Module Descriptor

Title	Nucleic Acid & Protein Technology		
Session	2026/27	**Status**	Published
Code	BIOL11006	**SCQF Level**	11
Credit Points	20	**ECTS (European Credit Transfer Scheme)**	10
School	**Health and Life Sciences**		
Module Co-ordinator	Farah Jaber		

Summary of Module

This module will ensure a sound knowledge of the nature and properties of nucleic acids and proteins and their role in gene expression. Practical experience of basic techniques used to study and manipulate nucleic acids and proteins e.g. PCR, gene cloning and 2D gel electrophoresis will be acquired.

Clinical, industrial and research applications of protein biotechnology will be studied. Integration of protein biotechnology and genetic engineering will introduce the techniques and applications of protein engineering.

Building on this knowledge there will be an opportunity to explore emerging techniques in biotechnology including genomics, proteomics and bioinformatics. It is important that a biotechnologist understands modern approaches to genome-wide gene expression and their value. Through practical sessions, you will learn to retrieve data from public databases, analyse them and interpret your findings in the context of the biology of the whole system.

Students will be expected contribute to discussions, source and present current literature examples which will develop critical thinking, research awareness, collaboration and communication skills. At this level you will be supported to become independent learners.

Module Delivery Method	**On-Campus[1]**	**Hybrid[2]**	**Online[3]**	**Work -Based Learning[4]**
	☒	☐	☒	☐

[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

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 an integrated knowledge of the principal theories, principles and concepts of gene expression.
L2	Demonstrate critical understanding of the methods and applications used to analyse patterns of gene expression.
L3	Demonstrate critical understanding of the principal concepts and applications of genetic engineering and protein biotechnology.
L4	Choose and apply the appropriate skills and techniques to retrieve, analyse and interpret biological information.
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** Demonstrate a knowledge that covers and integrates the main areas of the theory and applications of nucleic acid and protein technology.
Practice: Applied Knowledge and Understanding	**SCQF 11** Use a significant range of the principal skills, techniques and practices associated with nucleic acid and protein technologies.
Generic Cognitive skills	**SCQF 11** Applying critical analysis, evaluation and synthesis to issues/problems at the forefront of developments in nucleic acid and protein based technologies.
Communication, ICT and Numeracy Skills	**SCQF 11** Use skills to retrieve biological information and undertake critical evaluation of a wide range of data.
Autonomy, Accountability and Working with Others	**SCQF 11** Exercising substantial autonomy and initiative in a range of activities informed by current developments in nucleic acid and protein 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.

Delivery of this module will use blended learning . Core theory and concepts will be delivered by means of lectures, tutorials and discussions in which student participation will be expected. Practical classes will let students acquire experience in techniques used in recombinant DNA technology and protein technology.

Practical computer-based exercises on the retrieval and analysis of biological data will be provided. Students will apply this knowledge to obtain information on a selected protein which they will analyse and interpret in the context of current literature.

Lecture notes, links to reference sources and other support materials will be provided on the VLE.

Independent research will prepare students for tutorials sessions which will be used to evaluate current scientific research on the clinical, industrial and research applications of protein biotechnology and to evaluate the new techniques in biotechnology including genomics, proteomics and bioinformatics.

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	24
Tutorial / Synchronous Support Activity	8
Laboratory / Practical Demonstration / Workshop	16
Independent Study	152
n/a	
n/a	
TOTAL	200

Indicative Resources

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

It is envisaged that students will primarily use peer-reviewed research and review articles in nucleic acid, protein and biotechnology journals as their main reading material throughout this module. Students will be directed to current and previous publications, through the use of repositories on the module VLE site, and through institutional subscriptions to relevant journals. For basic concepts in nucleic acids, proteins and their applications to Biotechnology there are several books available. Examples are:

Ralph Rapley (2021) Molecular Biology and Biotechnology: Edition 7 Print IBSN 978-1-78801-786-2 ePub 978-1-78801-939-2

J. W. Dale, M von Schantz and N. Plant (2011) From Genes to Genomes: Concepts and Applications of DNA Technology. Wiley-Blackwell; 3rd Edition edition. ISBN-10: 0470683856

Walsh, G (2014) Proteins: Biochemistry and Biotechnology. Wiley-Blackwell; 2nd Revised edition edition ISBN-10: 0470669853

Good for revising basic concepts: DNA Learning Centre, Cold Spring Harbor Laboratory. http://www.dnalc.org/

UWS library lists: https://uws-uk.leganto.exlibrisgroup.com/leganto/readinglist/lists/11481766140003931

(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 attending and participating in all timetabled programme activities including on-campus and online teaching sessions, asynchronous online learning activities, placement, work-based elements, 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 on-campus for all sessions unless otherwise stated.

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	Steven Kelly
External Examiner	J Butcher
Accreditation Details	

Module Appears in CPD catalogue	☐ **Yes** ☒ **No**
Changes / Version Number	2

Assessment (also refer to Assessment Outcomes Grids below)
Assessment 1
Class Test: 50% of final mark
Assessment 2
Coursework (Report and presentation): 50% of 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	4

Component 2							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
Report of practical/ field/ clinical work	☐	☐	☒	☒	☐	50	2

Component 3							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
	☐	☐	☐	☐	☐		
Combined total for all components						100%	6 hours

Change Control

What	**When**	**Who**
