University of the West of England
BRISTOL

ACADEMIC SERVICES

MODULE SPECIFICATION

Part 1: Basic Data						
Module Title	Advanced Life Sciences					
Module Code	USSKL7-30-2		Level	2	Version	1
UWE Credit Rating	30	ECTS Credit Rating	15	WBL module?	No	
Owning Faculty	Health and Applied Sciences		Field	Healthcare Science		
Department	Biological, Biomedical and Analytical Sciences		Module Type	Standard		
Contributes towards	FdSc Healthcare Science BSc (Hons) Healthcare Science (Life Science)					
Pre-requisites	USSJT5-30-1 Scientific Basis of Life USSJT7-30-1 Pathophysiology of Disease USSJT8-30-1 Anatomy and Physiology		Co- requisites	None		
Excluded Combinations	None		Module Entry requirements	None		
First CAP Approval Date	2 February 2016		Valid from	September 2016		
Revision CAP Approval Date			Revised with effect from			

Part 2: Learning and Teaching	
Learning Outcomes	On successful completion of this module students will be able to fulfil the learning outcomes from 2 of the following 3 Life Sciences themed units of study (assessment intended for each learning outcome designated by [*] corresponding to assessment section): **1. Applied Genetics** • Describe the range of current gene-based techniques used in genetic studies [A1] • Discuss selected applications of current gene-based technology [A1, B2, B3] • Appreciate the continuing development gene-based technology [A1, B2, B3] • Explain the impact of gene-based technology on human society [A1, B2] • Understand and discuss the general principles underlying genome structure and function in a range of organisms, with a focus on the human genome [A1, B2] • Understand the fundamentals of molecular evolution and the basis of population genetics [A1] • Analyse and interpret laboratory data [B2] **2. Biology of Microorganisms** • Understand fundamental aspects of microbial growth, metabolism and lifestyle [A1] • Describe the unique nature of viruses [A1, B2]

	• Appreciate the significance of classification of bacteria [A1, B2] • Appreciate energy generation and metabolism in microorganisms [A1, B2] • Analyse data derived from laboratory study of microorganisms [A1, B2] • Relate the characteristics of certain microorganisms to their survival and success as pathogens [A1, B2] **3. Human Physiology** • Interpret and explain the principles of operation of the major physiological systems (as in the condition of health), with particular reference to homeostasis [A2, B1] • Relate particular practical investigative instrumentation / techniques in human physiology and pharmacology to the principles of operation noted above [A2, B1] • Analyse and interpret laboratory data [B1]
Syllabus Outline	Students will study an appropriate combination of 2 from the following 3 themed units of study: **1. Applied Genetics** • **Overview**: Applied genetics; revision of basic genetic concepts and terminology; manipulating the genome – recombinant DNA technology. • **Genome Mapping**: Human genome structure; DNA types; approaches to mapping genes – functional and positional cloning; comparing physical and genetic maps; interpreting sequence data; Using model genomes to afford an insight into functional genomics; legal and ethical issues. • **Genotyping**: DNA variation within organisms; detecting specific DNA variants within individual genomes; disease diagnosis; genetic screening; DNA profiling; ethical and legal issues. • **Population genetics**: Allele frequencies, genetic equilibria, population mixing, genetic drift and gene flow. • **Transgenic Organisms**: Creating transgenic organisms; using the technology to study gene function and regulation, transgenic mouse models for human disease; introduction to gene therapy; legal and ethical issues. • **Developmental genetics**: Stem cells; cell type specification in animals; patterning during embryogenesis; Hox genes in drosophila and mammals **2. Biology of Microorganisms** • Growth, nutrition and death of microbes; catabolism and anabolism • Microbial evolution; 16sRNA; bacterial taxonomy • Gram positive and Gram negative bacteria of medical, general or industrial importance • Virus structure and replication; lysogeny; classification of viruses • Certain microbiological diseases and their control relationship between host and microorganisms, mechanisms of pathogenicity **3. Human Physiology** • Review of neural and endocrine communication systems related to homeostatic control; somatic neuromuscular control; types of muscle as effectors • **Cardiovascular system**: Cardiac muscle and intrinsic properties of the heart; extrinsic control; vascular system and peripheral resistance; regulation of cardiovascular parameters such as blood pressure • **Respiration**: Mechanics of lung ventilation; neural and chemical control; gas exchange and transport including acid-base considerations; • **Endocrinology**: Selected examples from the endocrine system will be used to illustrate the role of hormones in homeostatic systems • **Digestion**: Structure and functional differentiation of human digestive tract; examples of integration of neural and endocrine control of motility and digestive secretions • **Renal physiology**: nephron form and function; measures of function such as clearance; fluid, electrolyte and acid-base balance; endocrinology as appropriate, including ADH, Aldosterone, ANP, Renin-Angiotensin system • **Principles of Pharmacology**: Receptors, autonomic and neuromuscular

