ZCHE C3100: Food Microbiology

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	
On successful completion of this module the learner should be able to:	
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 *This is prior learning (or a practical skill) that is recommended before enrolment in this module.*
No recommendations listed
Incompatible Modules *These are modules which have learning outcomes that are too similar to the learning outcomes of this module.*
No incompatible modules listed
Co-requisite Modules
No Co-requisite modules listed
Requirements *This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.*
No requirements listed

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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 Instrinsic 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 tuberculosum 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

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Module Workload

Workload: Full Time		
Workload Type	*Frequency*	*Average Weekly Learner Workload*
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