

<b>Module Title:</b>	Fermentation and Food Microbiology
<b>Language of Instruction:</b>	English
<b>Credits:</b>	10
<b>NFQ Level:</b>	7
<b>Module Delivered In</b>	<a href="#">1 programme(s)</a>
<b>Teaching &amp; Learning Strategies:</b>	The module will be taught as two theory classes of one hour duration and one two hour practical session over thirty weeks. Course lecture summaries, course calendar, announcements and other course-related information will be available on Blackboard, a virtual learning environment. Students can contact lecturer outside of class hours to discuss formative feedback given on written reports and group project work. The practical component will • allow students to develop the required technical competencies, attitudes and behaviours • develop problem solving abilities and group skills • promote learning via investigation of a problem, application of prior knowledge and analysis of results thus generating new knowledge • promote timely submission of reports written in the standard format
<b>Module Aim:</b>	The aim of this module is to introduce students to the microbiology of food and microbial physiology.
<b>Learning Outcomes</b>	
<i>On successful completion of this module the learner should be able to:</i>	
LO1	Have a detailed knowledge of microbiology as it applies to food processing and food preservation.
LO2	Have a substantial understanding of the microbiology of milk, milk products and diseases passed on by milk.
LO3	Understand the aetiology and transmission of microbial food borne illnesses.
LO4	Understand the interaction between the various food process technologies and microbiology.
LO5	Be able to identify and isolate the major groups of microorganisms involved in food borne illness.
LO6	Be able to function successfully in a food laboratory situation in terms of microbial techniques.
LO7	Be able to report scientific data in an acceptable format.
<b>Pre-requisite learning</b>	
<b>Module Recommendations</b> <i>This is prior learning (or a practical skill) that is recommended before enrolment in this module.</i>	
No recommendations listed	
<b>Incompatible Modules</b> <i>These are modules which have learning outcomes that are too similar to the learning outcomes of this module.</i>	
No incompatible modules listed	
<b>Co-requisite Modules</b>	
No Co-requisite modules listed	
<b>Requirements</b> <i>This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.</i>	
Successful completion of year 2 or equivalent	

**Module Content & Assessment**

**Indicative Content**

**Food Microbiology**

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.

**Food Borne Illnesses**

Food borne illnesses are studied in terms of the properties of the microorganisms themselves, the mode of entry and behaviour 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.

**Milk microbiology and fermentation.**

Microbial contamination of milk and milk products. Microbial quality control issues in milk production and processing. The production of fermented milk products. Properties of starter cultures. Mastitis and other milk borne diseases and their health and economic implications.

**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 phage in starter production. Control of phage in the cheese industry

**Practical**

The practical element of the course will consist of 30 two hour practicals covering the identification and isolation of the main groups of microorganisms involved in the food industry and also food fermentation.

Assessment Breakdown	%
Continuous Assessment	10.00%
Practical	40.00%
End of Module Formal Examination	50.00%

**Special Regulation**

Students must achieve a minimum grade (35%) in both the practical/CA and final examination.

**Continuous Assessment**

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Other	Class tests, specific assignments or presentations	1,2,3,4,5,6,7	10.00	n/a

No Project

**Practical**

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Practical/Skills Evaluation	Laboratory notebook and observation of skills		40.00	Sem 1 End

**End of Module Formal Examination**

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Formal Exam	No Description		50.00	Sem 1 End

ITCarlow reserves the right to alter the nature and timings of assessment

**Module Workload**

<b>Workload: Full Time</b>		
<i>Workload Type</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	30 Weeks per Stage	2.00
Laboratory	30 Weeks per Stage	2.00
Estimated Learner Hours	30 Weeks per Stage	2.00
Total Hours		180.00

**Module Delivered In**

Programme Code	Programme	Semester	Delivery
CW_SABFQ_D	<a href="#">Bachelor of Science in Biosciences</a>	3	Mandatory