

Module Details	
Module Title	Biomolecules and Cells
Module Code	CFS4021-B
Academic Year	2020/1
Credits	20
School	School of Chemistry and Biosciences
Subject Area	Chemistry
FHEQ Level	FHEQ Level 4
Pre-requisites	N/A
Co-requisites	N/A

Contact Hours	
Type	Hours
Learning Objects Interaction	16
Online Lecture (Synchronous)	16
Practical Classes or Workshops	6
Laboratories	9
Directed Study	153

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

Module Aims
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.

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. Drawing structures of proteins, fats, carbohydrates and nucleic acids. 5. Protein biosynthesis, ribosomes and RNA synthesis. 6. Supramolecular assemblies, e.g. cytoskeleton, ribosome, viruses. 7. Different cell types (i.e. protist, plant and human cells) 8. Cell shape, ultrastructure, components and their structure and function. 9. Cell movement, passive and active transport, cell-cell junctions and adhesion to extracellular matrix. 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. Online and on-campus tutorials will also be used to train students in specialist software and support learning and monitor progress as students move through the curriculum. A mix of dry and wet laboratory sessions will cover key lab skills.

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 cover structural aspects of the biomolecules, including relationships between structure and function, and classification of biomolecules. Underlying chemical concepts covered by core chemistry modules will be revisited in the context of these biological molecules. Laboratory work will underpin the lectures and will introduce to you how cells are studied. 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. Directed study provides you with the opportunity to undertake guided reading and to develop your own portfolio of learning to enhance transferable skills and knowledge relating to evaluation of your own role and subject provision. The VLE will be used to provide access to online resources, lecture notes and external links to websites of interest. Assessment 1: Short answer coursework (to assess learning objectives 1-8) Assessment 2: Final Summative MCQ examination (to assess learning objective 2-6).

Mode of Assessment

Type	Method	Description	Length	Weighting
Summative	Examination - MCQ	Open book MCQ examination 1.5 hour	1 hour 30 mins	60%
Summative	Coursework	Short answer coursework (0-1600 Words)	1 hour 30 mins	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.