

Module Title:	Biochemistry Metabolism	
Language of Instruction:	English	
Credits:	5	
NFQ Level:	6	
Module Delivered In	<a href="#">4 programme(s)</a>	
Teaching & Learning Strategies:	This module will be taught in three theory classes of one hour duration and the equivalent of a two hour practical class per week. Classes may take the form of formal lectures or tutorial-type sessions. A range of teaching techniques will be used as appropriate, including worksheets, PowerPoint and other presentations. Factual material presented at theory classes will be reinforced, discussed and developed during practical classes.	
Module Aim:	The aim of this module is to give the student a sound knowledge of key concepts in the control of metabolism, metabolic processes and introductory enzyme kinetics as well as to develop basic laboratory technical, numerical and reporting skills with due regard to Health and Safety.	
Learning Outcomes		
On successful completion of this module the learner should be able to:		
LO1	Explain how metabolism is controlled by enzymes and other mechanisms	
LO2	Outline central metabolic pathways and the synthesis of ATP	
LO3	Recognise the role of buffers in biochemistry	
LO4	Carry out basic biochemical techniques with due regard to safety in the laboratory	
Pre-requisite learning		
Module Recommendations		
This is prior learning (or a practical skill) that is recommended before enrolment in this module.		
4504	SCIE H1111	Chemistry
Incompatible Modules		
These are modules which have learning outcomes that are too similar to the learning outcomes of this module.		
No incompatible modules listed		
Co-requisite Modules		
No Co-requisite modules listed		
Requirements		
This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.		
No requirements listed		

## Module Content & Assessment

### Indicative Content

#### Buffers in biochemistry

The ionic product of water, buffers and buffering capacity, the Henderson Hasselbalch equation, the preparation of buffers, the blood buffering system

#### Enzymology

Classification and mode of action of enzymes. Factors influencing enzyme activity. Introduction to enzyme kinetics;  $K_m$ ,  $V_{max}$  and  $K_{cat}$ , the Michaelis-Menton and Lineweaver-Burk plots

#### Introductory Metabolism

Definition, anabolic and catabolic metabolism. Methods of metabolic control

#### Metabolic Pathways

Glycolysis and gluconeogenesis. Introduction to citric acid cycle, the electron transfer chain and  $\beta$ -oxidation. Ketosis. Amino acid catabolism

#### Bioenergetics

ATP synthesis. The yield of ATP from central catabolic metabolism

#### Practical

The first class will cover Health & Safety regulations. Further classes will include exercises on the following or similar; the preparation and testing of buffers, basic biochemical extraction and separation, enzymatic assays and the determination of the  $K_m$  and  $V_{max}$  of an enzyme. Students will also gain experience in biochemical calculations, plotting curves and laboratory report writing.

Assessment Breakdown	%
Continuous Assessment	10.00%
Practical	40.00%
End of Module Formal Examination	50.00%

### Special Regulation

Students must achieve a minimum grade (35%) in both the practical/CA and final examination

### Continuous Assessment

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Examination	A number of short assessments	1,2	10.00	n/a

No Project

### Practical

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Practical/Skills Evaluation	Practical Laboratory Book	3,4	40.00	Every Week

### End of Module Formal Examination

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Formal Exam	Two hour written final examination	1,2,3	50.00	End-of-Semester

SETU Carlow Campus reserves the right to alter the nature and timings of assessment

**Module Workload**

<b>Workload: Full Time</b>		
<i>Workload Type</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	12 Weeks per Stage	2.00
Laboratory	12 Weeks per Stage	2.00
Estimated Learner Hours	15 Weeks per Stage	5.13
Total Hours		125.00

**Module Delivered In**

Programme Code	Programme	Semester	Delivery
CW_SABTP_B	<a href="#">Bachelor of Science (Honours) in Biosciences with Biopharmaceuticals</a>	4	Mandatory
CW_SABRE_B	<a href="#">Bachelor of Science (Honours) in Brewing and Distilling</a>	4	Mandatory
CW_SABFQ_D	<a href="#">Bachelor of Science in Biosciences</a>	4	Mandatory
CW_SASCI_C	<a href="#">Higher Certificate in Science in Applied Biology or Applied Chemistry</a>	4	Group Elective 1