1. **Title of the module**

BIOS6290 (BI629) - Proteins: Structure and Function

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 6

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

30 credits (15 ECTS)

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

Autumn

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

Prerequisites:

BIOS3000 Introduction to Biochemistry

BIOS5320 Skills for Bioscientists 2

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

Biochemistry and related programmes.

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

8.1 Demonstrate an understanding of the structural organisation and biophysical properties of proteins together with their physiological function in terms of catalysis, ligand binding and as components of molecular machines.

8.2 Demonstrate an understanding of how the structure and function of proteins are studied and characterised using current biophysical methods such as mass spectroscopy, x-ray diffraction, nuclear magnetic resonance, fluorescence, circular dichroism, electron microscopy, atomic force microscopy and rapid mixing apparatus.

8.3 Use web-based tools to retrieve and manipulate protein-related data from international repositories, and the use of molecular graphics software to analyse protein structure in relation to topology and function.

8.4 Demonstrate knowledge and understanding of the instrumentation and the type of data generated by the techniques listed in 8.2 above using modern research equipment in the Research Facilities and Research Labs of the School of Biosciences.

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

9.1 Communicate effectively using writing.

9.2 Handle and analyse experimental data (including numerical data).

9.3 Problem solve.

9.4 Use web tools, data repositories, and computer software.

1. **A synopsis of the curriculum**

The module will cover the structural analysis of proteins and protein assemblies using techniques such as fluorescence, circular dichroism, mass spectrometry, atomic-force microscopy, cryo-EM, X-ray crystallography and NMR. It will also look at protein folding, molecular processing, *de novo* design, engineering and modelling. The module will also investigate the relationship between protein structure and function and cover the principles and practice of enzymology, ligand binding, and enzyme catalysis.

1. **Reading list (Indicative list, current at time of publication. Reading lists will be published annually)**

* Williamson, M. (2011) How Proteins Work. Garland Science
* Lesk, A.M. (2016, 3nd ed.) Introduction to Protein Science. Architecture, function and genomics. Oxford University Press
* Price & Nairn (2009) Exploring Proteins. Oxford University Press
* Rhodes G (2006, 3rd ed.) Crystallography Made Crystal Clear. Academic Press
* Steven, Baumeister, Johnson & Perham (2016) Molecular Biology of Assemblies and Machines.

1. **Learning and teaching methods**

Total contact hours: 70

Private study hours: 230

Total study hours: 300

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

Course work assignments (x3). Handling, analysis and interpretation of experimental data. (13.3% each)

Exam 1 (2h) Essay (30%)

Exam 2 (2h) Problem solving (30%)

13.2 Reassessment methods

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* | *9.1* | *9.2* | *9.3* | *9.4* |
| **Learning/ teaching method** |  |  |  |  |  |  |  |  |
| Lectures | **X** | **X** |  |  |  |  |  |  |
| Workshops | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** |
| Private study | **X** | **X** |  | **X** |  | **X** | **X** | **X** |
| **Assessment method** |  |  |  |  |  |  |  |  |
| Coursework- handling, analysis and interpretation of experimental data | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** |
| Exam 1 – Essay | **X** | **X** |  |  | **X** |  |  |  |
| Exam 2 – Problem solving | **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**

Biosciences 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 in problem solving sessions, revision sessions, 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.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date approved | Major/minor revision | Start date of the delivery of revised version | Section revised | Impacts PLOs (Q6&7 cover sheet) |
| 20/10/20 | Minor | Sep 2020 | 7-9, 11, 13 | No |
|  |  |  |  |  |

Revised FSO Feb 2020