Module Descriptor

Title	Microbial Technology		
Session	2025/26	**Status**	Published
Code	BIOL11004	**SCQF Level**	11
Credit Points	20	**ECTS (European Credit Transfer Scheme)**	10
School	**Health and Life Sciences**		
Module Co-ordinator	Steven Kelly		

Summary of Module

In this module, students will be provided with an insight into current biotechnology processes which rely on microorganisms. The module will deal extensively with the use of microorganisms in processes such as bioremediation, fermentation, biosensors and "clean industries". The exploitation of diverse microbial capabilities will be discussed with an emphasis on novel and developing technologies.

Current research papers will be used to enable students to discuss and critique advances in the use of microbial cells, enzymes and cellular components in a variety of sectors. Students with a particular interest in areas such as environmental, medical, industrial and food microbiology will have the opportunity to expand on their current knowledge of the exploitation of microbial metabolism in these areas and hypothesise future areas of research and method development based upon the current "state of the art".

Students will engage in workshops which enable them to exhibit critical analysis of this area. Case studies, including real world data from industrial contacts, will enable students to demonstrate problem solving skills based upon current knowledge of microbial metabolism and biotechnology techniques.

This module will work to develop a number of the key "I am UWS" Graduate Attributes to make those who complete the module (e.g.) Universal Work Ready Successful. These will include students who complete the module being; Analytical, Inquiring, Digitally literate, Autonomous, Ethically-minded, Effective communicator, Collaborative, Research-minded and Driven.

Module Delivery Method	On-Campus[1] ☒	Hybrid[2] ☐	Online[3] ☐	Work -Based Learning[4] ☐
Campuses for Module Delivery	☐ Ayr ☐ Dumfries	☒ Lanarkshire ☐ London ☐ Paisley	☐ Online / Distance Learning ☐ Other (specify)	

Terms for Module Delivery	Term 1	☒	Term 2	☐	Term 3	☐
Long-thin Delivery over more than one Term	Term 1 – Term 2	☐	Term 2 – Term 3	☐	Term 3 – Term 1	☐

Learning Outcomes	
L1	Demonstrate critical understanding of current knowledge, problems and techniques at the forefront of microbial technologies
L2	Demonstrate originality in tackling case studies and solving problems in aspects of microbial biotechnology.
L3	Evaluate and develop critiques of methodologies used in microbial-based biotechnology and, where appropriate, propose new hypotheses.
L4	
L5	

Employability Skills and Personal Development Planning (PDP) Skills	
SCQF Headings	**During completion of this module, there will be an opportunity to achieve core skills in:**
Knowledge and Understanding (K and U)	**SCQF 11** Demonstrating critical awareness of current issues in the exploitation of microorganisms in biotechnology.
Practice: Applied Knowledge and Understanding	**SCQF 11** Analyse a significant range of the principal skills, techniques, practices and/or materials which are associated with the exploitation of microorganisms in biotechnology.
Generic Cognitive skills	**SCQF 11** Applying critical analysis, evaluation and synthesis to issues/problems

[1] Where contact hours are synchronous/ live and take place fully on campus. Campus-based learning is focused on providing an interactive learning experience supported by a range of digitally-enabled asynchronous learning opportunities including learning materials, resources, and opportunities provided via the virtual learning environment. On-campus contact hours will be clearly articulated to students.

[2] The module includes a combination of synchronous/ live on-campus and online learning events. These will be supported by a range of digitally-enabled asynchronous learning opportunities including learning materials, resources, and opportunities provided via the virtual learning environment. On-campus and online contact hours will be clearly articulated to students.

[3] Where all learning is solely delivered by web-based or internet-based technologies and the participants can engage in all learning activities through these means. All required contact hours will be clearly articulated to students.

[4] Learning activities where the main location for the learning experience is in the workplace. All required contact hours, whether online or on campus, will be clearly articulated to students

	at the forefront of developments in microbial based biotechnologies.
Communication, ICT and Numeracy Skills	**SCQF 11** Undertaking critical evaluations of a wide range of numerical; and graphical data from case studies, current research and scholarship in microbial technologies.
Autonomy, Accountability and Working with Others	**SCQF 11** Exercising substantial autonomy and initiative in a range of activities informed by current developments in microbial technologies.

Prerequisites	**Module Code**	**Module Title**
	Other	
Co-requisites	**Module Code**	**Module Title**

Learning and Teaching

In line with current learning and teaching principles, a 20-credit module includes 200 learning hours, normally including a minimum of 36 contact hours and maximum of 48 contact hours.

The module will be delivered using a blended approach with lectures, tutorials and collaborative workshops.

Students will be required to access lecture notes, links to reference sources and other support materials on the VLE. This will provide students with core material which forms the basis of the syllabus and extensive supplementary material to broaden their reading within the subject.

Lecture content will deliver fundamental information which will assist students in understanding key concepts relevant to the diversity and exploitation of microbial metabolism in a wide range of sectors.