	pharmacology; structure-activity relationships; pharmacological analysis of drug-receptor interactions • **Applied physiology**: Examples of the integrative functioning of physiological systems under stress, to include dynamic, sustained exercise; extreme heat; stress and the general adaptation syndrome
Contact Hours	There will be 2 weeks of contact time at UWE in 2 x 1 week blocks. Included in each block week are laboratory workshops, lectures and tutorials. The contact time will equate to approximately 12 hours per block (a total of 24 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 48 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	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 Practical classes will include simulated case-study based investigations which will allow students to develop their analytical, interpretive and data handling skills. The remainder of the independent learning time allocated to the module should be spent preparing written assessments for submission [B1, B2, B3], and undertaking revision for the controlled component [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: 300 | Scheduled learning and teaching study hours: 72 | Independent study hours: 228 | Placement study hours: 0 | Allocated Hours: 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: 50% Coursework assessment percentage: 50% 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	**Applied Genetics** Brown, T.A. (2002) *Genomes.* 2nd ed. Oxford: Wiley-Liss. Lamb, B.C. (2006) *The Applied Genetics of Plants, Animals, Humans and Fungi.* 2nd ed. World Scientific Publishing. Lodish, H., Berk, A., Kaiser, C.A., Krieger, M., Bretscher, A., Ploegh, H., Amon, A. and Russell, P.J. (2009) *iGenetics: A Molecular Approach.* 3rd ed. San Francisco: Pearson Benjamin Cummings. Scott, M.P. (2012) *Molecular Cell Biology*. 7th ed. New York: WH Freeman and Co. **Biology of Microorganisms** Brooks, G.F., Carroll, K.C., Butel, J.S., Morse, S.A. and Mietzner, T. (2010) *Jawetz, Melnick & Adelberg's Medical Microbiology.* 25th ed. New York: McGraw Hill. Strelkauskas, A., Strelkauskas, J. and Moszyk-Strelkauskas, D. (2010) *Microbiology: a clinical approach*. New York: Garland Science. Willey, J.M., Sherwood, L.M. and Woolverton, C.J. (2011) *Prescott's Microbiology* 8th ed. New York: McGraw Hill. **Human Physiology** Berne, R. and Levy, M. (2010) *Principles of Physiology.* 6th ed. London: Mosby. Marieb, E. and Hoen, K. (2011) *Human Anatomy and Physiology.* 9th ed. San Francisco: Pearson Benjamin Cummings. Silverthorn, D. (2012) *Human Physiology: An Integrated Approach.* 6th ed. San Francisco: Pearson Benjamin Cummings. Stanfield, C.L. & Germann, W.J. (2007). *Principles of Human Physiology*. 3rd ed. San Francisco: Pearson Benjamin Cummings. Tortora, J.G. & Derrickson, B.H. (2008) *Principles of Anatomy and Physiology.* 12th ed. 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 exam will provide students with an opportunity to demonstrate both their knowledge on a broad range of topics through a series of short essay questions. Continuous assessment will be provided by the use of 3 x 30 minute online activities embedded in the module. These activities will require UWE login. The module leader will have full access to up-to-date data to monitor progress and marks obtained by students. Feedback at this level will also be provided online and will be by review of the tests after they have been completed and will include the correct answers (after the relevant assessment period has concluded). The design of these online assessed activities will be varied, for example: • Timed essay questions • MCQ

	• Label the structure • Prioritisation structure • Scenario based questions **Component B** The element will capture the content of online learning and practical workshops delivered in the block weeks. This summative assessment will take the form of a poster presentation. 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	Component B1	
% 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. Examination (1.5 hours)	50%
2. 3 x 30 minute online activities embedded in the learning process	50%
Component B **Description of each element**	**Element weighting** **(as % of component)**
1. Case study (poster)	100%

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. Case study (poster)	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.	