University of the West of England
BRISTOL

ACADEMIC SERVICES

MODULE SPECIFICATION

Part 1: Basic Data						
Module Title	Scientific Basis of Life					
Module Code	USSJT5-30-1		Level	1	Version	1.2
UWE Credit Rating	30	ECTS Credit Rating	15	WBL module?	No	
Owning Faculty	Health and Applied Sciences		Field	Biological, Biomedical and Analytical Sciences		
Department	Biological, Biomedical and Analytical Sciences		Module Type	Standard		
Contributes towards	FdSc Healthcare Science BSc (Hons) Healthcare Science (Life Science)					
Pre-requisites	N/A		Co- requisites	N/A		
Excluded Combinations	None		Module Entry requirements	N/A		
First CAP Approval Date	21st November 2012		Valid from	September 2015		
Revision CAP Approval Date			Revised with effect from			

Review Date	

Part 2: Learning and Teaching	
Learning Outcomes	On successful completion of this module students will be able to (assessment intended for each learning outcome designated by [*] corresponding to assessment section): • Compare the ultrastructure and function of prokaryotic and eukaryotic cells and their organelles [A1, B1] • Describe the structure of biological membranes and explain key concepts in membrane transport [A1] • Describe the key features and properties of nucleic acids, amino acids, proteins, lipids and carbohydrates [A1] • Describe key pathways in carbohydrate, lipid and amino acid metabolism and explain how energy from metabolism is channelled into ATP synthesis [A1] • Relate DNA & RNA structure to function and describe the basic features of gene structure and expression [A2] • Explain how genetic material can be altered by natural and artificial means [A2, B2] • Describe the modes of inheritance of characteristics [A2, B1] • Demonstrate key skills of data analysis in cell biology, genetics and biochemistry [B1] • Discuss current applications and impact of cell biology, genetics and biochemistry [A1, B2] • Reflect on how the scientific principles of cell biology, biochemistry and genetics underpin practice in healthcare science [B2]

Syllabus Outline	This module provides the learner with essential knowledge and understanding of the scientific basis of life. • **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. Electron transport and ATP synthesis. The major pathways of carbohydrate, lipid and amino acid metabolism and their significance in health and disease. Enzymes as biological catalysts. Determination and significance of Km and Vmax, specific activity. • **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. • **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.
Contact Hours	There will be 3 weeks of contact time at UWE in 3 x 1 week blocks. Included in each block week are laboratory workshops, lectures and tutorials. The contact time will equate to approximately 6 hours per block (a total of 18 hours). In addition to the allocated hours on campus learning, students will engage in synchronous and asynchronous online learning. This will comprise a total of approximately 54 hours of online engagement through a combination of lectures, synchronous online tutorials, synchronous and asynchronous discussions, online quizzes, and collaborative group work
Teaching and Learning Methods	The strategy of this module is to provide a platform for students to gain an understanding of the scientific basis of life. Students are expected to spend 72 hours on scheduled learning and 228 hours on independent learning. Theoretical material within the module will be presented to the students in the form of regular lectures throughout each of the semesters in the academic year. During those times of work based learning, these lectures will be delivered online and involve a number of technological enhancements. The learning of lecture content will be reinforced through time spent in independent learning by the directed reading of recommended texts and through the use of technology enhanced learning resources that will be provided online. This online learning and engagement will be delivered through several avenues: • Synchronous online tutorials in protected learning time where the student will contribute/attend an online activity appropriate to the content at the time at which the academic will be present online to facilitate and lead this scheduled/timetabled session. This tutorial will be themed/planned. • Asynchronous discussions in the student's own time (or during protected time where permitted and appropriate) where they will engage/collaborate with other students on the course or in specified groups, and in which the academic is permitted to moderate where necessary, but is not expected to contribute. • Synchronous surgery sessions timetabled for a specific time in which the

academic will be available online to answer live questions via discussion boards/blogs/collaborate or to respond to questions posted/asked prior to the session.
- Interactive, online formative quizzes made available either following a particular package of knowledge exchange/learning, or in specified sessions/time periods.
- Lectures delivered online through a combination of one or more of the following: visual/audio/interactivity/personal formative assessment

A number of relevant practical sessions will be incorporated during the campus based blocks in addition to the work based learning that must be achieved under supervision by a workplace supervisor. Practical sessions will both drive hands on learning and the acquisition of technical skills at both an individual and group working level.

The remainder of the independent learning time allocated to the module should be spent preparing written assessments for submission [B1, B2], and undertaking revision for the exams [A1, A2].

Scheduled learning includes lectures, seminars, tutorials, project supervision, demonstration, practical classes and workshops; fieldwork; external visits; work based learning; supervised time in studio/workshop.

Independent learning includes hours engaged with essential reading, case study preparation, assignment preparation and completion etc. These sessions constitute an average time per level as indicated in the table below. Scheduled sessions may vary slightly depending on the module choices you make.

Key Information Sets Information

Key Information Sets (KIS) are produced at programme level for all programmes that this module contributes to, which is a requirement set by HESA/HEFCE. KIS are comparable sets of standardised information about undergraduate courses allowing prospective students to compare and contrast between programmes they are interested in applying for.

