Module Descriptor

Title	Pure & Applied Genetics		
Session	2025/26	**Status**	Published
Code	BIOL09020	**SCQF Level**	9
Credit Points	20	**ECTS (European Credit Transfer Scheme)**	10
School	**Health and Life Sciences**		
Module Co-ordinator	Jamie Whitelaw		

Summary of Module

This module will take a more in depth look at the organisation of the genome and the control of gene expression in different organisms. Knowledge of genome function is key to understanding the normal and disease states in organisms. You will find out more about the human genome project and its effect on medicine, agriculture and forensics. The module will introduce the subject of bioinformatics, using databases to retrieve and construct information. You will acquire practical experience of modern techniques used to study and manipulate DNA e.g. real time PCR and gene cloning. Enquiry based skills will be enhanced by researching and discussing the advantages, problems and ethics of manipulating DNA for applications such as cloning, creating genetically modified organisms and gene therapy.

Undertaking this module will develop a range of graduate attributes. Knowledge and practical skills in molecular biology will be extended. Sourcing, reviewing and presenting current scientific literature within lab reports will develop critical thinking and presentation skills. The module will discuss new research developing innovation, research thinking and consideration of ethical issues.

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

Campuses for Module Delivery	☐ Ayr ☐ Dumfries	☒ Lanarkshire ☐ London	☐ Online / Distance Learning

[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

			☐ Paisley		☐ 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	Describe in detail the structure, organisation and role of genes and genomes
L2	Explain in depth a range of mechanisms that control gene expression in both prokaryotes and eukaryotes
L3	Demonstrate an ability to perform, analyse and evaluate molecular techniques used in DNA manipulation
L4	Discuss the scope and applications of DNA technology
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 9** Demonstrate a broad and integrated knowledge of genomic organisation and control of gene expression. Demonstrate a critical understanding of principal concepts and terminology of selected techniques for DNA manipulation.
Practice: Applied Knowledge and Understanding	**SCQF 9** Use the theoretical knowledge gained to perform appropriate techniques and analyse the results in the context of the theory.
Generic Cognitive skills	**SCQF 9** Critically analyse the technique, implications including ethical issues of an application of DNA technology.
Communication, ICT and Numeracy Skills	**SCQF 9** Communicate effectively orally and in writing. Analyse and interpret data where appropriate. Use IT to retrieve information.
Autonomy, Accountability and Working with Others	**SCQF 9** Working in teams to perform practical work and to research and present information will require time management, organisational skills and an understanding of professional practice.

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 a blended learning approach. Core theory and concepts will be delivered using formal lectures and tutorials where student participation will be expected. Students will acquire key practical skills by performing techniques use in DNA technology in the laboratory sessions. The concepts of these techniques will be reinforced by analysing and presenting the data including answering focussed questions on the concept of the techniques. Students will develop skills of computer based information retrieval as they are required to search through several data bases to retrieve data using it to construct information introduction to the subject of Bioinformatics. Enquiry based learning will be used to explore topical issues in DNA technology.

This will enhance skills of gathering information, critically analysing including ethical issues and presenting it.

Working in groups will develop organisational and time management skills.

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	12
Laboratory / Practical Demonstration / Workshop	12
Tutorial / Synchronous Support Activity	12
Asynchronous Class Activity	12
Independent Study	152
n/a	
TOTAL	200

Indicative Resources

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

T.A. Brown. (2006) Genomes 3., Garland Science, ISBN 0-8153-4138-5

D.S.T. Nicholl (2008) An Introduction to Genetic Engineering, 3rd Edition. Cambridge University Press, ISBN 13:9780521615211

Web site

http://www.dnalc.org/

Dolan DNA Learning Centre, Cold Spring Harbor Laboratory particularly DNA from the Beginning is an excellent site on the background molecular Biology.

Current relevant journals will be used.

T. A. Brown Gene Cloning and DNA Analysis: An Introduction

Publisher: Wiley-Blackwell; 6th Edition edition (26 Mar 2010) ISBN-10: 1405181737

(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, tutorials and practicals), completion of asynchronousactivities, 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.

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	Stuart Woods
External Examiner	A Tsaousis
Accreditation Details	RSB
Module Appears in CPD catalogue	☐ **Yes** ☒ **No**
Changes / Version Number	2.16

Assessment (also refer to Assessment Outcomes Grids below)

Assessment 1
Two 1 hour class tests worth 50% of the module mark. The resit will be two one hour class tests within the resit period.
Assessment 2
Coursework worth 50% of the final mark. The coursework will be two submissions.
Assessment 3
Observation of practical skills in molecular techniques used in DNA manipulation. This is a Pass/Fail component which must be passed.
(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	2

Component 2							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
Report of practical/ field/ clinical work	☐	☐	☐	☐	☒	50	0

Component 3							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
Clinical/ Fieldwork/ Practical skills assessment/ Debate/ Interview/ Viva voce/ Oral	☐	☐	☒	☐	☐	0	0
Combined total for all components						100%	2 hours

Change Control

What	**When**	**Who**
Module Coordinator change	12.2023	JW
Module Moderator change	04.2024	JW