minimum mark (out of 10) needed for the assessment tool to be weighted in the course final mark. In any case, final mark must be 5,0 or higher to pass the course.

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Attendance will be assessed?:

No

General clarifications on instruments for evaluation:

If a face-to-face final examination can be carried out, it will include numerical problems and theoretical questionnaires. On the other side, if an online final examination has to be considered, it will include only questionnaires about theoretical and numerical problems.
Additionally, questionnaires from a "Resources Bank" will be carry out continuously during the course. During the lectures, the students´debate capability will be assessed.
The instruments for evaluation: "Exams" and "Resources Bank" are individual activities; for these instruments, students can freely use any printed information. If plagiarized parts are detected, the student will fail the examination having to resit it next official call.

Clarifications on the methodology for part-time students and students with disabilities and special educational needs:

The specific rules laid down by the Faculty will be followed. Additionally, special circumstances must be weighted up in each case.

Clarifications on the evaluation of the first extraordinary call and extra-ordinary call for completion studies:

The evaluation criteria for special calls will be the same than for the normal ones. The equivalent previous calls´ marks will be used for the items "Resources Bank" and "Debate"; nevertheless, an examination will be carried out in the official date for the criterium "Exams".

Qualifying criteria for obtaining honors:

In accordance with the Article 80 paragraph 3 of the University of Cordoba Academic Regulations

BIBLIOGRAPHY

1. Basic Bibliography

- BASIC BIOTECHNOLOGY. J. Bu'lock & B. Kristiansen. Academic Press Inc. London. 1987
- INGENIERÍA BIOQUÍMICA. F. Gòdia Casablancas y J. López Santín. Editorial Síntesis. 1998
- INGENIERÍA DE BIOPROCESOS. Mario Díaz. Ediciones Paraninfo. 2012.
- BIOPROCESS ENGINEERING PRINCIPLES. P.A. Doran. Academic Press. (London), 1995

2. Further reading

None

COURSE DESCRIPTION

COORDINATION CRITERIA

Visits organization

SCHEDULE

Period	Examinations	Excursions	Lab practice	Lectures	Seminar
1# Fortnight	0,0	0,0	0,0	2,0	0,0
2# Fortnight	0,0	0,0	0,0	2,0	0,0
3# Fortnight	0,0	0,0	0,0	2,0	2,0
4# Fortnight	0,0	0,0	0,0	2,0	3,0
5# Fortnight	0,0	0,0	0,0	2,0	3,0
6# Fortnight	0,0	0,0	4,0	2,0	0,0
7# Fortnight	0,0	3,0	0,0	0,0	0,0
8# Fortnight	3,0	0,0	0,0	0,0	0,0
Total hours:	***3,0***	***3,0***	***4,0***	***12,0***	***8,0***

The methodological strategies and the evaluation system contemplated in this Course Description will be adapted according to the needs presented by students with disabilities and special educational needs in the cases that are required.

CONTINGENCY PLAN: CASE SCENARIO A

Case scenario A will correspond to a diminished on-site academic activity due to social distancing measures affecting the permitted capacity of classrooms.

METHODOLOGY

General clarifications on the methodology on case scenario A

A multimodal (hybrid) teaching system will be adopted, combining both on-site and remote classes via videoconference (synchronous) that will be held in the timetable approved by the corresponding Faculty or School. The time distribution of teaching activities (both on-site and remote) will be decided by the aforementioned Faculties and Schools bearing in mind the permitted capacity of classrooms and social distancing measures as established at that time.

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EVALUATION

Intended learnig	Debate	Exams	Laboratory Practice	Resource Bank
CB2	X	X		
CB5		X		X
CE1	X	X		X
CE16		X	X	X
CE4		X	X	X
CE6		X	X	
CT2		X	X	X
CT4	X	X	X	X
CT7	X	X		X
CU2				X
Total (100%)	***10%***	***70%***	***10%***	***10%***
Minimum grade	***0***	***4***	***0***	***0***

(*)Minimum mark (out of 10) needed for the assessment tool to be weighted in the course final mark. In any case, final mark must be 5,0 or higher to pass the course.

Attendance will be assessed (Scenario A)?:

No

General clarifications on instruments for evaluation (Scenario A):

If a face-to-face final examination can be carried out, it will include numerical problems and theoretical questionnaires. On the other side, if an online final examination has to be considered, it will include only questionnaires about theoretical and numerical problems.

Additionally, questionnaires from a "Resources Bank" will be carry out continuously during the course. During the lectures, the students´debate capability will be assessed.

The instruments for evaluation: "Exams" and "Resources Bank" are individual activities; for these instruments, students can freely use any printed information. If plagiarized parts are detected, the student will fail the examination having to resit it next official call.

Clarifications on the methodology for part-time students and students with disabilities and special educational needs (Scenario A):

The specific rules laid down by the Faculty will be followed. Additionally, special circumstances must be weighted up in each case.

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CONTINGENCY PLAN: CASE SCENARIO B

Case scenario B will bring about a suspension of all on-site academic activities as a consequence of health measures.

METHODOLOGY

General clarifications on the methodology on case scenario B

On-site teaching activities will be held via videoconference (synchronous) in the timetable approved by the corresponding Faculty or School. Alternative activities will be proposed for reduced groups in order to guarantee the acquisition of course competences.

EVALUATION

Intended learnig	Debate	Exams	Resource Bank
CB2	X	X	
CB5		X	X
CE1	X	X	X
CE16		X	X
CE4		X	X
CE6		X	
CT2		X	X
CT4	X	X	X
CT7	X	X	X
CU2			X
Total (100%)	***10%***	***75%***	***15%***
Minimum grade	***0***	***4***	***0***

(*)Minimum mark (out of 10) needed for the assessment tool to be weighted in the course final mark. In any case, final mark must be 5,0 or higher to pass the course.

Moodle Tools	Debate	Exams	Resource Bank
Questionnaire		X	X
Videoconference	X		

COURSE DESCRIPTION

Attendance will be assessed (Scenario B)?:

No

General clarifications on instruments for evaluation (Scenario B):

If a face-to-face final examination can be carried out, it will include numerical problems and theoretical questionnaires. On the other side, if an online final examination has to be considered, it will include only questionnaires about theoretical and numerical problems.
Additionally, questionnaires from a "Resources Bank" will be carry out continuously during the course. During the lectures, the students´debate capability will be assessed.
The instruments for evaluation: "Exams" and "Resources Bank" are individual activities; for these instruments, students can freely use any printed information. If plagiarized parts are detected, the student will fail the examination having to resit it next official call.

Clarifications on the methodology for part-time students and students with disabilities and special educational needs (Scenario B):

The specific rules laid down by the Faculty will be followed. Additionally, special circumstances must be weighted up in each case.