Module Specification

Molecular Biotechnology

Version: 2027-28, v1.0, Approved

Contents

Part 1: Information

Module title: Molecular Biotechnology

Module code: USSJSW-15-2

Level: Level 5

For implementation from: 2027-28

UWE credit rating: 15

ECTS credit rating: 7.5

College: College of Health, Science & Society

School: CHSS School of Applied Sciences

Partner institutions: None

Field: Applied Sciences

Module type: Module

Pre-requisites: Cells, Biochemistry and Genetics 2027-28

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: Molecular Biotechnology looks at the practical application of genetics and molecular biology to plant, animal and microbial breeding, medicine and environment monitoring. This module will cover the techniques that enable the analysis of genes and genomes via cloning, sequencing and bioinformatics analysis and applications of these for the improvement of food production, human health and the characterisation of individuals and populations.

Pre-requisites: Students must have passed Cells, Biochemistry and Genetics USSKA4-30-1 before starting this module.

Features: Not applicable

Educational aims: The module aims to review the range of molecular biotechnology techniques that have extended our understanding of the genetic material, to study selected topics illustrating the applications and the continuing development of these techniques and ethical issues such advances raise. Practically, students will gain valuable experience of laboratory techniques and bioinformatic tools routinely used for the study of genetic material, raising the level of their graduate skills and employability.

Outline syllabus: You will cover:

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

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.

Gene editing including CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) and DNA analysis in Biotechnology.
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: The module will be delivered as mix of lectures and integrated tutorial sessions – with computer-learning support together with a student centred extended practical project. Revision will be embedded in the lectures but also focused on in an additional coursework support session.

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

MO1 Understand the range of molecular biotechnology techniques and their potential applications and impact on human society.

MO2 Gain practical experience of techniques used in molecular biotechnology and be able to interpret laboratory and bioinformatic data generated from such analysis.

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Face-to-face learning = 36 hours

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/ussjsw-15-2.html

Part 4: Assessment

Assessment strategy: Assessment: Laboratory report (2500 words)

The assessment comprises an extended laboratory report providing the opportunity

to assess broad principles of Molecular Biotechnology applications, as well as the understanding of knowledge gained from practical laboratory sessions. Students will be required to complete and maintain a practical lab booklet as they work through the practical sessions, collecting and interpreting their own data. A template will be provided with sections where students must apply theoretical background delivered in the lectures that are linked to each practical session.

Formative feedback will be provided through support in the practical sessions and a dedicated coursework support session.

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

Assessment tasks:

Laboratory Report (First Sit)
Description: Extended practical report (2500 words)
Weighting: 100 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2

Laboratory Report (Resit)
Description: Extended Practical Report (2500 words)
Weighting: 100 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Biological Sciences [Frenchay] BSc (Hons) 2026-27

Biological Sciences {Foundation} [Frenchay] BSc (Hons) 2025-26