

Degree programme	Type	Course
Microbiology	OB	3

Contact lecturer

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Prerequisites

The student must have completed with success the subject Microbiology of the Microbiology degree, or some subject of equivalent content.

Group languages

You can consult this information at the [end](#) of the document.

Objectives

The aim of the Industrial Microbiology course is to provide students with a solid foundation in the main aspects of microbiology relevant to industrial applications, particularly those in which microorganisms play an active role in production processes. The first part of the course covers general topics, including the use of starter cultures in different industrial processes, as well as sterilization procedures and the control measures required to ensure their successful implementation. The second part examines the role of microorganisms in a range of specific industrial processes, with particular emphasis on the composition of the microbial communities involved and the metabolic activities that are most relevant to these processes.

Learning outcomes

- CM15 (Evaluate the role of microorganisms in processes of economic interest as producers of key compounds in the development of our societies and in the improvement of the quality of life.) Evaluate the role of microorganisms in processes of economic interest as producers of key compounds in the development of our societies and in the improvement of the quality of life.
- CM16 (Propose microbial processes to assess the environmental impact of human activity, as indicators of ecosystem alteration, as well as to recover contaminated environments.) Propose microbial processes to assess the environmental impact of human activity, as indicators of ecosystem alteration, as well as to recover contaminated environments.
- KM23 (Identify the operations and production processes involving microorganisms or their components.) Identify the operations and production processes involving microorganisms or their components.
- SM22 (Manage specific bibliography and internet tools to develop an academic work within the field of environmental or industrial microbiology both in English and in one's own language or others.) Manage specific bibliography and internet tools to develop an academic work within the field of environmental or industrial microbiology both in English and in one's own language or others.
- SM23 (Select the appropriate methodologies to characterise populations and communities of microorganisms from environmental and industrial samples and their abiotic environment.) Select the appropriate methodologies to characterise populations and communities of microorganisms from environmental and industrial samples and their abiotic environment.
- SM24 (Analyse industrial operations and processes involving microorganisms or their components in

order to contribute to their improvement and guarantee their success.) Analyse industrial operations and processes involving microorganisms or their components in order to contribute to their improvement and guarantee their success.

Contents

1. Introduction to Industrial Microbiology
2. Groups of microorganisms of industrial interest.
3. Problems caused by microorganisms
4. Microbial control strategies
5. Assessment of environmental microbial contamination
6. Cleaning and disinfection of industrial facilities
7. Reduction of microbial load in raw materials and products
8. Limitation of microbial growth
9. Production of cell biomass
10. Lactic fermentations on vegetables
11. Fermentation in meat
12. Production of alcoholic beverages
13. Microbiological aspects in the manufacture of dairy products
14. Production of energy using microorganisms

15. Fuel desulfurization

16. Biodegradable plastics of microbial origin

17. Microbial biosensors

Learning activities and methodology

Title	Hours	ECTS	Learning outcomes
Study	32	1.28	CM15, CM16, KM23, SM22, SM23, SM24
Text readings	20	0.8	CM15, CM16, KM23, SM22, SM23, SM24
Literature search	20	0.8	CM15, CM16, KM23, SM22, SM23, SM24
Theory lectures	30	1.2	CM15, CM16, KM23, SM22, SM23, SM24
Problem solving	30	1.2	CM15, CM16, KM23, SM22, SM23, SM24
Problem-solving sessions	15	0.6	CM15, CM16, KM23, SM22, SM23, SM24

Teaching is organized through a combination of lectures and problem-solving sessions.

Lectures. The lectures are designed to enable students to progressively acquire the knowledge required to develop a structured understanding of the role of microorganisms in industrial processes. Course contents are delivered in the classroom using teaching materials made available through the Moodle virtual learning environment.

Problem-solving sessions. These sessions are devoted to the interactive application, together with the instructor, of the concepts and tools covered in the course, in smaller groups than the lecture sessions. They include both numerical problem-solving exercises and the analysis and discussion of practical case studies. Both types of activities require students to carry out independent work outside the classroom.

In this course, the use of Artificial Intelligence (AI) technologies is permitted as part of the learning process, provided that the final work reflects a substantial contribution by the student in terms of analysis and critical reflection. Students must clearly identify any content generated using AI, specify the tools employed, and include a critical reflection on how these technologies influenced both the development process and the final outcome of the activity. Failure to disclose the use of AI will be considered a breach of academic integrity and may result in a reduction of the activity grade or more severe disciplinary measures, depending on the seriousness of the case.

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

Continuous assessment activities

Title	Weight	Hours	ECTS	Learning outcomes
Exam 2. Theory (65%) + Problem-solving (35%)	45%	1.5	0.06	CM15, CM16, KM23, SM22, SM23, SM24
Exam 1. Theory (65%) + Problem-solving (35%)	45%	1.5	0.06	CM15, CM16, KM23, SM22, SM23, SM24
Participation in class activities	10%	0	0	CM15, CM16, KM23, SM22, SM23, SM24

Assessment will be carried out through two exams each contributing 45% of the final grade. Each of the exams will cover theory (with a weight of 65%) and problem-solving (with a weight of 35%) contents. The remaining 10% of the grade will complement the exam scores only if both exams have been successfully passed and will be based on the level of participation in the problem-solving sessions, requiring the completion of the assigned tasks within the established deadlines. To pass the subject the student must obtain 5 over 10 or higher in each exam. If the event of failing to pass any of the exams, a reassessment exam is scheduled at the end of the semester. To participate in the reassessment exam, students must have been previously assessed in a set of activities the weight of which equals a minimum of two thirds of the total grade of the subject or module. Students will obtain the \"Not Evaluable\" qualification when the evaluation activities carried out have a weight lower than 67% of the final grade. Students that, having passed the exams, want to improve their grades may also take the reassessment exam. In the event of taking the reassessment exam, students implicitly renounce to their previously obtained grades.

Any irregularity committed during an assessment activity (including academic fraud, plagiarism, or the unauthorized use of AI, unless such use is explicitly permitted in the course guide) that may lead to a significant alteration of the assessment outcome will result in a grade of 0 for that assessment activity. If the course guide establishes that obtaining a minimum grade in that assessment activity is a compulsory requirement for passing the course, or if multiple irregularities are detected in different assessment activities within the same course, the final course grade will be 0. Furthermore, disciplinary actions may be initiated against any student found to have committed such irregularities.

SINGLE ASSESSMENT

Single common exam that includes both, theory and questions corresponding to the problem-solving sessions. The single assessment consists of a single exam that includes the contents of the entire theory program with a weight of 60% and problem-solving with a weight of 40%. The grade obtained in this exam constitutes 90% of the final grade of the subject. The remaining 10% corresponds to the evidence of problem-solving sessions. The delivery of evidence corresponding to the problem-solving sessions will follow the same procedure used for the continuous assessment. The single assessment exam will be performed in the same date fixed in the calendar for the last continuous assessment exam and the same recovery system will be applied as for continuous assessment. The same criterion for \"not assessable\" will be applied as in continuous assessment.

Bibliography

Software

There is no specific software associated with this subject.

Course groups and languages

The information provided is provisional until November 30. After this

date, you will be able to consult the language of each group through this [link](#). To access the information, you will need to enter the course CODE

Type of teaching	Group	Language	Semester	Shift
(TE) Theory	73	Catalan	second semester	morning-mixed
(PAUL) Classroom practices	731	Catalan	second semester	morning-mixed
(PAUL) Classroom practices	732	Catalan	second semester	morning-mixed