University of the West of England
BRISTOL

CORPORATE AND ACADEMIC SERVICES

MODULE SPECIFICATION

Part 1: Basic Data						
Module Title	Applied Biotechnology					
Module Code	USSKCG-15-3		Level	3	Version	1
Owning Faculty	Health and Applied Sciences		Field	Biological, Biomedical and Analytical Sciences		
Contributes towards	BSc Biological Sciences					
UWE Credit Rating	15	ECTS Credit Rating		Module Type	Standard	
Pre-requisites	Molecular Biology (USSKAL-30-2) And Genes & Biotechnology (USSKAM-30-2)		Co- requisites	None		
Excluded Combinations			Module Entry requirements			
Valid From	September 2014		Valid to	September 2020		

CAP Approval Date	28/03/2014

Part 2: Learning and Teaching	
Learning Outcomes	On successful completion of this module students will be able to: (All L.O. assessed in A & B) • review the scientific literature relevant to molecular biotechnology • gain an understanding of the fundamentals of molecular biotechnology • critically appraise the potential of microbes in the biotechnology sector in diagnostics, disease prevention, and therapy and in deriving commercial products • discuss the techniques associated with the generation of transgenic plants and animals and their applications • understand the application of modern biotechnological approaches in animal and plant breeding • discuss the application of biotechnology within a biodiversity setting • critically evaluate the potential of biotechnology to impact positively on the environment • critically discuss bioethical issues associated with modern biotechnology.
Syllabus Outline	• Fundamentals of Molecular Biotechnology. An introduction to molecular biotechnology. Biological systems in molecular biotechnology. Overview of standard techniques. • Molecular biotechnology of microbial systems. Molecular diagnostics, vaccines and therapeutic agents. Synthesis of commercial products via natural and recombinant microorganisms. Microbial insecticides. Principles of fermentation. Protein engineering and production using microbial systems for scientific, biomedical and environmental purposes. Bioremediation and the

	development of microorganisms for remediating contamination. • Molecular biotechnology of eukaryotic systems. Genetic engineering of plants. Development of transgenic plants and their potential in the agricultural and biomedical sectors. Molecular marker-assisted plant breeding. • Genetic engineering of animals. Development of transgenic and cloned animals for the agro-biotech sector. • Biotechnology in biomedicine: drug targeting and gene therapy. • Environmental biotechnology. Biofuels and their application. Development of second and third generation biofuels. • Biodiversity and the application of functional 'omics approaches to the discovery of novel therapeutic compounds • Biotechnology and bioethics. Ethical issues associated with the 'exploitation of nature' in general and with the development of transgenic animals and plants.
Contact Hours	• Students undertaking this 15 credit module can expect 36h of scheduled learning contact time with teaching staff, spread over one semester within the academic year. This contact time will occur during lectures (24h) and tutorials (12h)
Teaching and Learning Methods	Theoretical material within the module will be presented to the students in the form of weekly lectures throughout one of the semesters in the academic year. 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. The tutorials sessions will be used principally to engage the students in the development of their research presentation and data handling skills through the discussion, preparation and delivery of individual case studies covering relevant topics in the field of biotechnology. This will constitute component B1 of their summative assessment and will constitute the students submitting an in depth 2000 word report. Tutorial sessions will also be used to apply formative assessment in the form of online in class quizzes applied via Blackboard using TEL packages within the faculty and will also be used to further engage students in the development of their learning, analytical and revision skills and to provide opportunities for the interactive development of skills required for the work place. Students undertaking this module can expect to receive 24h of lectures spread appropriately over the 12 weeks of teaching of one semester and would be expected to spend at least another 3h per week in independent learning while undertaking directed reading in relation to each of the lecture sessions. In addition to the lectures the students will undertake 12h in total of tutorial sessions within the semester. The remainder of the independent learning time allocated to the module should be spent preparing written assessments for submission and undertaking revision for both formative assessment sessions and for the final exams (EX1). **Scheduled learning** includes lectures, tutorials and in class assessment periods. **Independent learning** includes hours engaged with essential reading, case study assignment preparation and completion, exam revision *etc*.
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	15

Hours to be allocated	Scheduled learning and teaching study hours	Independent study hours	Placement study hours	Allocated Hours
150	36	114	0	150

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

Written Exam: Unseen written exam
Coursework: Written report, oral presentation

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	60%
Coursework assessment percentage	40%
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 such as PubMed *etc*..

Indicative Reading List

- Glick, & Pasternak, (2009)*Molecular Biotechnology: Principles & Applications of Recombinant DNA*, 3rd ed.Washington D.C.:ASM Press, .
- Channarayappa, (2007) *Molecular Biotechnology: Principles & Practices*..

	Hydrabad: Universities Press.. • Wink, M. ed. (2011) *An Introduction to Molecular Biotechnology: Molecular Fundamentals, Methods and Applications in Modern Biotechnology*. 2nd ed. Weinheim: Wiley-VCH.. • Primrose, S.B. (2006) *Molecular Biotechnology*.. Oxford: Blackwell • Primrose, S.B. & Twyman, R.M. (2004) *Genomics – Applications in Human Biology*.. Oxford: Blackwell Publishing • Mepham, B.(2008) *Bioethics – an Introduction for the Biosciences*. 2nd ed. Oxford: Oxford University Press. • Bryant, J.A., Baggot la Velle, L. & Searle, J. (2005) *Introduction to Bioethics.* Chichester: Wiley Periodicals; e.g. Nature Biotechnology; The Economist, New Scientist *etc*.

Part 3: Assessment	
Assessment Strategy	Summative assessment for this module will be provided using a number of approaches. The nature of the programme to which this level 3 module contributes requires both coursework and examination-based assessment of student learning and a measure of their acquisition of written presentation skills of critically discussed and analysed data and information obtained from researching the literature. The ability of the students to write scientifically and analyse data will be assessed under component B1 in the form of an extended 2000 word case study report. This will be double marked and feedback provided in the form of written comments. The tutorials within the module offer the students opportunities to undertake formative assessment in a group environment and further individual formative assessment in the form of online quizzes will also be available. Feedback on formative assessment in tutorials will be given verbally while that for such learning performed online will be part of the design of the quiz. Final summative assessment under component A will take the form of an examination that comprises essay based questions designed to test the ability of the students to critically discuss topics in the subject area and to highlight further independent reading beyond the content of the lectures that they may have undertaken.

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

First Sit	
Component A (controlled conditions) **Description of each element**	**Element weighting** **(as % of component)**
1. Examination Exam Period 1 (3 hours)	100%
Component B **Description of each element**	**Element weighting** **(as % of component)**
1. Extended case study	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 Exam Period 3 (3 hours)	100%

Component B **Description of each element**	**Element weighting** **(as % of component)**
1. Extended case study	100%
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.	