

University of the West of Scotland

Module Descriptor

Session: 2022/23

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Status: Published

Title of Module: Microbial Technology

Code: BIOL11004	SCQF Level: 11 (Scottish Credit and Qualifications Framework)	Credit Points: 20	ECTS: 10 (European Credit Transfer Scheme)
School:	School of 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

Face-To-Face	Blended	Fully Online	HybridC	HybridO	Work-based Learning
	✓				

Face-To-Face

Term used to describe the traditional classroom environment where the students and the lecturer meet synchronously in the same room for the whole provision.

Blended

A mode of delivery of a module or a programme that involves online and face-to-face delivery of learning, teaching and assessment activities, student support and feedback. A programme may be considered “blended” if it includes a combination of face-to-face, online and blended modules. If an online programme has any compulsory face-to-face and campus elements it must be described as blended with clearly articulated delivery information to manage student expectations

Fully Online

Instruction that is solely delivered by web-based or internet-based technologies. This term is used to describe the previously used terms distance learning and e learning.

HybridC

Online with mandatory face-to-face learning on Campus

HybridO

Online with optional face-to-face learning on Campus

Work-based Learning

Learning activities where the main location for the learning experience is in the workplace.

Campus(es) for Module Delivery						
The module will normally be offered on the following campuses / or by Distance/Online Learning: (Provided viable student numbers permit)						
Paisley:	Ayr:	Dumfries:	Lanarkshire:	London:	Distance/Online Learning:	Other:
			✓			

Term(s) for Module Delivery					
(Provided viable student numbers permit).					
Term 1	✓	Term 2		Term 3	

Learning Outcomes: (maximum of 5 statements)
On successful completion of this module the student will be able to:
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.

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 Level 11. Demonstrating critical awareness of current issues in the exploitation of microorganisms in biotechnology.
Practice: Applied Knowledge and Understanding	SCQF Level 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 Level 11. Applying critical analysis, evaluation and synthesis to issues/problems at the forefront of developments in microbial based biotechnologies.
Communication, ICT and Numeracy Skills	SCQF Level 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 Level 11. Exercising substantial autonomy and initiative in a range of activities informed by current developments in microbial technologies.

Pre-requisites:	Before undertaking this module the student should have undertaken the following:

	Module Code:	Module Title:
	Other:	
Co-requisites	Module Code:	Module Title:

* Indicates that module descriptor is not published.

Learning and Teaching

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	Student Learning Hours (Normally totalling 200 hours): (Note: Learning hours include both contact hours and hours spent on other learning activities)
During completion of this module, the learning activities undertaken to achieve the module learning outcomes are stated below:	
Lecture/Core Content Delivery	6
Tutorial/Synchronous Support Activity	30
Independent Study	164
	200 Hours Total

**Indicative Resources: (eg. Core text, journals, internet access)

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)

Engagement Requirements

In line with the Academic Engagement Procedure, Students are defined as academically engaged if they are regularly engaged with timetabled teaching sessions, course-related learning resources including those in the Library and on the relevant learning platform, and complete assessments and submit these on time. Please refer to the Academic Engagement Procedure at the following link: [Academic engagement procedure](#)

Where a module has Professional, Statutory or Regulatory Body requirements these will be listed here: Attendance at synchronous sessions (lectures and tutorials), completion of asynchronous activities, and submission of assessments to meet the learning outcomes of the module.

Supplemental Information

Programme Board	Biological Sciences and Health
Assessment Results (Pass/Fail)	No
Subject Panel	Biology L7-11
Moderator	Gail McGarvie
External Examiner	A Tsaousis
Accreditation Details	
Changes/Version Number	2.14 Attendance Requirements updated, Equality and Diversity updated, teaching and learning and learning activities updated.

Assessment: (also refer to Assessment Outcomes Grids below)

An open book online examination worth 50% of the final mark

A literature review/critical analysis assignment worth 50% of the final mark

(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 Handbook.)

Assessment Outcome Grids (Footnote A.)

Component 1

Assessment Type (Footnote B.)	Learning Outcome (1)	Learning Outcome (2)	Learning Outcome (3)	Weighting (%) of Assessment Element	Timetabled Contact Hours
Class test (written)	✓	✓		50	5

Component 2

Assessment Type (Footnote B.)	Learning Outcome (1)	Learning Outcome (2)	Learning Outcome (3)	Weighting (%) of Assessment Element	Timetabled Contact Hours
Review/ Article/ Critique/ Paper		✓	✓	50	0

Combined Total For All Components	100%	5 hours
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Footnotes

- A. Referred to within Assessment Section above
- B. Identified in the Learning Outcome Section above

Note(s):

1. More than one assessment method can be used to assess individual learning outcomes.
2. Schools are responsible for determining student contact hours. Please refer to University Policy on contact hours (extract contained within section 10 of the Module Descriptor guidance note).
This will normally be variable across Schools, dependent on Programmes &/or Professional requirements.

Equality and Diversity

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. Please refer to the UWS Equality and Diversity Policy at the following link: [UWS Equality and Diversity Policy](#)

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