Central to this module will be student-led discussions of current research papers on selected topics. These sessions will follow a range of formats from informal scientific discussions to structured presentations by the students. A literature review will allow students to demonstrate an ability to discuss and critically analyse current research trends and future needs in a variety of microbial technologies.

Tutorial exercises will require the students to use a range of intellectual skills as they analyse current research papers within microbial based biotechnologies. They will be expected to link the theoretical knowledge obtained from lecture content, about the specific metabolic pathways in microbial genera and their potential exploitation by humans, to a wide range of novel and developing processes.

The written examination will provide an opportunity for students to demonstrate theoretical knowledge and critical or analytical skills related to the utilisation of that knowledge within microbiological research and commercial/industrial/clinical processes.

Learning Activities During completion of this module, the learning activities undertaken to achieve the module learning outcomes are stated below:	**Student Learning Hours** (Note: Learning hours include both contact hours and hours spent on other learning activities)
Lecture / Core Content Delivery	6
Tutorial / Synchronous Support Activity	30

Independent Study	164
n/a	
n/a	
n/a	
TOTAL	200

Indicative Resources

The following materials form essential underpinning for the module content and ultimately for the learning outcomes:

Bioremediation and Sustainable Technologies for Cleaner Environment, M. Prashanthi et al., Springer (2017) ISBN-10: 3319484389

Environmental Microbial Biotechnology, L. B. Sukla et al., Springer (2016) ISBN-10: 3319363123

Microbial Biotechnology, E. Cooper, Syrawood Publishing House (2016) ISBN-10: 1682860973

Microbial Biotechnology: Technological Challenges and Developmental Trends, B. Bhukya & A. D. Tangutur, Apple Academic Press(2016) ISBN-10: 1771883324

Quorum Sensing vs Quorum Quenching: A Battle with No End in Sight, V. C. Kalia, Springer (2016) ISBN-10: 8132235487

Journals e.g. Applied and Environmental Microbiology (http://aem.asm.org/)

Food and Environmental Microbiology VLE Site

(N.B. Although reading lists should include current publications, students are advised (particularly for material marked with an asterisk*) to wait until the start of session for confirmation of the most up-to-date material)

Attendance and Engagement Requirements

In line with the Student Attendance and Engagement Procedure, Students are academically engaged if they are regularly attending and participating in timetabled on-campus and online teaching sessions, asynchronous online learning activities, course-related learning resources, and complete assessments and submit these on time.

For the purposes of this module, academic engagement equates to the following:

Attendance at synchronous sessions (lectures and tutorials), completion of asynchronous activities, and submission of assessments to meet the learning outcomes of the module.

Equality and Diversity

The University's Equality, Diversity and Human Rights Procedure can be accessed at the following link: UWS Equality, Diversity and Human Rights Code.

In line with current legislation (Equality Act, 2010) and the UWS Equality, Diversity, and Human Rights Code, our modules are accessible and inclusive, with reasonable adjustment for different needs where appropriate. Module materials comply with University guidance on inclusive learning and teaching, and specialist assistive equipment, support provision and adjustment to assessment practice will be made in accordance with UWS policy and regulations. Where modules require practical and/or laboratory based learning or assessment required to meet accrediting body requirements the University will make reasonable adjustment such as adjustable height benches or assistance of a ‘buddy’ or helper.

(N.B. Every effort will be made by the University to accommodate any equality and diversity issues brought to the attention of the School)

Supplemental Information

Divisional Programme Board	**Biological Sciences Health**
Overall Assessment Results	☐ **Pass / Fail** ☒ **Graded**
Module Eligible for Compensation	☐ **Yes** ☒ **No** **If this module is eligible for compensation, there may be cases where compensation is not permitted due to programme accreditation requirements. Please check the associated programme specification for details.**
School Assessment Board	Biology
Moderator	Gail McGarvie
External Examiner	A Tsaousis
Accreditation Details	
Module Appears in CPD catalogue	☐ **Yes** ☒ **No**
Changes / Version Number	2

Assessment (also refer to Assessment Outcomes Grids below)
Assessment 1
An open book online examination worth 50% of the final mark
Assessment 2
A literature review/critical analysis assignment worth 50% of the final mark
Assessment 3
(N.B. (i) Assessment Outcomes Grids for the module (one for each component) can be found below which clearly demonstrate how the learning outcomes of the module will be assessed. (ii) An indicative schedule listing approximate times within the academic calendar when assessment is likely to feature will be provided within the Student Module Handbook.)

Component 1							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
Class test (written)	☒	☒	☐	☐	☐	50	5

Component 2							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
Review/ Article/ Critique/ Paper	☐	☒	☒	☐	☐	50	0

Component 3							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
	☐	☐	☐	☐	☐		
Combined total for all components						100%	5 hours

Change Control

What	When	Who