Module Specification

Molecular Biotechnology

Version: 2023-24, v2.0, 30 May 2023

Contents

Part 1: Information

Module title: Molecular Biotechnology

Module code: USSKAM-30-2

Level: Level 5

For implementation from: 2023-24

UWE credit rating: 30

ECTS credit rating: 15

Faculty: Faculty of Health & Applied Sciences

Department: HAS Dept of Applied Sciences

Partner institutions: None

Field: Applied Sciences

Module type: Module

Pre-requisites: Cells, Biochemistry and Genetics 2023-24

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: Pre-requisites: Students must have taken USSKA4-30-1: Cell Biochemistry and Genetics.

Features: Not applicable

Educational aims: This module will introduce you to the field of Molecular Biotechnologies which is the use of laboratory techniques to study and modify

nucleic acids and proteins for applications in areas such as human and animal health, agriculture, and the environment.

Outline syllabus: You will cover:

Gene editing including CRISPR and DNA analysis in Biotechnology.

Production of protein from cloned genes - Special vectors for expression of foreign genes in E. coli, problems with the production of recombinant protein in E. coli, production of recombinant protein by eukaryotic cells.

Sequencing genes and genomes – Methodology for sequencing genes, how to sequence a genome, how to characterise features in a genome.

DNA analysis in medicine – Production of recombinant pharmaceuticals, identification of genes responsible for human disease, gene therapy.

DNA analysis in agriculture – Gene addition approach to plant genetic engineering, gene subtraction, problems with genetically modified plants.

DNA analysis in forensic science and archaeology – DNA analysis in the identification of crime suspects, kinship studies by DNA profiling, Archaeogenetics focusing on Human evolution studies.

Impact of biotechnology on human society – Exploring the complexity and diversity of impact on society, the diversity of factors affecting potential impact on society including geographical location, historical background, ethics.

Part 3: Teaching and learning methods

Teaching and learning methods: Scheduled learning includes a mix of lectures and integrated tutorial sessions. Independent learning includes hours engaged with

essential reading, case study preparation, assignment preparation and completion. These sessions constitute an average time per level.

Module Learning outcomes: On successful completion of this module students will achieve the following learning outcomes.

MO1 Understand genomic technologies and bioinformatics approaches and data mining for the characterisation of genomes.

MO2 Describe the range of current gene-based techniques used in genetic studies including gene editing methodologies.

MO3 Acquire an appreciation of the research process through gaining practical experience of molecular genetics and DNA analysis and be able to interpret data obtained from such analysis.

MO4 Describe current and potential applications of biotechnology and ethical issues raised

MO5 Explore and explain the impact of biotechnology on human society.

Hours to be allocated: 300

Contact hours:

Independent study/self-guided study = 228 hours

Face-to-face learning = 72 hours

Total = 300

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link https://uwe.rl.talis.com/modules/usskam-30-2.html

Part 4: Assessment

Assessment strategy: 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.

The controlled component is a 2 hour written exam. The case study (B2) 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 an extended practical report which will provide the opportunity for the student to apply key methodologies in gene editing and DNA analysis and analyse results from these.

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

Assessment tasks:

Examination (First Sit)
Description: 2 hour exam
Weighting: 50 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO4, MO5

Case Study (First Sit)
Description: Case study
Weighting: 25 %
Final assessment: No
Group work: No
Learning outcomes tested: MO2, MO4, MO5

Report (First Sit)
Description: Extended practical report
Weighting: 25 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1, MO3

Examination (Resit)

Description: 2 hour exam
Weighting: 50 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO4, MO5

Case Study (Resit)
Description: Case study
Weighting: 25 %
Final assessment: No
Group work: No
Learning outcomes tested: MO2, MO4, MO5

Report (Resit)
Description: Extended Practical Report
Weighting: 25 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1, MO3

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Biological Sciences [Frenchay] MSci 2022-23

Biological Sciences [Frenchay] BSc (Hons) 2022-23

Biological Sciences {Foundation} [Sep][SW][Frenchay][6yrs] MSci 2021-22

Biological Sciences {Foundation} [Sep][FT][Frenchay][5yrs] MSci 2021-22

Biological Sciences {Foundation} [Sep][SW][Frenchay][5yrs] BSc (Hons) 2021-22

Biological Sciences {Foundation} [Sep][FT][Frenchay][4yrs] BSc (Hons) 2021-22