

Module Details	
Module Title	Biomolecules and Cells
Module Code	CFS4021-B
Academic Year	2024/5
Credits	20
School	School of Chemistry and Biosciences
FHEQ Level	FHEQ Level 4

Contact Hours	
Type	Hours
Directed Study	145
Interactive Learning Objects	8
Lectures	15
Practical Classes or Workshops	6
Laboratories	7
Online Lecture (Asynchronous)	15
Supervised time in studio/workshop	4

Availability	
Occurrence	Location / Period
BDA	University of Bradford / Academic Year

Module Aims
<p>This module will introduce you to the molecules of life and how these molecules produce the building blocks of living systems; cells. No previous knowledge of biology is assumed and the purpose of the module is to provide students with a good background of the structures and principles required within biochemistry, molecular, and cell biology. As a chemist or student studying other physical sciences or engineering disciplines, you will learn key concepts enabling you to communicate with biologists and medical scientists. Through lectures, workshops, and practical labs you will develop your understanding and appreciation of life sciences enabling you to bring these aspects to your major study areas.</p>

## Outline Syllabus

1. The chemical composition, structures, and functions of the four major types of biomolecules (proteins, nucleic acids, lipids and carbohydrates).
2. Chemical concepts that underpin biomolecule structures and functions.
3. Protein classifications and relationships between structure and function.
4. Protein biosynthesis, ribosomes, and RNA synthesis.
5. Supramolecular assemblies, e.g. cytoskeleton, ribosome, viruses.
6. Different cell types (i.e. protist, plant, and human cells)
7. Cell shape, ultrastructure, components, and their structure and function.
8. Cell movement, passive and active transport, cell-cell junctions, and adhesion to extracellular matrix.
9. Using specialist software packages to draw and inspect the structures of biomolecules.
10. Experimental methods used to study cells

## Learning Outcomes

Outcome Number	Description
01	Use specified chemical and biomolecular visualisation software packages to draw and manipulate biomolecules and their sub-units using different representation methods.
02	Recognise and describe the key features, structures, and functions of the four major types of biomolecules and their classifications.
03	Identify and distinguish key functional groups in biomolecules and their associated properties.
04	Describe the biosynthesis of nucleic acids and their role in genetic replication.
05	Describe and illustrate the differences between prokaryotic and eukaryotic cells and variations in cell types found across a range of living systems (i.e protist, plant and human cells).
06	Describe the structures and functions of cell membranes, various cell organelles and supramolecular assemblies (e.g. cytoskeleton, ribosome, and viruses).
07	Perform biological laboratory procedures, e.g. microscopy, and demonstrate understanding through interpretation of data and explanation of methods.
08	Perform biological laboratory procedures in accordance with health and safety protocols.

## Learning, Teaching and Assessment Strategy

The module uses a blended approach to support learning and achievement. Students will engage with a series of weekly online learning packages. These will include short videos that address key concepts, a set of structured activities (reading, online discussions, etc.) that 'scaffold' the learning, and a range of formative tasks that generate feedback on progress. On-campus sessions will build on the online material and develop it in conjunction with training in key skills within workshops and laboratory sessions.

Throughout this module, you will be introduced to a range of cell types from different organisms, both eukaryotic and prokaryotic, and study the four major classes of biomolecules (proteins, nucleic acids, lipids, and carbohydrates). You will study the structure of cells, the structure, and function of cellular components, and apply your knowledge of biomolecules to understanding supramolecular assemblies, pathways, and interactions in cellular processes. You will also cover the structural aspects of the biomolecules, including relationships between structure and function, and the classification of biomolecules. Underlying chemical concepts covered by core chemistry modules will be revisited in the context of these biological molecules.

Workshops will allow you an opportunity to learn how to draw, visualise and manipulate biomolecules using specialist software and test your understanding of the lecture material. A mix of wet and dry laboratory sessions will present you with tasks that underpin the lectures and will introduce you to how cells are studied. The practical elements will be assessed through the creation of a portfolio of software-based and post-lab tasks.

The VLE will be used to provide access to online resources, lecture notes and external links to websites of interest. Directed study will provide you with the opportunity to undertake guided reading and to develop your own portfolio of learning to enhance transferable skills and knowledge relating to the evaluation of your own role and subject provision.

Assessment 1: Portfolio-based coursework

Assessment 2: Final Summative MCQ examination

### Mode of Assessment

Type	Method	Description	Weighting
Summative	Computerised examination	Closed book MCQ computerised examination	60%
Summative	Coursework - Portfolio/e-portfolio	Portfolio encompassing a series of software-based and post-lab tasks (equivalent to 1500 wor	40%

### Reading List

To access the reading list for this module, please visit <https://bradford.rl.talis.com/index.html>

*Please note:*

*This module descriptor has been published in advance of the academic year to which it applies. Every effort has been made to ensure that the information is accurate at the time of publication, but minor changes may occur given the interval between publishing and commencement of teaching. Upon commencement of the module, students will receive a handbook with further detail about the module and any changes will be discussed and/or communicated at this point.*