Module Specification

Module Title	Protein Structure, Folding and Assemblies	Module Code	BIO367

Credit Value	15	Level	6	Mode of Delivery	On Campus	Semester B

Pre-requisite modules	Co-requisite modules	Overlapping modules
BIO269 Techniques for Bio and Chem Sci		

1) Content Description

Provide a description of the module, as it will appear in the Module Directory and on the Student Information System (approx. 70-80 words).

In the first part this module will cover the processes of protein biosynthesis, folding and degradation, and assembly of large macromolecular complexes, as well as structure and function of the macromolecular complexes that are involved in these processes. These complexes include the nucleosome, the ribosome, chaperonins and the proteasome. The module will also cover the relationships between misfolding, formation of amyloid fibres and human disease. In the second part our present knowledge about structure and function of the following macromolecular assemblies will be presented: collagen, muscle proteins, and fatty acid synthase, as well as the different types of viruses.

2) Module Aims

Specify the aims of the module, i.e. the broad educational purposes for offering this module.

The module aims to provide final year students with an advanced level understanding of protein structure and the processes ranging from protein synthesis and folding to degradation. It will also cover the relationships between misfolding, formation of amyloid fibres and human disease. The students will learn how these processes are related to human disease, how the macromolecular assemblies involved in it vary between species, and how the complexity of these assemblies is related to their function. It is a core module for final year Biochemistry and Chemistry with Biochemistry students, but is also suitable for other final year students with an interest in biomolecular form and function.

3) Learning Outcomes

Identify the learning outcomes for this module, i.e. knowledge, skills and attributes to be developed through completion of this module. Outcomes should be referenced to the relevant QAA benchmark statements and the Framework for Higher Education Qualifications in England, Wales and Northern Ireland (2008). The SEEC Credit Level Descriptors for Further and Higher Education 2003 and Queen Mary Statement of Graduate Attributes should also be used as a guiding framework for curriculum design.

Academic Content:	
A1	Evaluate the knowledge about structure and function of proteins and macromolecular assemblies and to propose how the level of complexity is related to a specific function.
A2	To demonstrate by example how a number of approaches can be used to study the molecular structures of proteins or macromolecular assemblies and their mechanisms of action.
A3	To use the molecular graphics software introduced in this module to analyse and present the structures of macromolecular assemblies.

Disciplinary skills - able to:	
B1	Enhance the students' understanding of how proteins are continuously synthesised, folded and assembled into larger complexes, and degraded
B2	Appreciate how malfunctioning of these processes is related to human diseases
B3	Appreciate how the primary structures of proteins determine the quaternary structures of macromolecular assemblies and how knowledge of the three- dimensional structures of these complexes is used to understand their functions
B4	Enhance the students' critical understanding of the limitations of our current knowledge about protein folding and macromolecular assemblies in particular

Attributes:	
C1	Appreciate how the experimental techniques which they know from previous modules can be used to obtain knowledge in a specific scientific context
C2	Learn to visualise and analyse protein structures using the molecular graphics software introduced in the computer workshop

4) Reading List

Provide an indicative reading list for the module. This should include key texts and/or journals but should not be an exhaustive list of materials.

Textbook of Structural Biology. Anders Liljas, Lars Liljas, Jur Piskur, Göran Lindblom, Poul Nissen and Morten Kjeldgaard, World Scientific, 2009.

Biochemistry. Donald J Voet and Judith G. Voet, 4th edition, Wiley, 2011.

These texts are recommended, but the course is not tied to a particular text-book.

Up-to-date review articles on target complexes will be given at the start of each topic.

5) Teaching and Learning Profile

Provide details of the method of delivery (lectures, seminars, fieldwork, practical classes, etc.) used to enable the achievement of learning outcomes and an indicative number of hours for each activity to give an overall picture of the workload a student taking the module would be expected to undertake. This information will form the Key Information Set for each undergraduate programme and will be used to populate the KIS widget found on the QMUL programme information pages. More information can be found online about KIS. You may also wish to refer to the QAA guidance on contact hours when completing this section.

Activity Type	KIS Category	Time Spent (in hours)
Lecture	Scheduled	25
Workshop	Scheduled	3
	Total	28

Specify the total module notional study hours. This should be a total of the hours given for each activity. The notional study hours for each academic credit point is 10. A 15 credit point module therefore represents 150 notional study hours.

Activity Type	Total Time Spent (in hours)	Percentage of Time Spent
Scheduled learning and teaching	28	18.7
Placement	0	0
Independent Study	122	81.3

Total	150	100

Use the information provided in the box above to specify the total time spent and the percentage time spent in each category of teaching and learning activity.

6) Assessment Profile

Provide details of the assessment methods used to assess the achievement of learning outcomes.

Description of Assessment	Assessment Type	KIS Category	Duration/Length	Percentage Weighting	Final element of assessment	Qualifying Mark
Written Examination	Examination	Written Exam	3 Hours	80%	Yes	
Coursework	Written assignment	Coursework		20%	No	

Final element of assessment: The assessment that takes place last. There should normally be only one element of assessment marked as final unless two assessment or submission dates occur on the same day.

Qualifying mark: A specified minimum mark that must be obtained in one or more elements of assessment in order to pass a module. This is in addition to, and distinct from, the requirement to achieve a pass in the module mark to pass the module.

Reassessment

Provide details of the reassessment methods used, specifying whether reassessment is either standard reassessment or synoptic reassessment.

○ Standard Reassessment ◉ Synoptic Reassessment

Synoptic reassessment details (if you have indicated synoptic reassessment above, please give details)		
Brief Description of Assessment	Assessment Type	Duration/Length of Examination/ Coursework
Resit Examination	Written Exam	3 Hours