MODULE SPECIFICATION

Part 1: Information			
Module Title	Genomic Technologies		
Module Code	USSKBF-30-3	Level	Level 6
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	Molecular Biology 2020-21		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description

Overview: Pre-requisites: students must have taken one out of USSKAL-30-2 Molecular Biology, or USSKAM-30-2 Genes and Biotechnology, or USSKB7-15-2 Molecular Genetics

Educational Aims: See Learning Outcomes

Outline Syllabus: Genome technologies:

DNA sequencing:
Structure of a genome, Sanger sequencing, next generation sequencing, future sequencing technologies.

Bioinfomatics Analysis Techniques - DNA:
Gene annotation, DNA and protein databases, SRS. Pairwise alignment techniques; BLAST, identity and similarity. Multiple sequence alignment; PSI-BLAST, Clustal.

Bioinformatics Analysis Techniques – Protein:
Secondary databases and protein structure predication; motifs, pattern and profile database, PROSITE, structure databases, Domains, ExPASy Proteomics tools. Structural Proteomics, methods of determination, how to display and store.

Model Genomes: Structure and organisation, techniques used to study model genome, discoveries made.

Analysis of Gene Expression and Function:
Expression analysis, microarrays, SAGE, RNAseq, functional assays, 'knock-out' and 'knock-down' technologies, proteomics.

Applications of genome technologies:

Current topics for example:
Drug development and targets – Analysis of drug resistance.
Identification of tumour-rejection antigens.
Genome Analysis in Forensic Science.
Reconstructing Phylogenies.
Antibiotic drug discovery and reverse vaccinology

Teaching and Learning Methods: The module will be delivered as a mix of lectures and data analysis tutorials.

The contact hours (66) are distributed as follows:
60 hours lectures
6 hours computer tutorials

Scheduled learning:
Scheduled contact time is structured around a series of lectures that introduce the key concepts of the topic under discussion.
Bioinformatics lectures will be supported by a serious of computer based tutorials to allow the students to put the theory in to practice and prepare for their assignment.
Revision will be embedded in the lectures but also focused on in an additional tutorial session.

Independent learning includes hours engaged with essential reading, case study preparation, assignment preparation and completion etc. These sessions constitute an average time per level.

Part 3: Assessment

The Assessment for this module is designed to test the breadth and depth of students' knowledge, as well as their ability to analyse, synthesize and summarise information critically, including published research.

Component A is an online exam, with a 24 hour window for completion. This assessment allows students to demonstrate both their ability to research, prioritise information and produced a structured, evidence based answer. This assessment links directly to requests from employers as they require graduates proficient at researching and scientific writing under pressure. The examination provides students with the opportunity to demonstrate their knowledge and understanding of the key concepts and paradigms associated with the subject matter, to use case studies and other evidence critically to support their arguments.

The case study provides the opportunity for the student to complete an in-depth analysis of selected topic from the module syllabus by critically reviewing published research. The second assignment will be a problem based data interpretation that allows the students to select and use appropriate bioinformatics techniques and interpreter the out puts of their analysis.

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

All work is marked in line with the Department's Generic Assessment Criteria and conforms with 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.

First Sit Components	Final Assessment	Element weighting	Description
Primary Source Exercise - Component B		20 %	Data interpretation
Examination (Online) - Component A	✓	60 %	Online Examination (24 hours)
Case Study - Component B		20 %	Case study
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Primary Source Exercise - Component B		20 %	Data interpretation
Examination (Online) - Component A	✓	60 %	Online Examination (24 hours)
Case Study - Component B		20 %	Case study

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 and critically discuss past, current and future developments in DNA sequencing technologies.	MO1
Review and discuss the scope of bioinformatics including alignment techniques and databases. Select and use appropriate bioinformatic 'tools'.	MO2
Discuss the concept of 'model' genomes and their importance. Describe and critically assess the techniques used to analysis model genomes and the discoveries that have been made using them.	MO3
Discuss and critically assess the methods of global expression analysis including the transcriptome and the proteome and the applications of these technologies.	MO4
Review, discuss and evaluate a range of current uses for genomic technologies.	MO5

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
Total Scheduled Learning and Teaching Hours:	66

	Hours to be allocated	300
	Allocated Hours	300
Reading List	*The reading list for this module can be accessed via the following link:* https://uwe.rl.talis.com/modules/usskbf-30-3.html	

Part 5: Contributes Towards
This module contributes towards the following programmes of study: Healthcare Science (Genetic Science) [Sep][FT][Frenchay][3yrs] BSc (Hons) 2018-19 Biomedical Science [Sep][FT][Frenchay][4yrs] MSci 2018-19 Forensic Science [Sep][FT][Frenchay][3yrs] BSc (Hons) 2018-19 Forensic Science [Sep][FT][Frenchay][4yrs] MSci 2018-19 Biomedical Science [Sep][FT][Frenchay][3yrs] BSc (Hons) 2018-19 Biological Sciences [Sep][FT][Frenchay][3yrs] BSc (Hons) 2018-19 Biological Sciences [Sep][FT][Frenchay][4yrs] MSci 2018-19