

Module Specification

Module Summary Information

1	Module Title	Fundamentals of Cell Biology
2	Module Credits	20
3	Module Level	4
4	Module Code	BMS4002

5	Module Overview
<p>Rationale:</p> <p>This module will introduce you to key cellular and sub-cellular concepts associated with biomedical sciences. You will encounter the cell as the fundamental, yet dynamic, unit of life. The module aims to describe the relationship between structure and function, and how the characteristics of cells facilitate their activities and allow them to contribute to the activity of tissues. You will develop a detailed and in-depth understanding of why and how cells behave as they do, both on their own, and as part of a tissue in a living organism. This module covers the main themes and laboratory techniques in cellular biology, and alongside the Biochemistry module (level 4) prepares you for the Introduction to Human Physiology level 4 module, the Blood Science and Clinical Biochemistry and Cellular Analysis level 5 modules, and the Molecular Basis of Disease and Pathophysiology level 6 modules.</p> <p>This module will introduce you to the 'Cell' as a unit of life with a detailed analysis of cell structure and function in the context of the tissue that they belong to, protein synthesis and protein trafficking, cell communication and cell signalling, cell cycle and programmed cell-death, significance of stem cells, and overview of the techniques used in cell biology.</p> <p>Alignment with Programme Philosophy and Aims:</p> <p>In line with the programme philosophy and aims, this module is a core module which enables you to develop your knowledge and understanding of cell biology in the field of Biomedical Sciences. This module contributes towards the programme aims in the following ways:</p> <ol style="list-style-type: none"> 1. Practice-led, knowledge applied: you will be introduced to themes and techniques in molecular and cellular biology. You learn how the knowledge and understanding of cell biology lead to development of novel diagnostic tools and therapeutic drugs to improve patient care. 2. Interdisciplinary: You will appreciate the close relationship between cell biology with other fields of science. 3. Employability-driven: This module will help you to develop knowledge, practical skills and attributes that readily transferable into future work settings in the field of Biomedical Sciences. These attributes include communication and presentation skills, critical thinking and problem solving, practical skills, digital literacy and IT, self-management and team working. 4. Internationalisation: You will be required to keep up with global developments related to cell and molecular advances which leads to new diagnostic and treatment strategies to improve patient care, for example through reading journal articles and following professional social media forums. 	

Learning and Teaching Strategy:

This module will use a blended approach to facilitate your learning. Lectures will introduce fundamental concepts in cell biology which will be supported by online resources provided via Moodle to prepare you for laboratory practical and data interpretation sessions, seminars and tutorials. The Moodle site will also provide opportunities to test your understanding of the taught concepts through quizzes, exemplar short answer and longer answered questions. Sessions will include the use of technology such as polling software system that will test your understanding of concepts and allow for real time feedback to monitor your progress.

Practical sessions will be tailored to develop your practical skills, data interpretation and problem solving skills. You will be expected to report your laboratory findings of your group to your peers. This improves your confidence and presentation skills with your peers. Forum discussions will focus on aspects of cellular processes which are important to development of novel diagnostic and therapeutic tools.

Active and informed participation through pre- & post-session work will be an integral component of the module. Such engagement will allow for the development of learning communities to enhance the learning experience of you and your peers.

To achieve the required 20 credits for this module, you will need to dedicate at least 200 hours studying the module material. For this module, the time is broken down in an approximately 25:75 ratio (directed: self-directed). The scheduled learning activities will include lectures, tutorials, practical sessions and facilitated discussions.

Assessment Strategy:

There will be two online tests involving data interpretation, explanation of principles and multiple choice questions. These tests will examine the entire content of the module.

6 Indicative Content

The eukaryotic cell

- **Mammalian cell culture**, primary cultures and cell lines. Culture media, growth and confluency.
- **Stem cells, cell differentiation and cell death**
- **Cytoskeleton and extracellular matrix:** cell-cell interactions, cell junctions.
- **Cell signalling:** hormone and growth factor receptors; second messengers; G proteins, cAMP, PIP3, signalling pathways
- **Protein sorting:** how proteins reach their cellular destinations

Cellular defence mechanisms

Leukocytes and immune responses. Innate and adaptive immunity, antigens, epitopes and antibodies. B and T lymphocytes. Primary and secondary immune responses and vaccination principles.

Eukaryotic cell division processes; cell cycle, mitosis, cell cycle control. Meiosis and sexual reproduction; chromosomes and karyotypes

7	Module Learning Outcomes	
	On successful completion of the module, students will be able to:	
	1	Demonstrate understanding of cell structure and function in the context of tissue environment
	2	Explain the main cellular processes that occur within a cell in tissues
	3	Discuss the application of techniques used in cell biology

8	Module Assessment		
Learning Outcome			
	Coursework	Exam	In-Person
1,2,3		X	

9	Breakdown Learning and Teaching Activities	
Learning Activities	Hours	
Scheduled Learning (SL) includes lectures, practical classes and workshops, peer group learning, Graduate+, as specified in timetable	40	
Directed Learning (DL) includes placements, work-based learning, external visits, on-line activity, Graduate+, peer learning, as directed on VLE	40	
Private Study (PS) includes preparation for exams	120	
Total Study Hours:	200	