MODULE SPECIFICATION

Part 1: Information			
Module Title	Molecular Biology		
Module Code	USSKAL-30-2	Level	Level 5
For implementation from	2020-21		
UWE Credit Rating	30	ECTS Credit Rating	15
Faculty	Faculty of Health & Applied Sciences	Field	Applied Sciences
Department	HAS Dept of Applied Sciences		
Module type:	Standard		
Pre-requisites	Cells, Biochemistry and Genetics 2020-21		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description

Overview: Pre-requisite:

USSKA4-30-1: Cell Biochemistry and Genetics

This module is a broad based approach to molecular bioscience, crossing boundaries of biochemistry, genetics, cell and developmental biology.

Educational Aims: The focus of this module is on the biology and function of the incredible macromolecular machines which drive living processes and student will also become familiar with the state-of-the-art technology used to conduct these studies.

How is a gene able to function so precisely as to produce the right product at the right time, place and in response to the right signals? How are processes such as development, cell division and environmental sensing executed and controlled?

Our understanding of these processes is best appreciated at the molecular level where we see they are orchestrated by macromolecules which interact and work together in a machine-like manner and provides a powerful insight into how organisms ‘work’ - develop, age and die.

Outline Syllabus: Students will study :

Genome complexity, the structure of genes and DNA replication.

RNA and protein synthesis and the control of gene expression.

Epigenetic 'marks' and their importance in cell differentiation, development and disease.

An overview of protein structure and function. Protein folding and denaturation. The importance of protein folding in health and disease.

Signal transduction and second messengers. The diverse nature of signals. General concepts of signal perception and transduction and the nature of the second messenger systems which operate to transduce and amplify incoming signals. Selected examples of cell signalling in health and disease.

An outline of the cell cycle and its regulation and the molecular mechanisms of circadian rhythms.

Teaching and Learning Methods: The module will be delivered as mix of lectures/lectorials, extended practicals, tutorials, webinars, data analysis exercises and other student-centred learning activities to enable the development of subject knowledge and skills alongside key science graduate attributes skills. This module will equip students with the skills and understanding they will need to take their place at the cutting edge of biomolecular research.

Scheduled learning:

Lectures/lectorials that introduce the key knowledge concepts of the topics under discussion.

Extended practicals and data analysis workshops will afford the acquisition and development of key practical, analytical and evaluative skills.

Tutorials, through webinars and conference communication events together with timetabled assessment feedback and revision sessions will provide opportunities to support the acquisition and consolidation of knowledge, skills and key science graduate attributes.

Independent Learning:

Students are expected to further their understanding through engagement with printed resources and web-based material and innovative tutorials. The students will also be able to monitor their own skill development through selfassessment activities and other learning material available on E-Learning Environment, Blackboard.

It is the expectation through attendance at the timetabled teaching and learning activities, engaged independent learning together with the completion of the case study and the research practical portfolio and end of module written examination will take students to the notional 300 hours of study associated with this module.

Contact Hours:

The contact hours (72) are distributed as follows:

24 hours of lectures/lectorials
12 hours of tutorials/webinars
36 hours of laboratory practicals, workshops and communication/conference activities

Part 3: Assessment

The Assessment Strategy has been designed to support and enhance the development of both subject-based and generic key skills, whilst ensuring that the modules Learning Outcomes are attained.

The coursework comprises two elements:

Extended Case Study assignment will provide an opportunity for students to have developed their practical skills and knowledge and then demonstrate their ability to apply critical thinking and problem solving skills to the case study task.

The second element is a Research Practical Inquiry portfolio. The content of this portfolio which will contain examples of both study skills and subject skills and require statistical analysis of laboratory data; interpretation and discussion of laboratory data; evidence of referencing; examples of communication presentation.

Component A is an online exam (with a 24 hour submission window) at the end of the module and will test a range of the learning outcomes.

Formative feedback is available to students throughout the module through group discussions particularly in practical/tutorial group sessions. Students are provided with formative feedback-forward for coursework assessment and for the exam through a revision and exam preparation session prior to the exam and through support materials supplied through Blackboard.

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Portfolio - Component B		25 %	Research Practical Inquiry Portfolio
Examination (Online) - Component A	✓	50 %	Online exam (24 hours)
Case Study - Component B		25 %	Extended case study
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Portfolio - Component B		25 %	Research practical inquiry portfolio
Examination (Online) - Component A	✓	50 %	Online exam (24 hours)
Case Study - Component B		25 %	Extended case study

Part 4: Teaching and Learning Methods

Learning Outcomes

On successful completion of this module students will achieve the following learning outcomes:

Module Learning Outcomes	**Reference**
Compare the structure and organisation of genomes within a wide range of organisms	MO1
Contrast the process of gene expression and regulation in prokaryotes and eukaryotes and appreciate the importance of the epigenome	MO2
Describe the key structural features of proteins and the forces governing protein folding illustrating the protein structure-function relationship	MO3
Show an understanding of the importance and knowledge of signal transduction and second messengers to cell function	MO4

	Discuss key factors controlling the (i) eukaryotic cell cycle and (ii) cell differentiation and developmental	MO5
	Have acquired an appreciation of the research process through gaining practical experience of a range of molecular biology techniques and be able to interpret data obtained from such	MO6
	Use appropriate information technology resources to seek, retrieve and interpret subject specific material alongside the acquisition of other key generic graduate skills	MO7

Contact Hours	**Independent Study Hours:**	
	Independent study/self-guided study	228
	Total Independent Study Hours:	228
	Scheduled Learning and Teaching Hours:	
	Face-to-face learning	72
	Total Scheduled Learning and Teaching Hours:	72
	Hours to be allocated	300
	Allocated Hours	300
Reading List	*The reading list for this module can be accessed via the following link:* https://uwe.rl.talis.com/modules/usskal-30-2.html	

Part 5: Contributes Towards

This module contributes towards the following programmes of study:

Biological Sciences {Foundation} [Sep][FT][Frenchay][4yrs] BSc (Hons) 2018-19

Biological Sciences {Foundation} [Sep][SW][Frenchay][5yrs] BSc (Hons) 2018-19

Biological Sciences {Foundation} [Sep][SW][Frenchay][6yrs] MSci 2018-19

Biological Sciences {Foundation} [Sep][FT][Frenchay][5yrs] MSci 2018-19