



MODULE SPECIFICATION

Part 1: Information			
Module Title	Cells, Biochemistry and Genetics		
Module Code	USSKA4-30-1	Level	Level 4
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	None		
Excluded Combinations	Scientific Basis of Life 2020-21		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description
<p>Educational Aims: This module aims to introduce you to the cell and molecular biology that underpins the rest of your course:</p> <p>Cell Biology: Cells are the basic units of all living organisms. They exist in a wide range of forms to occupy different niches as free-living organisms or to carry out diverse roles within multi-cellular organisms. This module focuses on the eukaryotic cells that make up multicellular organisms, although some of the contrasts between eukaryotes and prokaryotes will be mentioned.</p> <p>Biochemistry: This module will introduce the organelles and molecules that form the major components of cells and the biochemical pathways that take place within them. We will also consider how cells, organelles and biochemical pathways are studied experimentally.</p> <p>Genetics: Genetics is the study of inheritance, genes and the DNA molecules that make up the genetic material. In this module you will study the structure and function of DNA, genes, chromosomes and the genome, as well as the principles of inheritance.</p>

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Outline Syllabus: Biological chemistry: the properties and structures of biochemical building blocks and macromolecules. Acids and bases, simple buffer systems.

Structure and function of eukaryotic cells and their organelles. Membrane structure and transport across membranes via diffusion, carrier proteins, channels, active transport.

Key techniques in Cell Biology and Biochemistry. Light microscopy, confocal microscopy, the transmission electron microscope (TEM), the scanning electron microscope (SEM). Fractionation of cells and their contents, simple protein purification, separation and assay.

Introduction to metabolism. An overview of catabolic and anabolic pathways. The metabolic roles of ATP, NADH, NADPH and FADH₂. Enzymes as biological catalysts. Electron transport and ATP synthesis. The major pathways of carbohydrate and lipid metabolism and their significance in health and disease.

Studying genes. Genetics in context - genes, expectations and realities.

The genetic material and genomes. DNA photocopying - the replication of DNA. Decoding the messages within the genes - gene expression: transcription, RNA processing and translation. Altering the genetic material - mutation, recombination, gene cloning and PCR. Prokaryotic versus eukaryotic gene expression and protein synthesis. Epigenetics in Health and Disease.

Inheriting genes. What Mendel discovered and how molecular genetics relates to Mendel. Variation upon a Mendelian theme. The phenomenon of linkage - mapping genes. Gene inheritance patterns in humans and molecular approaches to diagnosing genetic disease.

Teaching and Learning Methods: See Assessment

Part 3: Assessment

The assessment strategy for this module is designed to test the breadth and depth of students' knowledge, as well as their ability to analyse data and relate subject knowledge to current applications and impact.

Component A consists of 2 online exams over a 24 hour period. The first is designed to take 1 hour and tests key concepts delivered in semester 1. There will thus be an opportunity to receive feedback before the second (nominally 2 hours), which will test breadth of knowledge across the module.

Component B1 is a written assignment, which will provide experience in interpreting and presenting data in Cell Biology, Genetics and Biochemistry. The use of short word limits develops skills in concise scientific writing and helps reduce plagiarism. Plagiarism is also reduced by requiring students to present group data. This feeds forward to assignments at level 2 in Biological Sciences and Biomedical Science programmes. Component B2, running throughout the year, will assess engagement with the practical classes and comprehension of key concepts through a series of online quizzes.

Plagiarism is reduced by making use of banks of similar questions assigned randomly.

Opportunities for formative assessment and feedback are built into the assignments and review of the January exam.

All work is marked in line with the Department's Generic Assessment Criteria and conforms to the university policies for the setting, collection, marking and return of student work. Assessments are described in the Module handbook that is supplied at the start of module.

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First Sit Components	Final Assessment	Element weighting	Description
Set Exercise - Component B		25 %	Interpretation and presentation of data
Portfolio - Component B		25 %	Online practical quizzes
Examination (Online) - Component A		15 %	Online examination (24 hours) - anticipated completion time 1 hour.
Examination (Online) - Component A	✓	35 %	Online examination (24 hours) - anticipated completion time 2 hours.
Resit Components	Final Assessment	Element weighting	Description
Set Exercise - Component B		25 %	Interpretation and presentation of data
Online Assignment - Component B		25 %	Online practical quizzes
Examination (Online) - Component A	✓	50 %	Online examination (24 hours) - anticipated completion time 3 hours.

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
	Describe the ultrastructure and function of eukaryotic cells, organelles and biological membranes	MO1
	Describe the key features and properties of nucleic acids, amino acids, proteins, lipids and carbohydrates	MO2
	Describe key pathways in carbohydrate and lipid metabolism and explain how energy from metabolism is channelled into ATP synthesis	MO3
	Relate DNA and RNA structure to function and describe the basic features of gene structure and expression	MO4
	Explain how genetic material can be altered by natural and artificial means	MO5
	Describe the modes of inheritance of characteristics	MO6
	Demonstrate key skills of data analysis in cell biology, genetics and biochemistry	MO7
Discuss current applications and impact of cell biology, genetics and biochemistry	MO8	
Contact Hours	Independent Study Hours:	
	Independent study/self-guided study	234
	Total Independent Study Hours:	234
	Scheduled Learning and Teaching Hours:	
Face-to-face learning	66	

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	Total Scheduled Learning and Teaching Hours:	66
	Hours to be allocated	300
	Allocated Hours	300
Reading List	<i>The reading list for this module can be accessed via the following link:</i> https://uwe.rl.talis.com/modules/usska4-30-1.html	

Part 5: Contributes Towards

This module contributes towards the following programmes of study: