Module Definition Form (MDF)

Module code: MOD007184	**Version:** 6 **Date Amended:** 05/May/2026

1. Module Title
Introduction to Cell Biology and Biochemistry

2a. Module Leader
Andrea Knight

2b. School
School of Life Sciences

2c. Faculty
Faculty of Science and Engineering

3a. Level
4

3b. Module Type
Standard (fine graded)

4a. Credits
30

4b. Study Hours
300

5. Restrictions

Type	Module Code	Module Name	Condition
Pre-requisites:	None		
Co-requisites:	None		
Exclusions:	None		
Courses to which this module is restricted:			

LEARNING, TEACHING AND ASSESSMENT INFORMATION

6a. Module Description

The cell is the building block of organisms, and is in turn made out of complex molecules. You will gain an overview of the cellular and molecular basis of life, focusing on the nature and roles of different cell types, including animal, plant and microbial cells, which will be essential for the rest of your course. You will be introduced to the different types of prokaryotic and eukaryotic cells, their identifying characteristics, properties and key structural differences. We will also explore the basics of cell structure and function, cell membranes and organelles, the cell growth and division cycle, including mitosis and meiosis.

Understanding cell structure and function also requires that you have a basic knowledge of the nature, roles and chemical structures of key biomolecules, including carbohydrates, lipids, nucleic acids and proteins. Key aspects of biochemistry and molecular biology are also explored, as are applications of modern DNA technology. Finally we will consider the genetic and molecular bases of disease through the study of specific hereditary conditions.

You will learn through a variety of hands-on practical sessions, which back up the theory you learn in lectures, and that provide you with training in general laboratory and biochemical techniques, along with data-handling and problem-solving exercises.

As well as providing you with subject-specific knowledge, you will develop a number of key transferable skills including practical techniques and skills relevant to your future employment, including familiarity with laboratory instrumentation, data collection, literacy, numeracy and data analysis.

6b. Outline Content

September start

Trimester 1

- The cellular basis of life and cell diversity
- Animal, plant and microbial cells
- The structure and function of prokaryotic and eukaryotic cells
- Viral structure, reproduction and role as cellular parasites
- Cell ultrastructure and function
- Cell division and cell cycle; mitosis and meiosis
- Key biological molecules; lipids, nucleic acids and proteins
- Methods for studying cells: microscopy,
- Cell culture techniques, subcellular fractionation
- Basic biological calculations

Trimester 2

- Key chemical principles relevant to biological systems
- Structure, properties and biological significance of molecules & macromolecules found in living organisms, including: amino acids and proteins; fatty acids and lipids; carbohydrates; nucleotides and nucleic acids
- Biochemistry of processes which support life, including cellular metabolism and its control
    - Relationship between protein structure, function and enzyme action
    - Structure and mode of action of common antibiotics
    - Energy conservation in metabolism - central metabolic pathways: glycolysis; the tricarboxylic acid cycle; the electron transfer chain
- Genetic material and discovery DNA structure: DNA replication; genetic basis of disease; transcription and translation; operons and the control of gene expression
- Restriction enzymes and cloning vectors; an introduction to recombinant DNA technology
- Biochemical assay techniques: chromatography; electrophoresis; quantitative colorimetric analysis; enzyme-catalysed reactions; and enzyme kinetic studies

January start

Trimester 2

- Key chemical principles relevant to biological systems
- Structure, properties and biological significance of molecules & macromolecules found in living organisms, including: amino acids and proteins; fatty acids and lipids; carbohydrates; nucleotides and nucleic acids
- Biochemistry of processes which support life, including cellular metabolism and its control
    - Relationship between protein structure, function and enzyme action
    - Structure and mode of action of common antibiotics
    - Energy conservation in metabolism - central metabolic pathways: glycolysis; the tricarboxylic acid cycle; the electron transfer chain
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- Restriction enzymes and cloning vectors; an introduction to recombinant DNA technology
- Biochemical assay techniques: chromatography; electrophoresis; quantitative colorimetric analysis; enzyme-catalysed reactions; and enzyme kinetic studies

Trimester 1

- The cellular basis of life and cell diversity
- Animal, plant and microbial cells
- The structure and function of prokaryotic and eukaryotic cells
- Viral structure, reproduction and role as cellular parasites
- Cell ultrastructure and function
- Cell division and cell cycle; mitosis and meiosis
- Key biological molecules; lipids, nucleic acids and proteins
- Methods for studying cells: microscopy,
- Cell culture techniques, subcellular fractionation
- Basic biological calculations

6c. Key Texts/Literature

The reading list to support this module is available at: https://readinglists.aru.ac.uk/

6d. Specialist Learning Resources

Access to science laboratories and appropriate equipment. Technical support

7. Learning Outcomes (threshold standards)		
No.	**Type**	**On successful completion of this module the student will be expected to be able to:**
1	Knowledge and Understanding	Describe the structural differences between viruses, prokaryotic cells and eukaryotic cells and the role of the major eukaryotic cell organelles.
2	Knowledge and Understanding	Explain the basic structure and functions of key macromolecules and the ways in which cells obtain and utilise energy
3	Knowledge and Understanding	Outline the nature and organisation and basic structure of the genetic material in viruses, prokaryotic and eukaryotic cells and the activities taking place during the cellular growth and division cycle.
4	Knowledge and Understanding	Discuss the basic techniques, strategies and applications of DNA-based technologies.
5	Intellectual, practical, affective and transferrable skills	Perform a number of basic laboratory techniques used in the handling, study and identification of different cell types and organelles and their function, and. the molecular separation and quantification of molecules
6	Intellectual, practical, affective and transferrable skills	Perform basic quantitative analysis on experimental data and identify and resolve problems.

8a. Module Occurrence to which this MDF Refers				
Year	**Occurrence**	**Period**	**Location**	**Mode of Delivery**
2026/7	ZZF	Template For Face To Face Learning Delivery		Face to Face

8b. Learning Activities for the above Module Occurrence			
Learning Activities	**Hours**	**Learning Outcomes**	**Details of Duration, frequency and other comments**
Lectures	44	1,2,3,4	22 x 2hrs lectures/active learning
Other teacher managed learning	28	5,6	10 x 2 hr practicals + 2 x 1 hr introduction + 2 x 2hr revision + 2 x 1 hr test
Student managed learning	228	1-6	Background reading, online activities, preparation for lectures and practicals, and completion of assessments
TOTAL:	300		

9. Assessment for the above Module Occurrence

The assessment for some modules includes a presentation (see below for details on how this particular module is assessed). We recognise that presenting, especially to a large group, can cause significant anxiety or distress for some students. If this may affect you, please contact your Module Leader or the Disability and Neurodiversity Service as early as possible. We will work with you to consider appropriate reasonable adjustments. Depending on your individual needs, these might include, for example, presenting to a smaller group or presenting only to a member of academic staff.

Assessment No.	Assessment Method	Learning Outcomes	Weighting (%)	Fine Grade or Pass/Fail	Qualifying Mark (%)
010	Coursework	1-4	40 (%)	Fine Grade	30 (%)
Coursework (2000 words)					

Assessment components for Element 010

Component No.	Assessment Title	Submission Method	Components needed for Mark Calculation?
010/1	Short assessed quiz 1	Scheduled Activity: Timetabled assessment task	Best 5 out of 6. All components used in calculation are equally weighted
010/2	Short assessed quiz 2		
010/3	Short assessed quiz 3		
010/4	Short assessed quiz 4		
010/5	Short assessed quiz 5		
010/6	Short assessed quiz 6		

Assessment No.	Assessment Method	Learning Outcomes	Weighting (%)	Fine Grade or Pass/Fail	Qualifying Mark (%)
011	Coursework	5-6	40 (%)	Fine Grade	30 (%)
Coursework (2000 words equivalent)					

Assessment components for Element 011

Component No.	Assessment Title	Submission Method	Weighting (%)	Components needed for Mark Calculation?
011/1	Lab Report 1	Canvas	50 (%)	All
011/2	Lab Report 2		50 (%)	

Assessment No.	Assessment Method	Learning Outcomes	Weighting (%)	Fine Grade or Pass/Fail	Qualifying Mark (%)
012	Coursework	1-4	20 (%)	Fine Grade	30 (%)
In class test (2 x 1000 words equivalent)					

Assessment components for Element 012				
Component No.	**Assessment Title**	**Submission Method**	**Weighting (%)**	**Components needed for Mark Calculation?**
012/1	End of trimester test 1		50 (%)	All
012/2	End of trimester test 2		50 (%)	

In order to pass this module, students are required to achieve an overall mark of 40% (for modules at levels 3, 4, 5 and 6) or 50% (for modules at level 7*).

In addition, students are required to:
(a) achieve the qualifying mark for each element of fine graded assessment as specified above
(b) pass any pass/fail elements

[* the pass mark of 50% applies for all module occurrences from the academic year 2024/25 – see Section 3a of this MDF to check the level of the module and Section 8a of this MDF to check the academic year]