



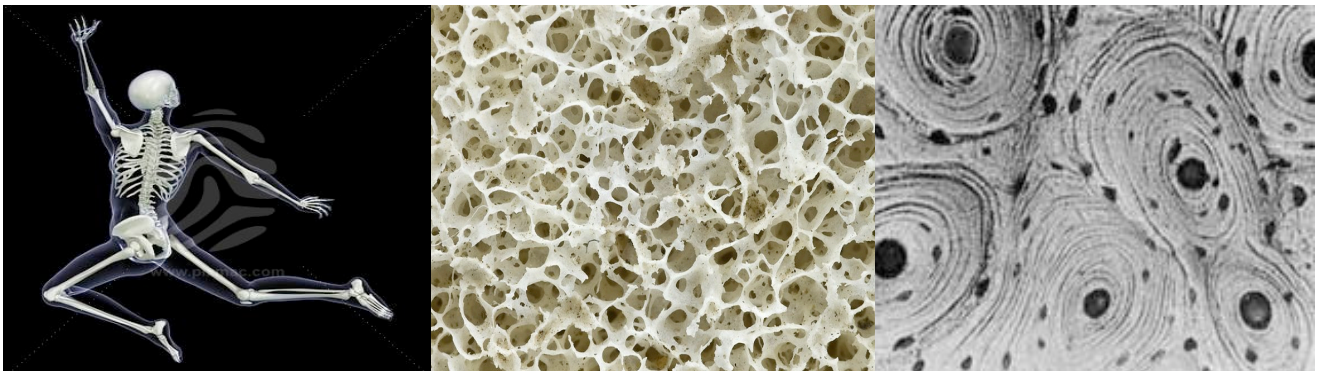
BASIC MEDICAL SCIENCES MODULE 2014/15

STUDENT INFORMATION

MODULE CO-ORDINATOR: Professor Veronica Campbell

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DEPARTMENT OF PHYSIOLOGY, BIOMEDICAL SCIENCES INSTITUTE, TRINITY COLLEGE,
PEARSE STREET, DUBLIN 2.



COURSE TITLE: Basic Medical Sciences		CODES: Health informatics (CS7015) Bioengineering (ME7B04) Physical sciences in medicine (CM8704) Medical device design (NCAD)
LEVEL: MSc	CREDITS: 5	PREREQUISITES: None
MODULE CO-ORDINATOR: Prof V. Campbell	LECTURERS: PROF V CAMPBELL DR Á KELLY	SPECIALIST LECTURERS: PROF JAMES JONES DR MARTIN BARR PROF O SHEILS DR E ROCHE MR RICHARD DOWNEY
TERMS: MICHAELMAS		
<p>AIMS & INTENTIONS</p> <p>The module aims to give an introduction to human biology and disease, such that students can appreciate the basis for scientific/technical procedures in the diagnosis, treatment and basic research associated with human disease. A basic understanding of terminology and practice is emphasized.</p> <p>The module is aimed at PG students who have no prior knowledge of physiology and or biology. The following MSc programmes participate in the module: Bioengineering, Physical Sciences in Medicine, Health Informatics and Medical Device Design. If you have queries regarding your participation please contact the module co-ordinator and/or programme director.</p> <p>The lecture series will outline the physiology and anatomy of the main body systems and introduces the cellular basis of these systems. Some principles of disease conditions will be covered. The specialist lectures and hospital laboratory visits will provide an insight into the role of various technologies in the diagnosis and management of patients. Additionally they will show the integration of basic sciences, technology and clinical medicine across the continuum of care.</p>		

SYLLABUS

Introduction: Integration of organ function, levels of biological organization, concepts of form fitting function, homeostasis (mechanisms of control and disturbances).

Cells, Tissues, Organs: the cell theory, the cell as a basic unit of life, cellular ultrastructure, intracellular organelles, cellular function in health and disease.

Blood: composition, function of plasma proteins, cellular components of blood, haemoglobin and oxygen transport, role of white blood cells in immunity, blood clotting, blood pathology (anaemia, abnormal clotting).

The Immune System: sources of immune challenges, immunological memory and specificity, mediators of immunity, immune responses, antibodies, self tolerance, blood typing, immune system pathology.

