

Course Unit	Food Microbiology Laboratories		Field of study	Biology and Biochemistry	
Bachelor in	Food Engineering		School	School of Agriculture	
Academic Year	2020/2021	Year of study	1	Level	1-1
Type	Semestral	Semester	2	ECTS credits	6.0
Code	9087-641-1203-00-20				
Workload (hours)	162	Contact hours	T -	TP -	PL -
			TC -	S -	E -
			OT -	O -	

T - Lectures; TP - Lectures and problem-solving; PL - Problem-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. Know the microbial morphology and structure
2. Know the main factors influencing the microbial growth and its control
3. Know the potential effects of pathogenic microorganisms in human health
4. Know basic and applied microbiology techniques: how to isolate, grow, measure, observe and identify microorganisms in the laboratory
5. Interpret the main microbiological criteria for the microbiological quality of food
6. Recognize the importance of microorganisms in food production

#### Prerequisites

Before the course unit the learner is expected to be able to:  
General knowledge in biology.

#### Course contents

1. Introduction to the study of microbiology. 2. Microbial Nutrition and metabolism. 3. Microbial growth. 4. Growth control. 5. Growth of microorganisms in foods. 6. Pathogenic microorganisms. 7. The microbiological quality foods. 8. Detection and quantification of microorganisms in foods. 10. Methods of microbial identification. 11. Microorganisms and food production.

#### Course contents (extended version)

1. Introduction to the study of microbiology.
2. Microbial Nutrition and metabolism.
  - Differentiation of microorganisms according to their nutritional requirements.
  - Energy metabolisms in microorganisms
3. Microbial growth.
  - How to measure microbial growth.
  - The influence of environmental factors on growth.
4. Microbial growth control.
  - Physical and chemical agents in the control of growth.
5. Growth of microorganisms in foods.
  - Food spoilage.
  - Control of factors that influence food spoilage.
6. Foodborne diseases.
  - Pathogenic microorganisms.
  - Infections and intoxications.
7. The microbiological quality of foods for human consumption.
  - Indicator microorganisms and the safety and quality of food.
  - Microbiological criteria.
  - The main foodborne pathogens.
8. Detection and quantitation of microorganisms in food.
9. Methods of microbial identification.
10. Microorganisms and food production.

#### Recommended reading

1. Doyle, M. P. , and Buchanan, R. L. Food Microbiology: Fundamentals and Frontiers, 4th edition, ASM, 2012
2. Jay, J. M. , Loessner, M. J. , Golden, D. A. . Modern Food Microbiology, 7<sup>th</sup> ed. , Springer, EUA, 2005
3. Lacasse, D. Introdução à microbiologia alimentar. Instituto Piaget. Lisboa, 1998
4. Prescott, L. M. , Harley, J. P. and Klein, D. A. Microbiology. 5th ed. McGrawHill. Dubuque, USA, 2002.
5. Prescott, L. M. , Harley, J. P. Laboratory Exercises in Microbiology. 5th ed. McGrawHill. Dubuque, USA, 2002

#### Teaching and learning methods

Theory will be exposed and case studies will be discussed in 1 lesson (one hour) per week. Laboratory work will be developed in one lesson (three hours) per week, and will be based on the analysis and application of normative references and legislation.

#### Assessment methods

1. Continuous assessment - (Regular) (Final)
  - Laboratory Work - 5% (Student's attendance and laboratorial skills.)
  - Intermediate Written Test - 35% (Regular written tests on practical contents.)
  - Intermediate Written Test - 30% (Written test on TP contents.)
2. Final assessment - (Regular, Student Worker) (Final)
  - Final Written Exam - 30% (Final written exam on TP contents.)
3. Recourse assessment - (Regular, Student Worker) (Supplementary, Special)
  - Final Written Exam - 60% (Written exam on TP contents.)
  - Final Written Exam - 40% (Written exam on practical contents.)

**Language of instruction**

1. Portuguese
2. Portuguese, with additional English support for foreign students.

**Electronic validation**

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30-10-2020	07-11-2020	07-11-2020	09-11-2020