



Module Specification

Molecular Genetics

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Part 1: Information

Module title: Molecular Genetics

Module code: USSKB7-15-2

Level: Level 5

For implementation from: 2023-24

UWE credit rating: 15

ECTS credit rating: 7.5

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, Human Biological Systems 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 Cell Biochemistry and Genetics (USSKA4-30-1) OR Human Biological Systems (USSJRU-30-1).

Features: Not applicable

Educational aims: See Learning Outcomes

Outline syllabus: Gene expression and its regulation:

DNA packaging and structure of chromatin

Effects of modification of DNA and of histones

Epigenetic control of gene expression

Basal and regulated transcription; structure and function of transcription factors

Co-transcriptional and posttranscriptional steps in gene regulation; structure and function of RNA binding proteins

Alternative splicing, RNA editing, RNA export

Regulation of mRNA translation, localization and stability

Function of microRNAs and other non-coding RNAs

Genome structure and function:

Introduction to genomics with a focus on the mapping and sequencing of genomes, assembling and annotating genomes; genome analysis; the human genome – structure and ethical legal and social implications of understanding it

Functional genomics; using sequence similarity to assign function

Assigning gene function experimentally

Genetics and disease; population genetics:

Causes of genetic variation; genotoxicity

Introduction to DNA repair; Mendelian and chromosomal basis of inheritance;

introduction to chromosomal aberrations

Genetic structure of populations; Hardy Weinberg Law; selection; genetic variation

SNPs and other polymorphisms and their association with disease

DNA profiling and the use of DNA in forensic analysis

Part 3: Teaching and learning methods

Teaching and learning methods: The module will be delivered as mainly as lectures with some practical classes, tutorial sessions and revisions sessions.

Scheduled learning

Scheduled contact time is structured around a series of lectures that introduce the key concepts of the topic under discussion.

Practical classes will allow students to develop their laboratory skills and to consolidate key concepts using classical genetics experiments

Tutorial sessions will include discussions on essay writing/creating essay plans, data interpretation.

Revision session will be based around writing targeted essay plans based on past papers, towards the end of the module.

Independent learning includes hours engaged with essential reading, case study preparation, assignment preparation and completion etc.

These sessions constitute an average time per level as indicated in the table below.

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

MO1 Understand and discuss the general principles underlying genome structure and function in a range of organisms, with a focus on the human genome

MO2 Discuss functional and comparative genomics using experimental models

MO3 Understand the fundamentals of molecular evolution and the basis of population genetics and DNA profiling

MO4 Discuss genetic polymorphisms, SNPs, the genetic basis of disease, and gene therapy

MO5 Discuss the several ways in which gene expression can be regulated in development and how it goes astray in disease

MO6 Find and use up-to-date literature

MO7 Communicate elements of molecular genetics in written format

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 117 hours

Face-to-face learning = 33 hours

Total = 150

Reading list: The reading list for this module can be accessed at [readinglists.uwe.ac.uk](https://uwe.rl.talis.com/modules/usskb7-15-2.html) via the following link <https://uwe.rl.talis.com/modules/usskb7-15-2.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, synthesise and summarise information critically, including published research and data from the 'grey' literature.

Assessment 1 is an in-depth analysis of a selected topic from the module syllabus by engaging in a practical exercise and critically reviewing published research.

Assessment 2 is an in-class test, which provides students with the opportunity to demonstrate their knowledge and understanding of the key concepts and paradigms associated with the subject matter, to use examples and other evidence critically to support their arguments.

Opportunities for formative assessment and feedback are built into the assignment preparation.

Assessment tasks:**Written Assignment (First Sit)**

Description: Laboratory practical write-up (1500 words)

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO2, MO4, MO6, MO7

In-class test (First Sit)

Description: In-class test (2 hours)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4, MO5, MO6, MO7

Written Assignment (Resit)

Description: Laboratory practical write-up (1500 words)

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO2, MO4, MO6, MO7

In-class test (Resit)

Description: In-class test (2 hours)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4, MO5, MO6, MO7

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Applied Biomedical Science [Frenchay] BSc (Hons) 2022-23

Forensic Science [Frenchay] MSci 2022-23

Forensic Science [Frenchay] BSc (Hons) 2022-23

Biomedical Science [Frenchay] BSc (Hons) 2022-23

Biomedical Science [Frenchay] MSci 2022-23

Biomedical Science [Sep][PT][Frenchay][6yrs] BSc (Hons) 2021-22

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

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

Biomedical Science [Sep][PT][Frenchay][8yrs] MSci 2021-22

Biomedical Science {Foundation} [Sep][SW][Frenchay][6yrs] MSci 2021-22

Biomedical Science {Foundation} [Sep][FT][Frenchay][5yrs] MSci 2021-22

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

Forensic Science {Foundation} [Sep][FT][Frenchay][5yrs] MSci 2021-22

Forensic Science {Foundation} [Sep][SW][Frenchay][6yrs] MSci 2021-22

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

Biomedical Science [Sep][PT][Frenchay][6yrs] BSc (Hons) 2020-21

Biomedical Science [Sep][PT][Frenchay][8yrs] MSci 2020-21