Module specification

When printed this becomes an uncontrolled document. Please access the Module Directory for the most up to date version by clicking on the following link: Module directory

Refer to the module guidance notes for completion of each section of the specification.

Module code	SCI641
Module title	Structural and Functional Biochemistry
Level	6
Credit value	20
Faculty	FAST
Module Leader	Ian Ratcliffe
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

Pre-requisites

None

Breakdown of module hours

Learning and teaching hours	18 hrs
Placement tutor support	0 hrs
Supervised learning e.g. practical classes, workshops	6 hrs
Project supervision (level 6 projects and dissertation modules only)	0 hrs
Total active learning and teaching hours	**24** hrs
Placement / work based learning	176 hrs
Guided independent study	0 hrs
Module duration (total hours)	200 hrs

For office use only	
Initial approval date	14/10/2020
With effect from date	01/09/2023
Date and details of revision	
Version number	1

Module aims

This module aims to bring together knowledge of life's building blocks: e.g. amino acids, peptides, proteins, lipids and polysaccharides and develop a coherent understanding of how these are organised within cells. A key outcome is for students to understand the relationship between the structure of biomolecules and their function in biological systems, and this will be illustrated by study of a range of examples including enzymology. The structural aspect will be extended to consider mechanical properties of biological macromolecules. Module content will further include study of experimental techniques used in the elucidation of structure.

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

1	Critically interpret the behaviour of biomacromolecules by consideration of their structure and 3D arrangement in space.
2	Illustrate by reference to specific examples the critical importance of the structure-function relationship in the correct functioning of biological systems
3	Rationalise the mechanical properties of selected biological macromolecules in terms of their structure.
4	Explain the fundamental working principles of experimental methods used in the elucidation of biomacromolecule structure and their application in the life sciences.
5	Devise and execute experiments to determine the molecular structure of selected biomacromolecules in a laboratory setting.

Assessment

Indicative Assessment Tasks:

Assessment 1. The student prepares a report detailing an experimental investigation, for example the structural characterisation of a biopolymer, demonstrating comprehensive understanding of the principles of the technique. Word count 2000 words.

Assessment 2. Open Book examination, testing application of knowledge of the structure-function relationships of biomacromolecules and their importance to key biological systems, and mechanical properties enabled by biomacromolecules. Duration 2 hours.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)
1	4 & 5	Report	50%
2	1, 2 & 3	Examination	50%

Derogations

N/A

Learning and Teaching Strategies

A range of teaching activities will be used to deliver this module. This will comprise formal lectures, laboratory practicals, 'flipped' classroom sessions and seminars. It will be essential for students to undertake regular independent study of additional resources in order to prepare for each session.

Indicative Syllabus Outline

- Review / revision of prior knowledge of key classes of biomacromolecules.
- Structural roles of proteins, lipids and polysaccharides in biological systems
- Polymer structure - function relationships and their importance in biochemistry
- Case study in structure-function relationship - enzymology
- Introduction to polymer physics
- Role of biomacromolecules in enabling enhanced mechanical properties of biological structures
- Polymer Characterisation techniques for the Life Sciences
- Roles of polymers in Life
- Polysaccharides
- Protein and Nucleic Acid Chemistry
- Modelling polymer behaviour

Indicative Bibliography:

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

Essential Reads

Kessel, A. and Ben-Tal, N. (2018) *Introduction to Proteins: Structure, Function, and Motion.* 2nd ed. Boca Raton, FL: CRC Press / Taylor and Francis Group.

Other indicative reading

Liljas, A., Liljas, L., Ash, M-R, Lindblom, G., Nissen, P. and Kjeldgaard, M. (2017). *Textbook of Structural Biology*. 2nd ed. London: World Scientific Publishing Co. Pte. Ltd.

Gosline, J.M. (2018). *Mechanical Design of Structural Materials in Animals.* Princeton: Princeton University Press.

Employability skills – the Glyndŵr Graduate

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
Critical Thinking
Emotional Intelligence
Communication