

Session: 2022/23

Title of Module: Nucleic Acid & Protein Technology			
Code: BIOL11006	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:	Farah Jaber		
Summary of Module			
<p>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.</p> <p>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.</p> <p>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.</p>			

Module Delivery Method					
Face-To-Face	Blended	Fully Online	HybridC	HybridO	Work-based Learning
			✓		
<p>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.</p> <p>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</p> <p>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.</p> <p>HybridC Online with mandatory face-to-face learning on Campus</p> <p>HybridO Online with optional face-to-face learning on Campus</p> <p>Work-based Learning Learning activities where the main location for the learning experience is in the workplace.</p>					

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)	
<p>On successful completion of this module the student will be able to:</p> <p>L1. Demonstrate an integrated knowledge of the principal theories, principles and concepts of gene expression.</p> <p>L2. Demonstrate critical understanding of the methods and applications used to analyse patterns of gene expression.</p> <p>L3. Demonstrate critical understanding of the principal concepts and applications of genetic engineering and protein biotechnology.</p> <p>L4. Choose and apply the appropriate skills and techniques to retrieve, analyse and interpret biological information.</p>	
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. 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 Level 11. Use a significant range of the principal skills, techniques and practices associated with nucleic acid and protein technologies.
Generic Cognitive skills	SCQF Level 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 Level 11. Use skills to retrieve biological information and undertake critical evaluation of a wide range of data.
Autonomy, Accountability and Working with others	SCQF Level 11. Exercising substantial autonomy and initiative in a range of activities informed by current developments in nucleic acid and protein 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	
<p>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.</p> <p>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.</p> <p>Lecture notes, links to reference sources and other support materials will be provided on the VLE.</p> <p>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.</p>	
Learning Activities During completion of this module, the learning activities undertaken to achieve the module learning outcomes are stated below:	Student Learning Hours (Normally totalling 200 hours): (Note: Learning hours include both contact hours and hours spent on other learning activities)
Lecture/Core Content Delivery	24
Laboratory/Practical Demonstration/Workshop	16
Tutorial/Synchronous Support Activity	8
Independent Study	152
	200 Hours Total
**Indicative Resources: (eg. Core text, journals, internet access)	
<p>The following materials form essential underpinning for the module content and ultimately for the learning outcomes:</p> <p>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:</p> <p>Ralph Rapley (2021) Molecular Biology and Biotechnology: Edition 7 Print ISBN 978-1-78801-786-2 ePub 978-1-78801-939-2</p>	

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/>

(**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, tutorials and practicals), completion of asynchronous activities, and submission of assessments to meet the learning outcomes of the module. This module has a practical element as part of the Royal Society of Biology accreditation which must be attended.

Supplemental Information

Programme Board	Biological Sciences and Health
Assessment Results (Pass/Fail)	No
Subject Panel	Biology L7-11
Moderator	Steven Kelly
External Examiner	A Tsaousis
Accreditation Details	
Version Number	2.13

Assessment: (also refer to Assessment Outcomes Grids below)

Class Test: 50% of final mark

Coursework (Report and presentation): 50% of 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)	Learning Outcome (4)	Weighting (%) of Assessment Element	Timetabled Contact Hours
Class test (written)	✓	✓	✓		50	2
Component 2						
Assessment Type (Footnote B.)	Learning Outcome (1)	Learning Outcome (2)	Learning Outcome (3)	Learning Outcome (4)	Weighting (%) of Assessment Element	Timetabled Contact Hours
Report of practical/ field/ clinical work				✓	25	0
Workbook/ Laboratory notebook/ Diary/ Training log/ Learning log				✓	10	0
Presentation			✓		15	0
Combined Total For All Components					100%	2 hours

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

[UWS Equality and Diversity Policy](#)

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