MODULE SPECIFICATION

Part 1: Information			
Module Title	Cells, Biochemistry and Genetics		
Module Code	USSKA4-30-1	Level	1
For implementation from	September 2019		
UWE Credit Rating	30	ECTS Credit Rating	15
Faculty	Health and Applied Sciences	Field	Applied Sciences
Department	Applied Sciences		
Contributes towards	This module is compulsory on all variants of the following programmes: BSc (Hons) Biomedical Science BSc (Hons) Biological Sciences		
Module type:	Standard		
Pre-requisites	None		
Excluded Combinations	USSJT5-30-1 Scientific Basis of Life		
Co- requisites	None		
Module Entry requirements	N/A		

Part 2: Description

This module aims to introduce you to the cell and molecular biology that underpins the rest of your course:

- 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.
- 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.
- 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.

Syllabus outline

- 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.

Part 3: Assessment: Strategy and Details

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 written exams. The first exam is 1h and tests key concepts delivered in semester 1 through MCQs as well as providing an opportunity to describe and apply knowledge in short written answers from a bank of questions provided in advance. There will thus be an opportunity to receive feedback before the second exam (2h), which will test breadth of knowledge across the module through MCQs and ability to describe and apply knowledge and synthesise arguments in short written answers.

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 their own practical 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.

Identify final timetabled piece of assessment (component and element)	Component A2

% weighting between components A and B (Standard modules only)	**A:**	**B**:
	50	**50**

First Sit

Component A (controlled conditions) **Description of each element**	**Element weighting** **(as % of component)**
1. Written examination (1 hour), Assessment Period 1	30
2. Written examination (2 hours), Assessment Period 2	70
Component B **Description of each element**	**Element weighting** **(as % of component)**
1. Interpretation and presentation of data	50
2. Online practical portfolio	50

Resit (further attendance at taught classes is not required)	
Component A (controlled conditions) **Description of each element**	**Element weighting** **(as % of component)**
1. Written examination (3 hours), Assessment Period 3	100
Component B **Description of each element**	**Element weighting** **(as % of component)**
1. Interpretation and presentation of data	50
2. Online practical portfolio	50

Part 4: Learning Outcomes & KIS Data

Learning Outcomes

On successful completion of this module students will be able to:

- describe the ultrastructure and function of eukaryotic cells, organelles and biological membranes [A1, B2]
- describe the key features and properties of nucleic acids, amino acids, proteins, lipids and carbohydrates [A1, B2]
- describe key pathways in carbohydrate and lipid metabolism and explain how energy from metabolism is channelled into ATP synthesis [A2, B2]
- relate DNA & RNA structure to function and describe the basic features of gene structure and expression [A2, B1]
- explain how genetic material can be altered by natural and artificial means [A2, B2]
- describe the modes of inheritance of characteristics [A2, B2]
- demonstrate key skills of data analysis in cell biology, genetics and biochemistry [B1, B2]
- discuss current applications and impact of cell biology, genetics and biochemistry [A2, B1]

Key Information Sets Information (KIS)

Key Information Set - Module data

Number of credits for this module				30
Hours to be allocated	Scheduled learning and teaching study hours	Independent study hours	Placement study hours	Allocated Hours
300	72	228	0	300

Contact Hours

The table below indicates as a percentage the total assessment of the module which constitutes a;

Written Exam: Unseen or open book written exam
Coursework: Written assignment or essay, report, dissertation, portfolio, project or in class test

Total Assessment	**Practical Exam**: Oral Assessment and/or presentation, practical skills assessment, practical exam (i.e. an exam determining mastery of a technique) Total assessment of the module: Written exam assessment percentage 50% Coursework assessment percentage 25% Practical exam assessment percentage 25% 100%
Reading List	https://rl.talis.com/3/uwe/lists/7DE5EDD6-CBA8-4348-DA73-7729E755EF65.html?embed=1&lti_relink_url=https:%2F%2Fuwe.rl.talis.com%2Flti%2Flaunch.html%3Fcustom_node_code_replacement%3D%2524%257B1%257D%26context_id%3DUSSKA4-30-1_18sep_1%26context_title%3DUSSKA4-30-1%2B-%2BCell%2Bbiochemistry%2Band%2Bgenetics%2B18sep_1%26resource_link_id%3DUSSKA4-30-1_18sep_1_6338211_1%26roles%3DInstructor%26custom_node_code_regex%3D%252F%255E%2528.%257B11%257D%2529.%252A%252F%26context_label%3DUSSKA4-30-1_18sep_1%26oauth_consumer_key%3DFD5B379E-83DF-EE63-55CE-B8A282E5DA9C%26relink%3Dtrue%26embed%3Dtrue%26signature%3D5f0bc96044a5cc6e4dfbb716a409592c854e950614081a42e97f0c584dcd9ee7

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Revision Approval Date	PER 28/11/2018 – see PER outcome report	Version	2	