

Module Details	
Module Title	Cell and Tissue Biology
Module Code	MHT5007-B
Academic Year	2022/3
Credits	20
School	Department of Biomedical and Electronics Engineering
FHEQ Level	FHEQ Level 5

Contact Hours	
Type	Hours
Lectures	24
Laboratories	24
Directed Study	152

Availability	
Occurrence	Location / Period
BDA	University of Bradford / Academic Year

Module Aims
The aim of this module is to make students familiar with basic cell and tissue biology which directly relates to engineers. Invasive medical devices are often associated with infection, so it is also important that medical engineering and clinical technology students have a good understanding of bacteria, viruses, parasites and other similar microorganisms. Students will learn both biology and engineering aspects of cells and the main aim is to make students understand the link between cell biology and other applications in medical engineering. Students will also learn about cell organelles, cell division, genetics, genetic engineering, cancer and various other cell types within the human body. Students will also get full training of 'hands on' cell culture. Cell culture is the process by which cells are grown under controlled conditions, generally outside of their natural environment. Cell culture conditions can vary for each cell type. Practicals are designed to provide students with basic training in cell culture techniques which are widely used in modern research laboratories and bio-industries, and training to grow animal and human cells.

Outline Syllabus

This module adopts a multidisciplinary approach and aims to assist the students in developing their knowledge and understanding of Cell and Tissue Biology including:

- * Eukaryotic Cells Structure (Organelles)
- * Cell Cycle
- * Extracellular Matrix & Cell Adhesion
- * Cytoskeleton
- * Cell Types
- * Tissue Level of Organisation
- * Cancer and Abnormal Cell Growth
- * Genetics
- * Genetic Engineering
- * Cell culture (practical)
- * Basic microbiology
- * Stem cell biology.

Learning Outcomes

Outcome Number	Description
01	Understand basic principles of biochemistry and cell/tissue biology.
02	Understand different cell types (including stem cells), cancer, apoptosis and mainly the relation between cell biology with medical implants such as cell/surface interactions, cytotoxicity, cell viability once they are introduced to biomaterials.
03	Understand the role of the immune system in combating infection as well as basic principles of infection control such as hand hygiene, health care waste management and how to control infection via medical devices (both invasive and non-invasive).
04	Understand basic cell culture techniques with full training of 'hands on' cell culture.

Learning, Teaching and Assessment Strategy

In this module students will learn basic cell and tissue biology which directly related to medical engineering, implants and etc. using interactive sessions. The first part of the module will mainly concentrate on the fundamentals of cell and micro-biology (LO1,2). The second part of the module will focus on tissue structure and properties as well as infection control (LO3,4). Key lectures will deliver core content, providing students with the opportunity to acquire information to enhance their knowledge and understanding of the subject. (LO 1,2,3,4.)

Students will get full training of 'hands on' cell culture. Cell culture is the process by which cells are grown under controlled conditions, generally outside of their natural environment. Cell culture conditions can vary for each cell type. This practical is designed to provide students with a basic training in cell culture techniques which are widely used in modern research laboratories and bio-industries and training to grow animal/human cells (LO2,LO4).

Interactive teaching sessions will be complemented by cell culture laboratory sessions (LO1,2) and infection control (3,4) to allow students to apply this learning principles in labs. Student will learn how to work with animal and human cell lines such as healthy and cancerous bone cells. Directed study provides students with the opportunity to undertake guided reading and to develop their own portfolio of learning to enhance transferable skills and knowledge. (LO 1,2,3,4.)

The relevant concepts, principles and theories will be explored by formal lectures. Concepts, principles and theories explored in formal lectures and practised in tutorials. Cognitive and personal skills developed in problem solving exercises, tackled by working in small groups supported by members of academic staff.

There will be two set of summative assessments:

- 1) Summative coursework (1) with maximum 2500 words limit (50%) (LO 1,2,3,4).
- 2) Summative coursework (2) with maximum 2500 words limit (50%) (LO 1,2,3,4).

Mode of Assessment

Type	Method	Description	Weighting
Summative	Coursework - Written	1. Report (2000-2500 words)	50%
Summative	Coursework - Written	2. Report (2000-2500 words)	50%

Reading List

To access the reading list for this module, please visit <https://bradford.rl.talis.com/index.html>

Please note:

This module descriptor has been published in advance of the academic year to which it applies. Every effort has been made to ensure that the information is accurate at the time of publication, but minor changes may occur given the interval between publishing and commencement of teaching. Upon commencement of the module, students will receive a handbook with further detail about the module and any changes will be discussed and/or communicated at this point.