

| Module Details | |
|----------------|--|
| Module Title | Biomolecules and Cells (Distance Learning) |
| Module Code | CFS5025-B |
| Academic Year | 2022/3 |
| Credits | 20 |
| School | School of Chemistry and Biosciences |
| FHEQ Level | FHEQ Level 5 |

| Contact Hours | |
|------------------------------|-------|
| Type | Hours |
| Interactive Learning Objects | 20 |
| Online Lecture (Synchronous) | 24 |
| Tutorials | 2 |
| Laboratories | 6 |
| Directed Study | 148 |

| Availability | |
|--------------|--|
| Occurrence | Location / Period |
| DLA | 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.</p> <p>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.</p> <p>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. 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 subunits 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

This module will adopt a flipped approach where content will be delivered online through the VLE and then students will meet via online conferencing software to discuss the topic and develop their understanding. The VLE will be used to provide access to online resources, lecture notes and external links to websites of interest. There will be extensive use of the VLE to provide formative assessment opportunities to allow students to develop and demonstrate their understanding. Students will meet the module team in person at the start of the academic year after which all teaching will be delivered at distance. Online material will deliver core content; providing you with the opportunity to acquire the information to enhance your knowledge and understanding of the basic aspects of the molecular basis of life. This will be complemented by tutorials to allow you to apply this learning to specific exemplar problems. 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. A visit to campus for the summer placement will underpin the lectures with important practical skills and will provide a visual introduction to 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.

Assessment 1: Short answer coursework (LOs 1-6)

Assessment 3: Final summative MCQ examination (LOs 2-6)

Assessment 3: Laboratory report on practical lab (LOs 1-8)

Mode of Assessment

| Type | Method | Description | Weighting |
|-----------|----------------------|------------------------------------|-----------|
| Summative | Laboratory Report | Laboratory report on practical lab | 20% |
| Summative | Examination - MCQ | Closed Book MCQ Exam (1.5 Hrs) | 60% |
| Summative | Coursework - Written | Short Answer Coursework | 20% |

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.