



Title:	Structural Biochemistry	APPROVED
Long Title:	Structural Biochemistry	
Module Code:	BIOL6024	Duration: 1 Semester
Credits:	5	
NFQ Level:	Fundamental	
Field of Study:	Biochemistry & Cell Biology	
Valid From:	Semester 1 - 2017/18 (September 2017)	
Module Delivered in	9 programme(s)	
Module Coordinator:	Brigid Lucey	
Module Author:	Fiona OHalloran	
Module Description:	This module describes the molecular structure and properties of the major classes of biomolecules, emphasizing the relationship between molecular structure and biological function.	
Learning Outcomes		
<i>On successful completion of this module the learner will be able to:</i>		
LO1	Describe the molecular structure and properties of carbohydrates and lipids.	
LO2	Describe the structure and functions of nucleic acids and proteins and explain the biochemistry of information flow from DNA to protein.	
LO3	Perform analytical techniques for the quantitation of biomolecules and prepare buffer solutions	
LO4	Write scientific reports to interpret analytical results and evaluate the precision and accuracy of laboratory data.	
LO5	Perform data handling exercises and explain the importance of standards and controls in biological assays	
Pre-requisite learning		
Module Recommendations		
<i>This is prior learning (or a practical skill) that is strongly recommended before enrolment in this module. You may enrol in this module if you have not acquired the recommended learning but you will have considerable difficulty in passing (i.e. achieving the learning outcomes of) the module. While the prior learning is expressed as named CIT module(s) it also allows for learning (in another module or modules) which is equivalent to the learning specified in the named module(s).</i>		
12750	BIOL6024	Structural Biochemistry
Incompatible Modules		
<i>These are modules which have learning outcomes that are too similar to the learning outcomes of this module. You may not earn additional credit for the same learning and therefore you may not enrol in this module if you have successfully completed any modules in the incompatible list.</i>		
No incompatible modules listed		
Co-requisite Modules		
No Co-requisite modules listed		
Requirements		
<i>This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed. You may not enrol on this module if you have not acquired the learning specified in this section.</i>		
No requirements listed		

Module Content & Assessment
Indicative Content
Carbohydrates

Biological functions of carbohydrates / Nomenclature / Stereoisomers in carbohydrate chemistry / Structure and properties of important monosaccharides, disaccharides and polysaccharides / Carbohydrate derivatives .

Lipids

Biological functions of lipids/ Classification / Structure of Fatty acids, Glycerides, Non-glycerol lipids and Complex lipids / Biological membranes (structure, transport)

Nucleic Acids

Biological functions of nucleic acids / Nomenclature / Chemical composition and structure of nucleotides / Structure and properties of DNA double helix / Packaging of DNA / Replication / Transcription / Translation /Mutations and repair mechanisms

Amino acids and proteins

Biological functions of proteins / Structure and properties of essential amino acids / Peptide bond formation / Protein folding; secondary, tertiary and quaternary structure / Protein denaturation / Protein analysis.

Practical skills

Preparation of laboratory buffers and solutions / Quantitation of biomolecules / Interpretation of analytical data / Estimation of precision and accuracy of experimental results

Assessment Breakdown

%

Course Work

100.00%

Course Work

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Multiple Choice Questions	Theory based assessment of lecture material	1	30.0	Week 7
Multiple Choice Questions	Theory based assessment of lecture material	2	30.0	Week 13
Written Report	Practical reports with theory assessment and data handling exercises	3,4,5	20.0	Every Second Week
Practical/Skills Evaluation	Laboratory Exam	3,4,5	20.0	Week 12

No End of Module Formal Examination

Reassessment Requirement
Repeat examination

Reassessment of this module will consist of a repeat examination. It is possible that there will also be a requirement to be reassessed in a coursework element.

The institute reserves the right to alter the nature and timings of assessment

Module Workload

Workload: Full Time				
<i>Workload Type</i>	<i>Workload Description</i>	<i>Hours</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	class-based instruction	2.0	Every Week	2.00
Lab	practical laboratory instruction	2.0	Every Week	2.00
Independent & Directed Learning (Non-contact)	study of lecture notes	2.0	Every Week	2.00
Independent & Directed Learning (Non-contact)	report preparation, data-handling exercises	1.0	Every Week	1.00
Total Hours				7.00
Total Weekly Learner Workload				7.00
Total Weekly Contact Hours				4.00

This module has no Part Time workload.

Module Resources

Recommended Book Resources

- D. L. Nelson, M. M. Cox, 2017, *Lehninger Principles of Biochemistry*, 7th Ed., Freeman and Sapling [ISBN: 9781464126116]

Supplementary Book Resources

- Krish Moorthy 2007, *Fundamentals of Biochemical Calculations*, 2nd Ed., CRC Press [ISBN: 1420053574]
- Lisa A. Seidman 2008, *Basic laboratory calculations for biotechnology*, Pearson Benjamin Cummings San Francisco, CA [ISBN: 0132238101]
- PC Engel, AR Leech, M Board, 2010, *Pain-free Biochemistry: An essential guide for the Health Sciences*, Ebook Ed., Wiley [ISBN: 9780470722961]

This module does not have any article/paper resources

Other Resources

- Website: DNA Learning Center
<https://www.dnalc.org/resources>
- Website: Kevin Ahern and Indira Rajagopal *Biochemistry Free and Easy*
<http://biochem.science.oregonstate.edu/files/biochem/ahern/BiochemistryFreeandEasy3.pdf>

Module Delivered in

Programme Code	Programme	Semester	Delivery
CR_SAGBI_8	<u>Bachelor of Science (Honours) in Agri-Biosciences</u>	3	Mandatory
CR_SHERB_8	<u>Bachelor of Science (Honours) in Herbal Science</u>	3	Mandatory
CR_SNHSC_8	<u>Bachelor of Science (Honours) in Nutrition and Health Science</u>	3	Mandatory
CR_SPHBI_8	<u>Bachelor of Science (Honours) in Pharmaceutical Biotechnology</u>	3	Mandatory
CR_SAGBI_7	<u>Bachelor of Science in Agri-Biosciences</u>	3	Mandatory
CR_SBIBI_7	<u>Bachelor of Science in Applied Biosciences and Biotechnology</u>	3	Mandatory
CR_SFSTE_7	<u>Bachelor of Science in Food and Health Science</u>	3	Mandatory
CR_SCEBS_8	<u>Common Entry Biological Sciences</u>	3	Mandatory
CR_SBIOS_6	<u>Higher Certificate in Science in Applied Biosciences</u>	3	Mandatory