Information about the subject

Degree: Bachelor of Science Degree in Biotechnology

Faculty: Faculty of Veterinary Medicine and Experimental Sciences

Code: 1100405 **Name:** Biotechnological Processes and Products

Credits: 6,00 **ECTS Year:** 4 **Semester:** 1

Module: Bioengineering and Biotechnological Processes

Subject Matter: Biotechnological Processes and Products **Type:** Compulsory

Department: Biotechnology

Type of learning: Classroom-based learning

Languages in which it is taught: Spanish

Lecturer/-s:

1104	Francisco Javier Soriano Pons **(Responsible Lecturer)**	fj.soriano@ucv.es
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CAUR	Francisco Javier Soriano Pons **(Responsible Lecturer)**	fj.soriano@ucv.es

Module organization

Bioengineering and Biotechnological Processes

Subject Matter	ECTS	Subject	ECTS	Year/semester
Genetic Engineering	6,00	Genetic and Molecular Engineering	6,00	3/2
Bioreactors	6,00	Bioreactors	6,00	3/2
Biochemical Engineering	6,00	Biochemical Engineering	6,00	3/1
Plant and Animal Biotechnology	6,00	Plant and Animal Biotechnology	6,00	3/2
Cell Culture	6,00	Cell Culture	6,00	3/2
Biotechnological Processes and Products	6,00	Biotechnological Processes and Products	6,00	4/1

Recommended knowledge

Microbiology knowledge

Learning outcomes

At the end of the course, the student must be able to prove that he/she has acquired the following learning outcomes:

R1 The student has understood and assimilated the contents of the subject.

R2 The student is able to solve problems or case studies related to the subject contents, by using different resources (bibliographic, IT, etc.)

R3 The student is able to write an intelligible and organized text on different aspects of the subject.

R4 The student is able to present and defend his/her work adequately.

R5 The student seeks bibliographic information from different sources and can analyze it with a critical and constructive spirit.

R6 The student collaborates with the teacher and his/her peers throughout the learning process; he/she works in a team; treats everyone with respects, is proactive and fulfills the organization rules of the course.

Competencies

Depending on the learning outcomes, the competencies to which the subject contributes are (please score from 1 to 4, being 4 the highest score):

BASIC		Weighting			
		1	2	3	4
CB1	Students acquire and understand knowledge in their field of study based on general secondary education but usually reaching a level that, although supported on advanced text books, also includes aspects involving state-of-the-art knowledge specific to their area.				x
CB2	Students are able to apply knowledge to their work in a professional way and have the competences enabling them to state and defend views and opinions as well as perform problem-solving tasks in their field of study.				x
CB3	Students are able to collect and interpret relevant data (generally in their field of study) and give opinions that involve reflection on relevant social, scientific or ethical issues.			x	
CB4	Students can communicate information, ideas, problems and solutions to a specialized or non-specialized audience.			x	
CB5	Students develop the necessary learning skills to undertake further studies with a high level of autonomy.				x

GENERAL		Weighting			
		1	2	3	4
CG01	Capacity to analyze and synthesize.			x	

SPECIFIC		Weighting			
		1	2	3	4
CE22	Knowing and understanding contents, principles and theories related to biotechnology.				x

CE23	Knowing how to use laboratory equipment and to carry out basic operations for each discipline including: safety measures, handling, waste disposal and activity register.	x			
CE24	Knowing basic and instrument laboratory techniques in the different areas of biotechnology.	x			
CE25	Knowing how to analyze and understand scientific data related to biotechnology.			x	
CE27	Knowing and applying action plans and assessment criteria of biotechnology processes.	x			
CE28	Integrating life science and Engineering into processes of development of biotechnological products and applications.				x
CE29	Contrasting and checking results of biotechnological experimentation.	x			
CE30	Solving and analyzing problems posed by biotechnology.				x
CE31	Describing and calculating important variables of processes and experiments.			x	
CE32	Knowing how to use different specific operating systems and software packages designed for Biotechnology.	x			
CE33	Knowing and complying with legislation and ethics of biotechnological processes and applications.			x	
CE34	Knowing main characteristics of Molecular biosciences and biotechnology communication.		x		

TRANSVERSAL		Weighting			
		1	2	3	4
CT02	Capacity to organize and plan.				x
CT03	Mastering Spanish oral and written communication.				x
CT05	Knowing and applying Basic ITC skills related to Biotechnology.			x	
CT06	Capacity to manage information (capacity to look for and analyze information coming from different types of sources).				x
CT07	Problem solving.				x

CT09	Capacity to work in interdisciplinary and multidisciplinary team.		x	
CT10	Interpersonal skills.		x	
CT12	Critical and self-critical capacity.			x
CT13	Ethics.			x
CT14	Capacity to learn			x
CT16	Capacity to produce new ideas (creativity)			x
CT17	Leadership abilities		x	
CT18	Taking initiatives and enterprising spirit			x
CT19	Capacity to apply theoretical knowledge			x
CT20	Research skills		x	
CT21	Sensitivity to environmental issues			x

Assessment system for the acquisition of competencies and grading system

Assessed learning outcomes	Granted percentage	Assessment method
R1, R2, R3, R5	70,00%	Written test
R1, R2, R3, R4, R5, R6	30,00%	Submission of papers

Observations

This course is not eligible for single evaluation. According to the general evaluation and qualification regulations, the preferred evaluation system will be continuous evaluation.
The written test will follow a system of continuous assessment through solving questionnaires, in the classroom, on the content of each of the topics taught during the course.
Written test. To pass the subject, it is necessary to obtain a minimum score of 5/10.
Work delivery. To pass the subject it will be necessary to obtain a 5/10 in the qualification of the assigned periodic works.If a student, for some justified reason, could not be evaluated by one of these systems, he may consult with the teacher and agree on some other alternative for the evaluation and qualification of the knowledge acquired.

