

## Module specification

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Module code	SCI547
Module title	The Cell and Molecular Biology
Level	5
Credit value	20
Faculty	FAST
Module Leader	Dr Neil Pickles
HECoS Code	100344
Cost Code	GAFS

## Programmes in which module to be offered

Programme title	Is the module core or option for this programme
BSc (Hons) Biochemistry	Core
BSc (Hons) Biomedical Science	Core

## Pre-requisites

None

## Breakdown of module hours

Learning and teaching hours	30 hrs
Placement tutor support	0 hrs
Supervised learning e.g. practical classes, workshops	0 hrs
Project supervision (level 6 projects and dissertation modules only)	0 hrs
<b>Total active learning and teaching hours</b>	<b>30 hrs</b>
Placement / work based learning	170 hrs
Guided independent study	0 hrs
<b>Module duration (total hours)</b>	<b>200 hrs</b>

<b>For office use only</b>	
Initial approval date	14/10/2020
With effect from date	01/09/2022
Date and details of revision	21/04/2021 Addition of BSc Biomedical Science
Version number	2

## Module aims

The module aims to develop further knowledge and understanding of cell and molecular biology that builds on the anatomy, physiology and cell biology learnt at Level 4. It starts with the chemical components of living cells, macromolecules and cell structures and organelles. The essential functions of the cell including metabolism, DNA replication and gene expression. How a complex of cells can form a tissue is examined. Finally, molecular biology is explored in depth – with the aim of developing an appreciation of techniques and topics such as polymorphic markers, RFLP analysis and genetic disease

## Module Learning Outcomes - at the end of this module, students will be able to:

1	Explain and analyse the structure and functions of cellular macromolecules, such as proteins, carbohydrates, lipids and nucleic acids
2	Explain and analyse key concepts of cellular biochemistry, metabolism and molecular biology
3	Evaluate the functions of the cell, organelles and the development of tissues
4	Analyse the central dogma of DNA → RNA → Protein and its relationship to gene mutations and cellular disease
5	Evaluate molecular biology techniques, such as polymorphic markers, restriction enzymes, genetic markers of disease and gel electrophoresis

## Assessment

### Indicative Assessment Tasks:

The assessment will take the form of online exam questions but will utilise continuous assessment to test in-depth knowledge, analysis and evaluation of the complexities of molecular and cellular biology, evaluating facts and concepts of the subjects under study. The 2 hour exam will consist of multiple choice and analysis questions drawn from the syllabus below.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)
1	1-5	Examination	100%

## Derogations

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For Biomedical Science students (only):

This module must be passed at or above 40%.

Compensation for failure is not permitted for this module and other “core” biomedical science modules across the programme.

## Learning and Teaching Strategies

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Strategies used in this module will involve flipped classroom, scale-up methodologies and lead lectures, seminars, tutorials, case studies and student-led presentations.

## Indicative Syllabus Outline

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- Cell structure and chemical components of cells, including structure and function of macromolecules
- Cell functions – cell membrane, organelles, transport and signalling.
- Metabolism – energy (ATP production), catalysis, oxidation and reduction, and enzyme kinetics
- Proteins – structure and function, monoclonal and polyclonal antibodies, electrophoresis and western blotting, gel filtration and chromatography
- Gene expression - transcription switches, repressors and activators, initiation, distance control, combinatorial control.
- Molecular biology - isolating cells and culture, restriction enzymes, electrophoresis, nucleotide sequences, DNA hybridisation, in situ hybridization. Polymorphic markers, gene frequencies, DNA cloning, ligase, plasmids, cDNA libraries, PCR, and DNA engineering.
- Genetic markers of disease (e.g. RFLP)

## Indicative Bibliography:

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Please note the essential reads and other indicative reading are subject to annual review and update.

### Essential Reads

Alberts, B., Hopkin, K., Johnson, A.D., Morgan, D., Raff, M, Roberts, K, and Walter, P. (2019) *Essential Cell Biology* 5<sup>th</sup> Ed. New York: W.W. Norton &Co.

### Other indicative reading

Reed R (2016) *Practical Skills in Biomolecular Sciences* (5<sup>th</sup> edition), Pearson.

Alberts, B (2017) *Molecular biology of the cell* (6<sup>th</sup> edition), Norton.

A number of online resources provide high-quality material, for example the National Center for Biotechnology Information, or the DNA learning Center at the Cold Spring Harbor Laboratory. An example is below.

[molecular biology of the cell free online 4th edition](#)

## Employability skills – the Glyndŵr Graduate

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Each module and programme is designed to cover core Glyndŵr Graduate Attributes with the aim that each Graduate will leave Glyndŵr having achieved key employability skills as part of their study. The following attributes will be covered within this module either through

the content or as part of the assessment. The programme is designed to cover all attributes and each module may cover different areas. [Click here to read more about the Glyndwr Graduate attributes](#)

**Core Attributes**

Engaged  
Creative  
Enterprising  
Ethical

**Key Attitudes**

Commitment  
Curiosity  
Resilience  
Confidence  
Adaptability

**Practical Skillsets**

Digital Fluency  
Organisation  
Leadership and Team working  
Critical Thinking  
Emotional Intelligence  
Communication