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

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

Written Exam: Unseen written exam, open book written exam, In-class test
Coursework: Written assignment or essay, report, dissertation, portfolio, project
Practical Exam: Oral Assessment and/or presentation, practical skills assessment, practical exam

Please note that this is the total of various types of assessment and will not necessarily reflect the component and module weightings in the Assessment section of this module description:

	Total assessment of the module:
	Written exam assessment percentage: 40%
	Coursework assessment percentage: 60%
	Practical exam assessment percentage: 0%
	100%
Reading Strategy	All students will be encouraged to make full use of the print and electronic resources available to them through membership of the University. These include a range of electronic journals and a wide variety of resources available through web sites and information gateways. The University Library's web pages provide access to subject relevant resources and services, and to the library catalogue. Many resources can be accessed remotely. Students will be presented with opportunities within the curriculum to develop their information retrieval and evaluation skills in order to identify such resources effectively. Any **essential reading** will be indicated clearly, along with the method for accessing it, e.g. students may be expected to purchase a set text, be given or sold a print study pack or be referred to texts that are available electronically, etc. This guidance will be available either in the module handbook, via the module information on Blackboard or through any other vehicle deemed appropriate by the module/programme leaders. If **further reading** is expected, this will be indicated clearly. If specific texts are listed, a clear indication will be given regarding how to access them and, if appropriate, students will be given guidance on how to identify relevant sources for themselves, e.g. through use of bibliographical databases. A detailed reading list will be made available through relevant channels, e.g. module handbooks, Blackboard, etc.
Indicative Reading List	It is recommended that the following book be purchased by all students as it covers most of the module material at an appropriate level: Alberts, B., Bray, D., Hopkin, K., Johnson, A.D., Lewis, J., Raff, M., Roberts, K. and Walter, P. (2013) *Essential Cell Biology*. New York: Garland Science. Extensive notes will be provided via blackboard on the scientific topics. Links to useful and credible websites will also be provided. The students are also advised to consult the basic scientific texts in Frenchay and Glenside libraries, of which the following is a representative sample: Russell, P.J. (2009) *iGenetics: A Molecular Approach*. Boston: Pearson. Robinson, T.R. (2010) *Genetics for Dummies*. Ames: Wiley-Blackwell. Lodish, H., Berk, A. and Kaiser, C.A. (2007) *Molecular Cell Biology*. New York: WH Freeman and Co. Alberts, B., Johnson, A., Lewis, J., Raff, M., Roberts, K. and Walter, P. (2008) *Molecular Biology of the Cell*. New York: Garland Science. Nelson, D.L. and Cox, M.M. (2008) *Lehninger Principles of Biochemistry*. New York: WH Freeman and Co. Berg, J.M., Tymoczko, J.L. and Stryer, L. (2011) *Biochemistry: International Edition*. New York: WH Freeman and Co.

Part 3: Assessment	
Assessment Strategy	The Assessment Strategy has been designed to support and enhance the development of both subject-based and more general skills, whilst ensuring that the modules learning outcomes are attained, as described below. **Component A** The written exams will provide students with an opportunity to demonstrate both their knowledge on a broad range of topics through a series of short answer questions, and more in-depth knowledge though a selection of medium length questions. **Component B** The first coursework element will provide an opportunity for students to consolidate factual knowledge through data interpretation in Cell Biology, Biochemistry and Genetics. The second element allows students to apply their knowledge and identify examples of how the principles of Cell Biology, Biochemistry and Genetics underpin practice in Healthcare Science through preparation and defence of a poster. Formative feedback is available to students throughout the module through group discussions, and in workshops. Students are provided with formative feed-forward for their exam through a revision and exam preparation session prior to the exam and through the extensive support materials supplied through Blackboard. All work is marked in line with the Department's Generic Assessment Criteria and conforms to university policies for the setting, collection, marking and return of student work. Where an individual piece of work has specific assessment criteria, this is supplied to the students when the work is set. This assessment strategy has been designed following best practice on effective assessment from JISC (http://www.jisc.ac.uk/whatwedo/programmes/elearning/assessment/digiassess.aspx) and The Open University's Centre for Excellence in Teaching and Learning (http://www.open.ac.uk/opencetl/centre-open-learning-mathematics-science-computing-and-technology/activities-projects/e-assessment-learning-the-interactive-comp). Technical design and deployment of the activities will also follow best practice developed at UWE by the Education Innovation Centre in collaboration with academic colleagues across the university. Staff guidance and support are already in place (http://info.uwe.ac.uk/online/Blackboard/staff/guides/summative-assessments.asp).

Identify final assessment component and element		
% weighting between components A and B (Standard modules only)	**A:**	**B**:
	40	**60**

First Sit	
Component A (controlled conditions) **Description of each element**	**Element weighting** **(as % of component)**
1. Examination (1.5 hours)	50%
2. Examination (1.5 hours)	50%
Component B **Description of each element**	**Element weighting** **(as % of component)**
1. Data interpretation exercise	50%
2. Poster presentation and defence (20 minutes)	50%

Resit (further attendance at taught classes is not required)	
Component A (controlled conditions) **Description of each element**	**Element weighting** **(as % of component)**
1. Examination (3 hours)	100%
Component B **Description of each element**	**Element weighting** **(as % of component)**
1. Data interpretation exercise and case study	100%
If a student is permitted a retake of the module under the University Regulations and Procedures, the assessment will be that indicated by the Module Description at the time that retake commences.	