MODULE SPECIFICATION

Part 1: Information			
Module Title	Environmental Microbiology		
Module Code	USSKN9-15-3	Level	Level 6
For implementation from	2020-21		
UWE Credit Rating	15	ECTS Credit Rating	7.5
Faculty	Faculty of Health & Applied Sciences	Field	Applied Sciences
Department	HAS Dept of Applied Sciences		
Module type:	Standard		
Pre-requisites	Life on Earth 2020-21		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description

Overview: Pre-requisites: Students must have taken USSK5C-30-1 Life on Earth AND at least one of: USSKAQ-30-2 Microbial Life or USSKN7-15-2 The Microbial World

Educational Aims: This module will explore the functional processes and interactions of microorganisms within terrestrial and aquatic ecosytems.

Outline Syllabus: Microbial Metabolism: students will understand the molecular mechanisms by which microbes can utilise nutrients within various ecosystems, including photoautotrophs, chemolithotrophs and heterotrophs. This will include an in depth understanding of the various energy generating mechanisms utilised by microbes.

Microbial Ecology: students will learn about the diversity of microorganisms that can live in a range of environments, including terrestrial environments (soil and sediments), aquatic environments (oceanography and limnology), aeromicrobiology and extreme environments (hydrothermal vents and astrobiology). This will include an understanding of the environmental selection pressures that give rise to the characteristic microflora found within each environment, including the impact of a changing climate.

Microbial interactions: students will learn how microorganisms can interact directly with humans, animals and plants through symbiosis (including mutualistic, commensalistic, or parasitic relationships).

Bioremediation and water treatment: students will use their knowledge of microbial metabolic processes to investigate the use of naturally occurring or introduced microorganisms for the breakdown of environmental pollutants (organic and metal pollutants). This will also include an in depth study of traditional and novel approaches to production of drinking water and wastewater treatment processes.

Microbial genomics: students will learn about the composition and expression of the microbial genetic material (metagenomic and whole transcriptome studies, and bioinformatic analysis), and how this impacts on microbial evolution, taxonomy, population genomics and phylogeography.

Biotechnology: students will learn how microorganisms can be exploitation for industrial purposes, including energy generation through biofuels, anaerobic digestion and microbial fuel cells.

Teaching and Learning Methods: See Assessment

Part 3: Assessment

Component A is a written exam. This assessment will provide students with an opportunity to demonstrate in depth knowledge on the module subject matter, with the expectation that students will be required to show evidence of critical analysis of the controversies that exist in this field of study. The process of revision and examination is known to strengthen the memory pathways for future use of relevant material and is an essential employability skill.

The coursework will comprise of a 2000 word laboratory report and associated critical review of the literature, based on practical experimental work undertaken during the course of the module. This will develop key skills in experimental design, data collection and handling, statistics and data interpretation, as well as critical analysis of results to formulate evidenced conclusions. A critical review of the literature will be included within this laboratory report, to ensure students can place this experimental work within contemporary scientific knowledge.

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Laboratory Report - Component B		40 %	Laboratory report and critical literature review
Examination (Online) - Component A	✓	60 %	Online Examination (24 hours)
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Written Assignment - Component B		40 %	Data handling and critical literature review
Examination (Online) - Component A	✓	60 %	Online Examination (24 hours)

Part 4: Teaching and Learning Methods

Learning Outcomes

On successful completion of this module students will achieve the following learning outcomes:

Module Learning Outcomes	Reference
Understand the molecular mechanisms associated with microbial metabolism	MO1
Critically evaluate the role microorganisms play in various environmental ecosystems and understand the environmental selection pressures that give rise to the characteristic microflora found within each environment	MO2
Evaluate the relative importance of microbial interactions with humans, animals and plants in functioning ecosystems	MO3
Critically assess the role of microorganisms in bioremediation, water treatment and energy generation processes, including the current state of novel technological approaches	MO4
Statistically analyse laboratory data, enabling interpretation of complex data sets in the context of existing knowledge	MO5
Understand the genomic diversity of microorganisms and how this can be utilised for biotechnology applications	MO6

Contact Hours

Independent Study Hours:	
Independent study/self-guided study	117
Total Independent Study Hours:	117
Scheduled Learning and Teaching Hours:	
Face-to-face learning	33
Total Scheduled Learning and Teaching Hours:	33
Hours to be allocated	150
Allocated Hours	150

Reading List

The reading list for this module can be accessed via the following link:

https://uwe.rl.talis.com/index.html

Part 5: Contributes Towards

This module contributes towards the following programmes of study:

Environmental Science [Sep][FT][Frenchay][4yrs] MSci 2018-19

Environmental Science [Sep][FT][Frenchay][3yrs] BSc (Hons) 2018-19

Biological Sciences [Sep][FT][Frenchay][3yrs] BSc (Hons) 2018-19

Biological Sciences [Sep][FT][Frenchay][4yrs] MSci 2018-19