The cardiovascular system: components, path of blood flow through the system, anatomy of heart, heart rhythms, regulation of heart, blood vessel anatomy, blood flow to organs, anatomy of the respiratory system, mechanics of breathing, gas transport.

The excitable tissues - brain and muscle: divisions of the nervous system, basic brain anatomy and physiology, electroencephalogram (EEG), spinal cord, reflexes, neural cell form and function, neural communication, neurogenesis and neurodegeneration, muscle tissue types, muscle contraction, communication systems in muscle, neural muscular junction, physics of joint movement, muscle metabolism, muscle fibre types, adaptive changes in muscle.

Bone and Cartilage: functions, types, anatomy, extracellular matrix composition, cellular component, growth and repair, skeletal pathologies, concept of bone as an organ, pathologies of bone and cartilage.

The Endocrine System: components, functions, control systems, abnormal endocrine function, pancreatic hormones, insulin, diabetes.

The Renal and Digestive Systems: components, function, micturition, renal functional units (the nephron), renal processes (filtration, reabsorption, secretion), water balance, renal pathology, digestion (absorption, motility, secretion), accessory organs (pancreas, liver).

Specialist lectures*: Cancer, Histopathology, Paediatric diabetes patients- benefits of technology, Orthopaedics.

***Note**: these lectures have a clinical focus and are delivered in a conference presentation style. Lecture notes are NOT provided therefore students should take adequate notes for their own requirements.

Patient Investigation Laboratory Visits**

Histopathology Laboratory, St James's Hospital, Dublin 8.

Diagnostic Imaging Laboratory, St James's Hospital, Dublin 8.

****Note:** Please see appendix I for further useful instructions.

RECOMMENDED TEXTS

Human Physiology

by Lauralee Sherwood 2010 Brooks & Cole.

Fundamentals of anatomy & physiology

by Martini, Nath & Bartholomew

Wheater's functional histology: a text & colour atlas

by Burkitt, Young & Heath

Essential cell biology

by Bruce Alberts et al.

Gray's anatomy for students

by Drake et al.

LEARNING OUTCOMES

On completion of this course the student will be able to:

- Describe the basic functions of the human physiological systems.
- Describe the morphological characteristics of mammalian cell types.
- Explain the functional roles of these cell types and how their form fits their function.
- Appreciate how these cells interact in the various organ systems.
- Explain the homeostatic mechanisms of each organ system (you should be able to give examples).
- Differentiate normal and pathological anatomy and physiology.
- Explain the mechanisms of disease (e.g. diabetes, neurodegeneration etc).
- Be familiar with the diagnostic procedures and medical interventions for diseases.
- Analyse the BMS material and integrate with information from their own discipline.

At the end of each lecture you will receive more specific learning outcomes for the lecture and you will be expected to undertake self-directed further reading and research.

TEACHING STRATEGIES

The course is taught using a combination of lectures and visits to two clinical laboratories. Combined, these different teaching styles give the student an opportunity to integrate this knowledge into their assignments and future careers.

ASSESSMENT MODES

CS7015 & CM8704

Individual written assignment

A written paper based on a choice of topics must be submitted (**HARD copy only**) by each student by **Friday 12 December 2014**. This should be submitted to Physiology, Level 2, Trinity Biomedical Sciences Institute, Pearse St

