Instituto Politécnico de Bragança

Course Unit	Microbiology, Toxicology and Food Safety			Field of study	Food Industries
Bachelor in	Dietetics and Nutrition			School	School of Health
Academic Year	2024/2025	Year of study	1	Level	1-1
ECTS credits	5.0				
Type	Semestral	Semester	2	Code	8149-807-1203-00-24

Workload (hours)	135	Contact hours	T	-	TP	30	PL	30	TC	-	S	-	E	-	OT	7,5	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): Ermelinda Lopes Pereira, Maria Jose Rodrigues Frade Falcao

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
1. Know the morphology and structure of microorganisms.
2. Know the conditioning factors of microbial growth in food and its control
3. Identify and characterize the main etiologic agents of foodborne diseases
4. Ensure and control the microbiological quality of food.
5. Know the methods used in food analysis; Know how to interpret the analytical results
6. Understand fundamental toxicity concepts and toxicity evaluation.
7. Understand toxicity parameters and toxicological studies.
8. Know the methodological approaches for risk assessment in food toxicology.

Prerequisites

Before the course unit the learner is expected to be able to:
None

Course contents

Introduction to the study of microbiology. Morphology and structure of microorganisms. Nutrition and microbial growth. Microbial spoilage of food. Foodborne illnesses. Indicator microorganisms and microbiological criteria. Methods for detecting and identifying microorganisms. Mechanisms of toxicity, toxic effects and dose-response relationships. Metabolism and biotransformation. Toxicological parameters and toxicological studies. Toxicity testing methods. Toxicity classification. Risk Assessment

Course contents (extended version)

1. Introduction to the study of microbiology.
2. Morphology and structure of microorganisms
3. Nutrition and microbial growth. Factors influencing microbial growth and its control
4. Microbial spoilage of foods
5. Foodborne diseases: etiologic agent, pathogenesis, prevention and responsible practices
6. Microbiological indicators of food safety and quality. Microbiological criteria
7. Methods for detecting and identifying microorganisms in food and food processing environments.
8. General principles of toxicology
   - Dose-response relationships and toxicological parameters, mechanisms of toxicity.
9. Toxicity testing methods by descriptive animal tests and 'in vitro' tests.
   - Toxicity classification of substances.
10. Risk assessment in toxicology: risk characterization, risk management and risk communication.

Recommended reading

1. Ferreira, W. F. C. ; Sousa, J. C. F., Lima, N. (2010). Microbiologia. Lidel-Edições técnicas, Lda. Lisboa. 622 páginas. ISBN: 978-972-757-515-2 2.
2. Forsythe, S.J. (2020). The microbiology of safe food. 3rd Edition. ISBN: 978-1-119-40501-6
3. INSA (2019). Interpretação de resultados de ensaios microbiológicos - Valores-guia. Instituto Nacional de Saúde Dr. Ricardo Jorge
4. Quintanilha, A., Freire, Â., Halpen, M. (2008). Bioquímica. Organização molecular da vida. Lisboa
5. Shibamoto, T.; Bjeldanes, L. (2009). Introduction to Food Toxicology, Second Edition. ISBN: 978-0-12-374286-5

Teaching and learning methods

Lectures using powerpoint presentations. Lectures notes deposited in the e-learning resources. Laboratory classes

Assessment methods

1. Continuous evaluation - (Regular, Student Worker) (Final)
   - Intermediate Written Test - 60% (Written tests on theoretical-practical content)
   - Intermediate Written Test - 40% (Written tests on practical content)
2. Final - (Regular, Student Worker) (Final, Supplementary, Special)
   - Final Written Exam - 60% (Written tests on theoretical-practical content)
   - Final Written Exam - 40% (Written tests on practical content)

Language of instruction

Portuguese

Electronic validation

Ermelinda Lopes Pereira, Maria Jose Rodrigues Frade Falcao	Juliana Almeida de Souza	Luis Migue Fernandes Nascimento	Adília Maria Pires da Silva Fernandes
21-03-2025	21-07-2025	21-07-2025	21-07-2025