

University of the West of Scotland

Module Descriptor

Session: 2023/24

Last modified: 08/02/24

Status: Published

Title of Module: DNA Technology

Code: BIOL10009	SCQF Level: 10 (Scottish Credit and Qualifications Framework)	Credit Points: 20	ECTS: 10 (European Credit Transfer Scheme)
School:	School of Health and Life Sciences		
Module Co-ordinator:	Jamie Whitelaw		

Summary of Module

Gene editing, stem cells, recombinant vaccines, PCR are terms that have been in the media recently. There has been rapid advancements in the development of techniques used to manipulate DNA. These techniques have been applied to areas such as medical diagnosis, treatment and prognosis, forensic analysis and the biotechnology industry. The improved technology has also led to the emergence of genetic engineering. Genetic engineering brings about change by scientifically altering an organism's genetic code. This has been applied not only to basic research but to advance fields such as medical diagnosis and treatment and creation of genetically modified plants and animals. Despite obvious benefits to society there has been public fear and criticism of the application of this technology which needs to be taken into account. This module will further your knowledge of genome structure, organisation and control of gene expression in normal and disease states. Provide an understanding of current DNA technologies and their applied to improving health, agriculture and society.

Undertaking this module will develop a range of graduate attributes. Knowledge in the principles behind the techniques used to manipulate DNA will be reviewed and extended to current and future applications of the technology. Sourcing, reviewing and presenting current scientific literature 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

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. Explain in detail the principles, methodology and applications of DNA manipulation</p> <p>L2. Evaluate the benefits and limitations of genetic engineering on society</p> <p>L3. Explain using appropriate detailed examples the genetics of disease</p> <p>L4. Critically evaluate current research in DNA Technology and its applications</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)	<p>SCQF Level 10.</p> <p>Demonstrate a critical understanding of the principles, theories and concepts of DNA technology.</p> <p>Demonstrate a knowledge and understanding of the application of DNA Technology including the benefits and limitations.</p>
Practice: Applied Knowledge and Understanding	<p>SCQF Level 10.</p> <p>Use the theoretical knowledge gained to perform appropriate techniques and analyse the results in the context of the theory.</p>
Generic Cognitive skills	<p>SCQF Level 10.</p> <p>Critically analyse the potential and limitations of DNA Technology.</p> <p>Critically evaluate current research in the area of DNA Technology.</p>
Communication, ICT and Numeracy Skills	<p>SCQF Level 10.</p> <p>Communicate effectively orally and in writing to your peers.</p>
Autonomy, Accountability and Working with others	<p>SCQF Level 10.</p> <p>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.</p>

Pre-requisites:	Before undertaking this module the student should have undertaken the following:
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	Module Code:	Module Title:
	Other:	or equivalent
Co-requisites	Module Code:	Module Title:

* Indicates that module descriptor is not published.

Learning and Teaching

Delivery of this module will use a hybrid learning approach. Core theory and concepts will be delivered using face to face or recorded lectures, tutorials and discussions. Students will be expected to select, evaluate and discuss relevant scientific literature on a variety of applications of DNA technology. Case studies will be used to evaluate the benefits, limitations and ethics of applications such as gene editing and stem cell therapy.

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	12
Tutorial/Synchronous Support Activity	12
Asynchronous Class Activity	12
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:

The module will use current and relevant web sites and scientific literature. For general revision any recent general molecular Biology, genetic engineering text book. There are many in the library.

Background information/revision

T.A. Brown. (2017) Genomes 4. Garland Science, ISBN 9780815345084

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.

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

(**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, workshops, 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	Steven Kelly
External Examiner	A Tsaousis
Accreditation Details	This module is part of the BSc (Hons) Applied Bioscience, BSc (Hons) Applied Bioscience with Forensic Investigation; accredited by Royal Society of Biology (RSB)
Changes/Version Number	2.12 MC updated, Change delivery to Hybrid C

Assessment: (also refer to Assessment Outcomes Grids below)
A final open book online test worth 60% of the final mark
Coursework worth 40% of the final mark. The coursework will consist of a report and a critical evaluation of relevant scientific publications or applications.
(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)	✓	✓	✓		60	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
Review/ Article/ Critique/ Paper				✓	20	0
Presentation				✓	20	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.

[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)