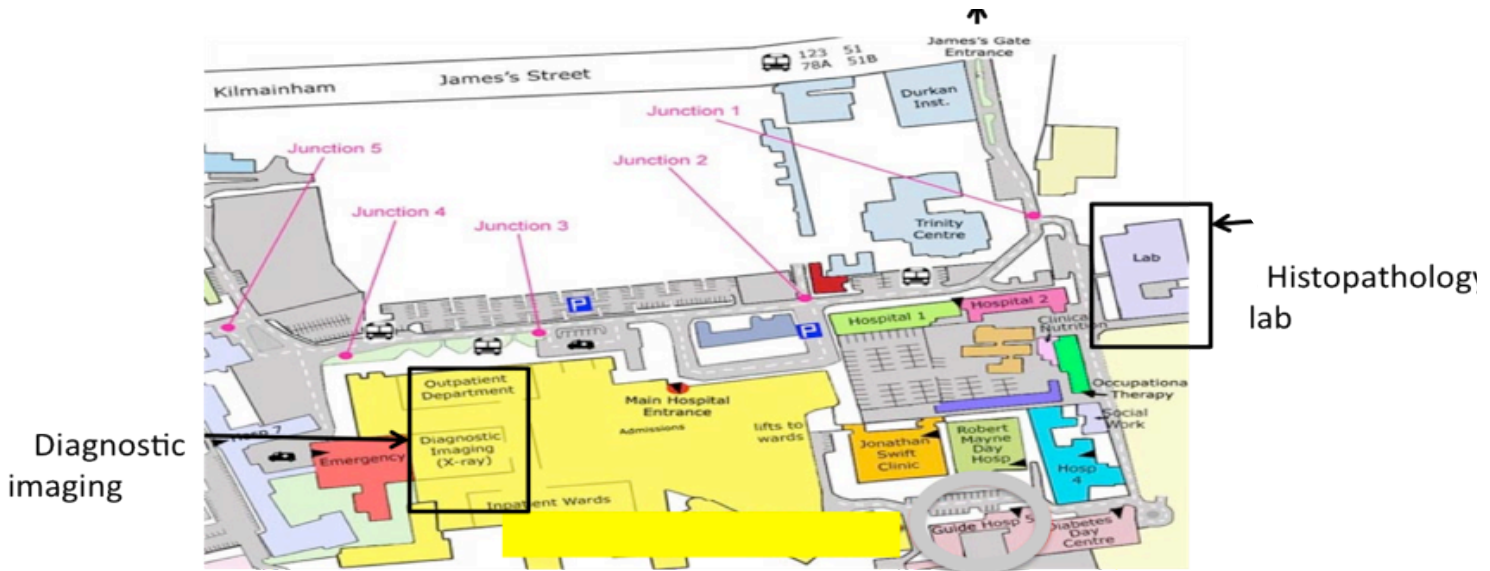
MAX 4000 words, a maximum of 4 tables/figures, references should be numbered in the

text and listed at the end of the assignment in order of appearance. Marks for the written assignment will be awarded as follows: integration of relevant module information (50%), appropriate definitions and examples *e.g.*, disease conditions (30%), integration of relevant information from students own course (20%).

ME7B04

A 2 hour exam paper consisting of short answer questions will take place in January 2015 (date to be confirmed)

Appendix I: Instructions for laboratory visits to SJH



Appendix II: BMS timetable

Date	Time	Topic, speaker	Location
3rd October	2-5pm	Introduction to module	Stanley Quek LT
		Cells, tissues & organs Prof V Campbell	
		The immune system Prof V Campbell	
10th October	2-5pm	Cardio vascular system, Dr Á Kelly	Stanley Quek LT
17th October	2-6pm	Specialist Lecture: Histopathology Prof O Sheils	Stanley Quek LT
		The nervous system Prof V Campbell	
24th October	2-4.00pm	Specialist Lecture: Bioengineering a solution to faecal incontinence, Prof James Jones	Stanley Quek LT
31st October	2-5.00pm	Connective tissue Bone, Cartilage, Muscle Prof V Campbell	Stanley Quek LT
7th November	2-3.30pm	Endocrine system Prof V Campbell	Tercentenary Hall LT
	4-5.30pm	Specialist Lecture: Cancer Dr Martin Kerr	
14th November	2-3.00pm	The digestive system I Prof V Campbell	Stanley Quek LT

	3-4.00pm	Specialist lecture: Orthopaedic implant surgery, Mr Richard Downey	
	4-5.00pm	The digestive system II Prof V Campbell	

21st November	2-3.30pm	Specialist lecture: Paediatric diabetes patients- benefits of technology, Prof E Roche	Stanley Quek LT
	4-5pm	The renal system, Prof V Campbell	

28th November	2-3.30pm	Patient investigation: Histopathology lab visit 1	SJH
	3.30-4.30pm	Patient investigation: Diagnostic imaging lab visit 2	

5th December	2-6pm	Private study on written assignment/exam preparation	
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21st November – assignment topics will be announced
12th December – deadline for submission of assignment