

Module Title:	Food Microbiology
Credits:	5
NFQ Level:	7
Module Delivered In	2 programme(s)
Teaching & Learning Strategies:	Food Microbiology will be taught employing the dual approach of lectures and experimental work so students will learn the theory of microbial interaction with food systems whilst also becoming technically trained on how to safely work with food pathogens in the Microbiology laboratory.
Module Aim:	To provide the student with a strong knowledge of the basic principles and applications of food microbiology, primarily the important beneficial and spoilage food microorganisms, their detection, biotyping, metabolic capabilities and genomes with emphasis also on the methods and systems employed in their control.
Learning Outcomes	
<i>On successful completion of this module the learner should be able to:</i>	
LO1	Discuss the factors that determine microbial growth, survival and death in foods
LO2	Explain the identification, enumeration and genomics of food spoilage microbes and relevance to food safety
LO3	Explain the role of beneficial microbes in food preservation and food fermentation.
LO4	Review the important food-borne pathogens of humans and plants with respect to characteristics, habitat, culturing and prevention.
LO5	Discuss microbial control in foods using biological, chemical and physical methods
Pre-requisite learning	
Module Recommendations <i>This is prior learning (or a practical skill) that is recommended before enrolment in this module.</i>	
No recommendations listed	
Incompatible Modules <i>These are modules which have learning outcomes that are too similar to the learning outcomes of this module.</i>	
No incompatible modules listed	
Co-requisite Modules	
No Co-requisite modules listed	
Requirements <i>This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.</i>	
No requirements listed	

Module Content & Assessment

Indicative Content

Review of Basic Microbiological principles relating to food

General microbiological principles and the relevance of second year modules including Microbiology and Microbial biochemistry and Genetics.

Factors that Affect Microbial Growth in Food & Beverage

Intrinsic and extrinsic factors including nutrients, water activity, pH, oxidation-reduction potential, temperature, gaseous atmosphere and their impact on microbial spoilage

Sources of Microorganisms

Soil, water, air, plants, animals, humans, equipment. Micro flora of meat and meat products, milk and other dairy products. Micro flora of fruit and vegetables products, canned foods and alcoholic beverages.

Food Borne Illnesses

Food borne illnesses are studied in terms of the properties of the microorganisms themselves, the mode of entry and behavior in food, the types of foods involved, toxicology and symptoms and the methodologies used in each case. Food borne infections, including Salmonella, E coli, Shigella, Vibrio, Listeria and Campylobacter. Food borne intoxications, including Staphylococcus aureus and Clostridium botulinum. Other food borne illnesses including Bacillus cereus, Clostridium perfringens and illness passed on by food such as Brucella abortis, Mycobacterium tuberculosis and Trichinella. Virus infections passed on by foods. Mycotoxins.

Fungi and Viruses

An introduction to the most important groups of fungi used in the food and biotechnology industries. Fundamentals of brewing and ethanol production. An introduction to the biology of viruses with particular emphasis on the importance of food-borne viruses

Uses of Micro-organism in Food Processing and Preservation

The role of microbiology in food preservation and food spoilage. Microbiological aspects of food processing. Methods of food preservation, including the use of asepsis, removal of microorganisms; filtration, heat, drying and anaerobic conditions. Heat preservation methods including canning, pasteurisation, and other heat treatments and the theory of heat sterilization. Food and microbial preservation by low temperatures, including refrigeration, freezing, lyophilization, blast and cryogenic freezing. Food preservation by drying. Chemical additives as food preservatives.

Microbiological Analysis of Food and Beverage

Detection of pathogens. Enumeration of microorganisms, sample preservation and representative sampling. Indicator organisms:- coliforms, faecal coliforms, enterococci. Water Microbiology

Assessment Breakdown	%
Continuous Assessment	20.00%
Practical	20.00%
End of Module Formal Examination	60.00%

SETU Carlow Campus reserves the right to alter the nature and timings of assessment

Module Workload

Workload: Full Time		
<i>Workload Type</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	12 Weeks per Stage	2.00
Laboratory	12 Weeks per Stage	2.00
Independent Learning	15 Weeks per Stage	5.13
Total Hours		125.00

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_SABTP_B	Bachelor of Science (Honours) in Biosciences with Biopharmaceuticals	5	Mandatory
CW_SABFQ_D	Bachelor of Science in Biosciences	5	Mandatory