Module Specification

Cells, Biochemistry and Genetics

Version: 2025-26, v5.0, Approved

Contents

Part 1: Information

Module title: Cells, Biochemistry and Genetics

Module code: USSKA4-30-1

Level: Level 4

For implementation from: 2025-26

UWE credit rating: 30

ECTS credit rating: 15

College: College of Health, Science & Society

School: CHSS School of Applied Sciences

Partner institutions: None

Field: Applied Sciences

Module type: Module

Pre-requisites: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: Cells, Biochemistry and Genetics is an introductory Molecular Cell Biology module, focussing on eukaryotic cells in multicellular organisms. This module will consider what cells are made of, how they function and reproduce and how we study them.

Features: Not applicable

Educational aims: This module aims to introduce you to the cell and molecular biology that underpins the rest of your course:

Cell Biology:
Cells are the basic units of all living organisms. They exist in a wide range of forms to carry out diverse roles within multi-cellular organisms. This module focuses on the eukaryotic cells that make up multicellular organisms, although some of the contrasts between eukaryotes and prokaryotes will be mentioned. You will learn about the subcellular organelles within cells and consider how cells and organelles can be visualised through microscopy.

Biochemistry:
This module will introduce the molecules that form the major components of cells and the key biochemical pathways that take place within them. We will also consider the structure and function of biological membranes as well as how biochemical pathways are studied experimentally.

Genetics:
Genetics is the study of inheritance, genes and the DNA molecules that make up the genetic material. In this module you will study the structure and function of DNA, genes, chromosomes and the genome, as well as the principles of inheritance. You will be introduced to some key experimental methods in the study of genetics.

Outline syllabus: Biological chemistry: the properties and structures of biochemical building blocks and macromolecules. Acids and bases and the importance of water.

Structure and function of eukaryotic cells and their organelles. Membrane structure and transport across membranes via diffusion, carrier proteins, channels, active transport.

Key techniques in Cell Biology and Biochemistry. Light microscopy, confocal microscopy, the transmission electron microscope (TEM), the scanning electron microscope (SEM). Fractionation of cells and their contents, simple protein purification, separation and assay.

Introduction to metabolism. An overview of catabolic and anabolic pathways. The metabolic roles of ATP, NADH, NADPH and FADH2. Enzymes as biological catalysts. Electron transport and ATP synthesis. The major pathways of carbohydrate and lipid metabolism and their significance in health and disease.

Studying genes. Genetics in context - genes, expectations and realities.

The genetic material and genomes. DNA structure and replication. Decoding the messages within the genes - gene expression: transcription, RNA processing and translation. Altering the genetic material - mutation, recombination, gene cloning and PCR. Prokaryotic versus eukaryotic gene expression and protein synthesis. Epigenetics in Health and Disease.

Inheriting genes. What Mendel discovered and how molecular genetics relates to Mendel. Variations upon a Mendelian theme. The phenomenon of linkage - mapping genes. Gene inheritance patterns in humans and molecular approaches to diagnosing genetic disease.

Part 3: Teaching and learning methods

Teaching and learning methods: The module is delivered as a mix of interactive lectures, practical classes and workshops to enable the development of subject knowledge and key skills in molecular cell biology.
Independent learning includes self-assessment through formative quizzes, sample exam questions and suggested reading as well as completion of the assessed quizzes.

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

MO1 Explain how the structure and composition of eukaryotic cells, organelles and biological membranes relates to their functions.

MO2 Describe the major metabolic pathways involved in energy generation and storage in eukaryotic cells.

MO3 Describe the mechanisms of DNA replication and gene expression and explain the principles of inheritance.

MO4 Gain experience and comprehend key concepts of practical methods and data analysis in cell biology, biochemistry and genetics.

Hours to be allocated: 300

Contact hours:

Independent study/self-guided study = 228 hours

Face-to-face learning = 72 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/usska4-30-1.html

Part 4: Assessment

Assessment strategy: Assessment 1: Online Assignment (50%)
The online assignment assesses engagement with the practical classes and comprehension of key concepts through a series of 10 online quizzes, of which the best 8 scores are used. Formative online activities are available for students to complete if they miss a class, and these can also be used to practise before taking the assessed quiz. Plagiarism is reduced by making use of banks of similar questions assigned randomly. This assignment offers opportunities for formative assessment and feedback during the year. Students are supported to succeed during the practical classes, for example by carrying out exercises and calculations similar to those in the quizzes.

Assessment 2: Examination (50%)
Three hour on-campus invigilated examination to align with the Institute of Biomedical Science requirements.

This assessment will test knowledge and application of key theoretical concepts. Students are supported to succeed by a specimen exam paper and a formative online exam covering the first semester as well as a timetabled revision workshop.

Assessment tasks:

Online Assignment (First Sit)
Description: Online practical quizzes
Weighting: 50 %
Final assessment: No
Group work: No
Learning outcomes tested: MO4

Examination (First Sit)
Description: 3 Hour on-campus invigilated examination.
Weighting: 50 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3

Online Assignment (Resit)
Description: Online practical quizzes
Weighting: 50 %
Final assessment: No
Group work: No
Learning outcomes tested: MO4

Examination (Resit)
Description: 3 Hour on-campus invigilated examination.
Weighting: 50 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Biomedical Science {Foundation} [Frenchay] - WITHDRAWN MSci 2024-25

Biomedical Science {Foundation} [Frenchay] BSc (Hons) 2024-25

Biological Sciences {Foundation} [Frenchay] BSc (Hons) 2024-25

Biological Sciences {Foundation} [Frenchay] - WITHDRAWN MSci 2024-25

Biomedical Science {Foundation} [Frenchay] BSc (Hons) 2024-25

Biomedical Science [Frenchay] BSc (Hons) 2025-26

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

Biomedical Science [Frenchay] - WITHDRAWN MSci 2024-25

Biomedical Science [Frenchay] BSc (Hons) 2024-25

Biomedical Science [Frenchay] BSc (Hons) 2024-25

Biomedical Science [Frenchay] BSc (Hons) 2025-26