1. **Title of the module**

BIOS3010 (BI301) - Enzymes and Introduction to Metabolism

1. **School or partner institution which will be responsible for management of the module**

Biosciences

1. **The level of the module (Level 4, Level 5, Level 6 or Level 7)**

Level 4

1. **The number of credits and the ECTS value which the module represents**

15 credits (7.5 ECTS credits)

1. **Which term(s) the module is to be taught in (or other teaching pattern)**

Spring

1. **Prerequisite and co-requisite modules**

Pre-requisite:

BIOS3000 Introduction to Biochemistry

1. **The programmes of study to which the module contributes**

Biochemistry and related programmes

Biology and related programmes

Biomedical Science and related programmes

1. **The intended subject specific learning outcomes.
On successfully completing the module students will be able to:**

8.1 Analyse kinetic data and understand the principles of enzyme kinetics

8.2 Discuss the basic structure and functions of enzymes.

8.3 Perform enzyme assays to determine the kinetic properties of enzymes and to present the data in an appropriate manner.

8.4 Write down the key pathways of metabolism in animals and micro-organisms.

8.5 Describe mechanisms of control of these metabolic pathways.

1. **The intended generic learning outcomes.
On successfully completing the module students will be able to:**

9.1 Be able to extract and interpret information on a basic level (knowledge management).

9.2 Be able to use basic computer skills for use in spreadsheet work and data retrieval.

9.3 Be able to analyse and evaluate data (problem solving) on a basic level.

1. **A synopsis of the curriculum**

This course aims to introduce the 'workers' present in all cells – enzymes, and their role in the chemical reactions that make life possible.

The fundamental characteristics of enzymes will be discussed – that they are types of protein that act as catalysts to speed up reactions, or make unlikely reactions more likely. Methods for analysis of enzymic reactions will be introduced (enzyme kinetics). Control of enzyme activity, and enzyme inhibition will be discussed.

Following on from this the pathways of intermediary metabolism will be introduced. Enzymes catalyse many biochemical transformations in living cells, of which some of the most fundamental are those which capture energy from nutrients. Energy capture by the breakdown (catabolism) of complex molecules and the corresponding formation of NADH, NADPH, FADH2 and ATP will be described. The central roles of the tricarboxylic acid cycle and oxidative phosphorylation in aerobic metabolism will be detailed. The pathways used in animals for catabolism and biosynthesis (anabolism) of some carbohydrates and fat will be covered, as well as their control. Finally how humans adapt their metabolism to survive starvation will be discussed.

1. **Reading list (Indicative list, current at time of publication. Reading lists will be published annually)**
* Lehninger principles of biochemistry - Nelson DL, Cox MM. New York: W.H. Freeman and Company Seventh edition, International edition. 2017 (editions 5 and 6 also suitable)
1. **Learning and teaching methods**

Total contact hours: 38

Private study hours: 112

Total study hours: 150

1. **Assessment methods**
	1. Main assessment methods

Practical (30%) 1500 words maximum

MCQ assessments – 40 questions (20%)

Exam, 2hr (50%)

13.2 Reassessment methods

Reassessment Instrument: like for like

1. **Map of module learning outcomes (sections 8 & 9) to learning and teaching methods (section12) and methods of assessment (section 13)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Module learning outcome** | *8.1* | *8.2* | *8.3* | *8.4* | *8.5* | *8.6* | *9.1* | *9.2* | *9.3* | *9.4* |  |  |
| **Learning/ teaching method** |  |  |  |  |  |  |  |  |  |  |  |  |
| **Private Study** | **X** | **X** | **X** | **X** | **X** |  | **X** | **X** | **X** |  |  |  |
| Workshop | **X** | **X** | **X** |  |  |  | **X** | **X** | **X** |  |  |  |
| Laboratory | **X** | **X** | **X** |  |  |  | **X** | **X** | **X** |  |  |  |
| Lectures | **X** | **X** | **X** | **X** | **X** |  | **X** | **X** | **X** |  |  |  |
| **Assessment method** |  |  |  |  |  |  |  |  |  |  |  |  |
| MCQ test |  |  |  | **X** | **X** |  | **X** |  | **X** |  |  |  |
| Practical | **X** | **X** | **X** |  |  |  | **X** | **X** | **X** |  |  |  |
| Exam | **X** | **X** | **X** | **X** | **X** |  | **X** | **X** | **X** |  |  |  |

1. **Inclusive module design**

The School recognises and has embedded the expectations of current equality legislation, by ensuring that the module is as accessible as possible by design. Additional alternative arrangements for students with Inclusive Learning Plans (ILPs)/declared disabilities will be made on an individual basis, in consultation with the relevant policies and support services.

The inclusive practices in the guidance (see Annex B Appendix A) have been considered in order to support all students in the following areas:

a) Accessible resources and curriculum

b) Learning, teaching and assessment methods

1. **Campus(es) or centre(s) where module will be delivered**

Canterbury

1. **Internationalisation**

Bioscience is an international discipline. This module presents subject-specific knowledge, research approaches and techniques, generated, developed and refined by scientists around the world. Mastery of the learning outcomes will equip students to apply the theories and techniques of the module in a wide range of international contexts. In compiling the reading list, consideration has been given to the range of texts that are available internationally and a selection has been identified to complement the delivery of the material. The School of Biosciences is an international community of students and staff. Group activities e.g. in practicals, tutorials, workshops and self-study will naturally draw on the international make-up of the student body; the module teaching team includes members with international experience of teaching and research collaboration.

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**Revision record – all revisions must be recorded in the grid and full details of the change retained in the appropriate committee records.**

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| --- | --- | --- | --- | --- |
| Date approved | Major/minor revision | Start date of the delivery of revised version | Section revised | Impacts PLOs (Q6&7 cover sheet) |
| 20/01/20 | Minor | Sep 2020 | 8, 9, 11-13 | No |
|  |  |  |  |  |

Revised FSO Feb 2020