University of the West of England
BRISTOL

CORPORATE AND ACADEMIC SERVICES

MODULE SPECIFICATION

Part 1: Basic Data						
Module Title	Molecular Biology					
Module Code	USSKAL-30-2		Level	2	Version	1
Owning Faculty	Health and Applied Sciences		Field	BBAS		
Contributes towards	BSc Biological Sciences					
UWE Credit Rating	30	ECTS Credit Rating	15	Module Type	Standard	
Pre-requisites	USSKA4-30-1 Cell Biochemistry and Genetics		Co- requisites	None		
Excluded Combinations	None		Module Entry requirements			
Valid From	September 2015		Valid to	September 2021		

CAP Approval Date	28/03/2014

Part 2: Learning and Teaching	
Learning Outcomes	On successful completion of this module students will be able to: • Compare the structure and organisation of genomes within a wide range of organisms (A, B1) • Contrast the process of gene expression and regulation in prokaryotes and eukaryotes and appreciate the importance of the epigenome (A, B1) • Describe the key structural features of proteins and the forces governing protein folding illustrating the protein structure-function relationship (A, B2) • Show an understanding of the importance and knowledge of signal transduction and second messengers to cell function (A, B2) • Discuss key factors controlling the (i) eukaryotic cell cycle and (ii) cell differentiation and developmental (A, B2) • 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 (A,B) • use appropriate information technology resources to seek, retrieve and interpret subject specific material alongside the acquisition of other key generic graduate skills (A,B)
Syllabus Outline	This module is a broad based approach to molecular bioscience, crossing boundaries of biochemistry, genetics, cell and developmental biology. The focus 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. 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.
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
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 self-assessment 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.
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 3 hour written exam **Coursework**: Extended Case Study, Research Practical Inquiry Portfolio 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% 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. A detailed reading list will be made available through relevant channels, e.g. module handbooks, Blackboard, etc. 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.
Indicative Reading List	The latest edition of: • Alberts B.et al., *Molecular Biology of the Cell*, Abingdon: Garland Science. • Alberts B. et al., *Essential Cell Biology*, Abingdon: Garland Science. • Brown T.A. *Genomes 3.* Abingdon: Garland Science • Lodish H.et al., *Molecular Cell Biology*, New York: W.H. Freeman and Company • Russell P.J. *i Genetics* Harlow: Pearson Education • Watson J. et al. *Molecular Biology of the Gene*. San Francisco, California: Pearson/ Benjamin Cummings

Part 3: Assessment	
Assessment Strategy	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 The controlled component is a three hour exam 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.

Identify final assessment component and element		
% weighting between components A and B (Standard modules only)	**A:** **50%**	**B**: **50%**
First Sit		
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. Extended Case Study	50%
2. Research Practical Inquiry 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. Examination (3 hours)	100%
Component B **Description of each element**	**Element weighting** **(as % of component)**
1. Extended Case Study	50%
2. Research Practical Inquiry Portfolio	50%
If a student is permitted an **EXCEPTIONAL RETAKE** of the module the assessment will be that indicated by the Module Description at the time that retake commences.	