

Course Unit	Industrial Microbiology			Field of study	Engeneiring and related techniques	
Master in	Biotechnological Engineering			School	School of Agriculture	
Academic Year	2023/2024	Year of study	1	Level	2-1	ECTS credits 5.0
Туре	Semestral	Semester	2	Code	5010-784-1203-00-23	
Workload (hours)	135	Contact hours	T - TP T - Lectures; TP - Lectures a	- PL - T	C - S - solving, project or laboratory; TC	Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s) Paula Cristina Azevedo Rodrigues

Learning outcomes and competences

- At the end of the course unit the learner is expected to be able to: 1. Identify the main features that confer the microorganism the potential industrial interest. 2. Ackowledge the methodologies os prospection, screening and identification of microorganisms with industrial potencial. 3. Assess different substrates with potential to be used in bioprocesses. 4. Identify the key parts of an industrial bioprocesses.

### Prerequisites

Before the course unit the learner is expected to be able to: Not applicable

#### Course contents

Industrial microorganisms: screening, identification and preservation. Industrial substrates. Microbial improvement and genetically modified organisms. Bioprocesses.

# Course contents (extended version)

- Introduction to Industrial Microbiology

   Industrial Microbiology and its relation with Biotechnology
   Objectives and applications
   Classic versus modern Industrial Microbiology

  - Overview of methods and processes
- Industrial microorganims
   Pre-requisites for industrial microorganims
   Prospection, isolation and selection of organisms with industrial potential
   GRAS status
- Identification and characterisation of microbes
   The importance of microbial identification and characterisation
   Methods of identification and characterisation
- 4. Preservation of industrial microbes

   Preservation methods
   Assessment of purity, viability and genetic stability
  - Culture collections
- Strain improvement
- 6. Fermentation substrates
- Media formulation
- Industrial waste as fermentation media
- 7. Major industrial processes and products
   8. Probiotics: application in food matrices

   Screening, isolation and selection of new isolates
  - Characterization of the isolates in terms of industrial application

#### Recommended reading

- Baltz, R. H., Demain, A. L., Davies, J. E. (2010). Manual of Industrial Microbiology and Biotechnology, 3rd edition, ASM Press, Washington
   Waites, M., Morgan, N., Rockey, J. (2002). Industrial Microbiology, Blackwell Science
   Wilson, D. B; Sahm, H.; Stahmann, K. -P.; Koffas, M. (Editors) (2020). Industrial Microbiology, Wiley-VCH, ISBN: 978-3-527-34035-4, 424 Pages
   Journals of specialty, e. g., Journal of Industrial Microbiology & Biotechnology; World Journal of Microbiology & Biotechnology

# Teaching and learning methods

Lectures using audio-visual media and teacher-student interaction (presentation and discussion of case-studies). Preparation of a project and aboratorial work.

Assessment methods

- 1. Regular students (Regular) (Final, Special)

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   Projects 60% (Elaboration of a laboratory project on industrial microbiology (mark > 9. 5))
   Final Written Exam 40% (Final written exam on the theoretical contents (mark > 9. 5))

   Working students (Student Worker) (Final, Supplementary, Special)

   Final Written Exam 40% (Written exam on the theoretical contentes (mark > 9. 5))

   Working students (Student Worker) (Final, Supplementary, Special)

   Projects 60% (Project on industrial microbiology (mark > 9. 5))

   Recourse (Regular, Student Worker) (Supplementary, Special)

   Projects 60% (Revised version of project)
   Final Written Exam 40% (Written exam on the theoretical contents)

## Language of instruction

### English

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Electronic validation			
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18-01-2024	18-01-2024	23-01-2024	23-01-2024