*The use of artificial intelligence (AI)-based tools is subject to the discretion of the teacher, who may establish specific limits or conditions depending on the training or assessment activity.

MENTION OF DISTINCTION:
In accordance with the regulations governing the assessment and grading of subjects in force at UCV, the distinction of "Matrícula de Honor" (Honours with Distinction) may be awarded to students who have achieved a grade of 9.0 or higher. The number of "Matrículas de Honor" (Honours with Distinction) may not exceed five percent of the students enrolled in the group for the corresponding academic year, unless the number of enrolled students is fewer than 20, in which case a single "Matrícula de Honor" (Honours with 9 Distinction) may be awarded. Exceptionally, these distinctions may be assigned globally across different groups of the same subject. Nevertheless, the total number of distinctions awarded will be the same as if they were assigned by group, but they may be distributed among all students based on a common criterion, regardless of the group to which they belong. The criteria for awarding "Matrícula de Honor" (Honours with Distinction) will be determined according to the guidelines stipulated by the professor responsible for the course, as detailed in the "Observations" section of the evaluation system in the course guide.

Learning activities

The following methodologies will be used so that the students can achieve the learning outcomes of the subject:

M1 Teacher presentation of contents, analysis of competences, explanation and in-class display of skills, abilities and knowledge.

M2 Group work sessions supervised by the professor. Case studies, diagnostic tests, problems, field work, computer room, visits, data search, libraries, on-line, Internet, etc. Meaningful construction of knowledge through interaction and student activity.

M3 Activities carried out in spaces with specialized equipment.

M4 Supervised monographic sessions with shared participation..

M5 Application of multidisciplinary knowledge.

M6 Personalized and small group attention. Period of instruction and/or guidance carried out by a tutor to review and discuss materials and topics presented in classes, seminars, readings, papers, etc.

M7 Set of oral and/or written tests used in initial, formative or additive assessment of the student

M8 Group preparation of readings, essays, problem-solving, seminars, papers, reports, etc. to be presented or submitted in theoretical , practical and/or small-group tutoring sessions. Work done on the university e-learning.

M9 Student's study: Individual preparation of readings, essays, problem-solving, seminars, papers, reports, etc. to be presented or submitted in theoretical, practical and/or small-group tutoring sessions. Work done on the university e-learning platform.

IN-CLASS LEARNING ACTIVITIES

	LEARNING OUTCOMES	HOURS	ECTS
ON-CAMPUS CLASS M1	R1, R2, R3, R5, R6	40,00	1,60
PRACTICAL CLASSES M2	R1, R2, R3, R4, R5, R6	6,00	0,24
SEMINAR M4	R1, R2, R5, R6	5,00	0,20
GROUP PRESENTATION OF ASSIGNMENTS M5	R1, R2, R3, R4, R5, R6	4,00	0,16
TUTORIAL M6	R1, R2, R3, R4, R5, R6	3,00	0,12
ASSESSMENT M7	R1, R2, R3, R4, R5, R6	2,00	0,08
TOTAL		**60,00**	**2,40**

LEARNING ACTIVITIES OF AUTONOMOUS WORK

	LEARNING OUTCOMES	HOURS	ECTS
AUTONOMOUS GROUP WORK M8	R1, R2, R3, R4, R5, R6	18,00	0,72
AUTONOMOUS INDIVIDUAL WORK M9	R1, R2, R3, R4, R5, R6	72,00	2,88
TOTAL		**90,00**	**3,60**

Description of the contents

Description of the necessary contents to acquire the learning outcomes.

Theoretical contents:

Content block	Contents
DIDACTIC UNIT 1. INDUSTRIAL OBTAINING PROCESSES OF BIOTECHNOLOGICAL PRODUCTS	Unit 1. Microorganisms of industrial use. Bacteria, yeasts and filamentous fungi Unit 2. Microbial growth. Culture media. Optimization of growth conditions. Types of production processes Unit 3. Industrial fermenters. Types, design and control systems. Scaling. Obtaining products on an industrial scale Unit 4. Production processes through immobilized biocatalysts Unit 5. Extraction of the final product. Isolation and purification methods Problem solving in class
DIDACTIC UNIT 2- BIOTECHNOLOGICAL SECTORS	Unit 1. Biomass production. Organic products, biopolymers, enzymes and other macromolecules. Unit 2. Therapeutic products and antibiotics Unit 3. Food biotechnology. Obtaining food and drinks. Unit 4. Biotechnology and agricultural industry. Production improvements. Biopesticides. Biofertilizers. Auxiliary fauna. Unit 5. Biotechnology and environment. Soil characteristics. Causes of soil and water pollution. Sources and types of contaminants. Unit 6. Bioremediation. Microorganisms for the recovery of contaminated soils. Unit 7. Phytoremediation. Plants for the recovery of contaminated soils. Unit 8. Design of green filters (wetlands) for the recovery of contaminated waters. Unit 9. Wastewater treatment plants Unit 10. Biofuels. Lignocellulosic biomass, liquid biofuels and biogas. Unit 11. Biosensors. Types and operation. Applications Unit 12. Introduction to biomaterials.

Organization of the practical activities:

	Content	Place	Hours
PR1.	Problem resolution	Lecture room	6,00

Temporary organization of learning:

Block of content	Number of sessions	Hours
DIDACTIC UNIT 1. INDUSTRIAL OBTAINING PROCESSES OF BIOTECHNOLOGICAL PRODUCTS	9,00	18,00
DIDACTIC UNIT 2- BIOTECHNOLOGICAL SECTORS	21,00	42,00

References

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COMPEMENTARY BIBLIOGRAPHY
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