MODULE SPECIFICATION TEMPLATE

**SECTION 1: MODULE SPECIFICATIONS**

1. Title of the module

BI503 Cell Biology

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

Biosciences

1. Start date of the module

September 2003 latest revision July 2013

1. The number of students expected to take the module

80

1. Modules to be withdrawn on the introduction of this proposed module and consultation with other relevant Schools and Faculties regarding the withdrawal

None this is a minor revision of an existing module

1. The level of the module (e.g. Certificate [C], Intermediate [I], Honours [H] or Postgraduate [M])

I

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)

Autumn and Spring Term

1. Prerequisite and co-requisite modules

Core Stage 1 modules

1. The programmes of study to which the module contributes

Biochemistry and related programmes

Biomedical Science and related programmes

Biology and related programmes

1. The intended subject specific learning outcomes

On successful completion of this module students will be able to demonstrate the following academic attainments

1. An understanding of key areas of cell biology
2. An understanding of modern microscopic methods for identifying cellular components

12.The intended generic learning outcomes

1. Development of abilities to handle scientific literature
2. Development of skills in presenting a concise digest of a research area both orally and in written form

13. A synopsis of the curriculum

The cell is the fundamental structural unit in living organisms. Eukaryotic cells are compartmentalized structures that like prokaryotic cells, must perform several vital functions such as energy production, cell division and DNA replication and also must respond to extracellular environmental cues. In multicellular organisms, certain cells have developed modified structures, allowing them to fulfil highly specialised roles.This module reviews the experimental approaches that have been taken to investigate the biology of the cell and highlights the similarities and differences between cells of complex multicellular organisms and microbial cells. Initially the functions of the cytoskeleton and certain cellular compartments, particularly the nucleus, are considered. Later in the unit, the mechanisms by which newly synthesised proteins are secreted or shuttled to their appropriate cellular compartments are examined.

**Lectures:**

**Cell motility and the cytoskeleton.** - types of cell movements. Actin-based mechanisms - actin/myosin systems in muscle and other cells in higher eukaryotes and the discovery of corresponding microbial systems. - microtubules and their role in intracellular transport: dynein and kinesin. Microtubules in cilia and flagella. ATP and GTP driven processes - the family of intermediate-sized filaments; their structure, cellular role. Concepts of the evolution of intermediate filaments between microbes and man.

**Regulation of the mitotic cell cycle and the dynamic structure of the nucleus.**  – the

interphase nucleus - chromatin structure (histones, nucleosomes, higher order folding;

telomeres; kinetochore etc), nucleolus, nuclear envelope structure, biogenesis of ribosomes,

genetic approaches to analysis of regulation of mitosis, definition of yeast cdc genes;

comparison with biochemical approaches, regulation of progression from G1 → S → G2 → M.

Cycle exit to G0 and return. Growth factor, signalling and apoptosis. Chromatin structure and

its regulation through the cycle, Dynamics of the nuclear envelope and chromosome/chromatid

separation.

**Overview of membrane traffic in eukaryotic cells.** - relationship of endocytotic and

exocytotic pathways, compartments and sorting.

**Biogenesis of proteins destined for organelles or for secretion.-** experimental approaches –

yeast and bacterial sec genes vs biochemical dissection of mammalian secretory tissue, signal

sequences targeting proteins to different organelles, folding and post-translational modification

of proteins in the secretory pathway, eukaryotic and prokaryotic secretory pathway –

biochemical and genetic dissection of compartments, transport mechanisms and targeting.

**Practicals:** Actomyosin contraction in myofibrils using phase microscopy .

**Supervisions:** Reading and précis of a scientific paper in cell and molecular biology. Presentation of its chief findings and impact

14.Indicative Reading List

* Core texts:
* Lodish HF, Berk A, Kaiser CA, Krieger M, Molecular cell biology, 6th Edition, W.H. Freeman, 2007
* Optional texts:
* Alberts B, Molecular Biology of the Cell, 3rd Edition, Garland Science Pub., 2008
* Alberts B, Essential Cell Biology, 3rd Edition, Garland Science Pub., 2009
* Much of the module material is covered at some (usually more introductory) level in Biology and Biochemistry textbooks, as recommended in other modules - examples include Campbell’s Biology and Nelson & Cox’s (Lehninger’s) Principles of Biochemistry.

15.Learning and Teaching Methods, including the nature and number of contact hours and the total study hours which will be expected of students, and how these relate to achievement of the intended module learning outcomes

Module material will be delivered through lectures and a practical class and both will address learning outcomes 11.1 and 11.2.

The supervision and presentation underpin the development of skills in analysing the research literature and presentation of research work in a concise and accessible form, this addresses learning outcomes 12.1 and 12.2 in addition to 11.1

**Contact hours:**

24h lectures

1h supervision

3h practical

2h presentation

**Self Study:** 120 hours

Practical report 24 hours

Supervision and presentation 18 hours

Reading and preparation for examination 78 hours

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16.Assessment methods and how these relate to testing achievement of the intended module learning outcomes

1. Practical. 20% This will address learning outcomes 11.1 and 11.2

2. Reading the scientific literature. Group and individual work aimed at (1) using Web of Science/PubMed plus printed and online sources to identify literature on a subject (2) reading, understanding and criticising papers (3) presenting scientific subjects as abstracts, and orally. 15% This will address learning outcomes 11.1, 12.1 and 12.2

3. Final examination. 65% this will address learning outcomes 11.1, 11.2 and 12.1

17.Implications for learning resources, including staff, library, IT and space

None this is a minor revision of an existing module

18.The School recognises and has embedded the expectations of current disability equality legislation, and supports students with a declared disability or special educational need in its teaching. Within this module we will make reasonable adjustments wherever necessary, including additional or substitute materials, teaching modes or assessment methods for students who have declared and discussed their learning support needs. Arrangements for students with declared disabilities will be made on an individual basis, in consultation with the University’s disability/dyslexia support service, and specialist support will be provided where needed.

19.Campus(es) where module will be delivered:

Canterbury

**SECTION 2: MODULE IS PART OF A PROGRAMME OF STUDY IN A UNIVERSITY SCHOOL**

**Statement by the School Director of Learning and Teaching/School Director of Graduate Studies (as appropriate):** "I confirm I have been consulted on the above module proposal and have given advice on the correct procedures and required content of module proposals"

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| ................................................................Director of Learning and Teaching/Director of Graduate Studies (delete as applicable)…………………………………………………Print Name | ..............................................Date |

**Statement by the Head of School:** "I confirm that the School has approved the introduction of the module and, where the module is proposed by School staff, will be responsible for its resourcing"

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| .................................................................Head of School…………………………………………………….Print Name | ..............................................Date |

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Last updated February 2013