



**Trinity College Dublin**  
Coláiste na Tríonóide, Baile Átha Cliath  
The University of Dublin



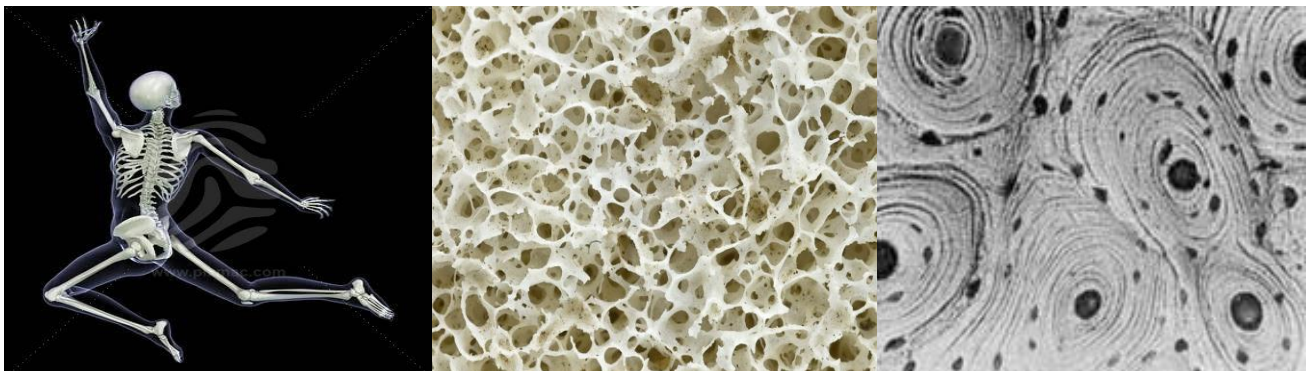
# **ANATOMY & PHYSIOLOGY MODULE 2015/16**

## **STUDENT INFORMATION**

**MODULE CO-ORDINATOR: Dr Deirdre Edge**

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DEPARTMENT OF PHYSIOLOGY, BIOMEDICAL SCIENCES INSTITUTE, TRINITY COLLEGE,  
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<b>Pre-requisites</b>	None
<b>ECTS</b>	5
<b>Chief Examiner</b>	Dr Deirdre Edge
<b>Teaching Staff</b>	<p><b>LECTURERS:</b></p> <p>DR DEIRDRE EDGE</p> <p><b>SPECIALIST LECTURERS:</b></p> <p>DR M BARR</p> <p>PROF O SHEILS</p> <p>DR E ROCHE</p> <p>MR RICHARD DOWNEY</p>
<b>Delivery</b>	<p><b>TEACHING STRATEGIES</b></p> <p>The course is taught by lectures and laboratory class</p> <p><b>Lectures will commence on: 9<sup>th</sup> October 2015</b></p>
<b>Aims</b>	<p><b>AIMS &amp; INTENTIONS</b></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 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 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> <p>The module is aimed at students who have no prior knowledge of physiology and or biology. In addition to UG Engineering students, the following MSc programmes participate in the module: Bioengineering, Physical Sciences in Medicine, Health Informatics and Medical Device Design.</p>
<b>Learning Outcomes</b>	<p>When students have successfully completed this module they should be able to:</p> <ol style="list-style-type: none"> <li>1. Describe the basic functions of the human physiological systems.</li> <li>2. Describe the morphological characteristics of mammalian cell types.</li> </ol>

	<ol style="list-style-type: none"> <li>3. Explain the functional roles of these cell types and how their form fits their function.</li> <li>4. Appreciate how these cells interact in the various organ systems.</li> <li>5. Explain the homeostatic mechanisms of each organ system (you should be able to give examples).</li> <li>6. Differentiate normal and pathological anatomy and physiology.</li> <li>7. Explain the mechanisms of disease (e.g. diabetes, neurodegeneration etc.).</li> <li>8. Be familiar with the diagnostic procedures and medical interventions for diseases.</li> <li>9. Analyse the BMS material and integrate with information from their own discipline.</li> </ol> <p>At the end of each lecture you will receive more specific learning outcomes for the lecture and you will be expected to undertake complete self-directed further reading and research.</p>
<b>Syllabus</b>	<p><b>SYLLABUS</b></p> <p><u>Introduction:</u> Integration of organ function, levels of biological organization, concepts of form fitting function, homeostasis (mechanisms of control and disturbances).</p> <p><u>Cells, Tissues, Organs:</u> the cell theory, the cell as a basic unit of life, cellular ultrastructure, intracellular organelles, cellular function in health and disease.</p> <p><u>Blood:</u> composition, function of plasma proteins, cellular component of blood, haemoglobin and oxygen transport, role of white blood cells in immunity, blood clotting, blood pathology (anaemia, abnormal clotting).</p> <p><u>The Immune System:</u> sources of immune challenges, immunological memory and specificity, mediators of immunity, immune responses, antibodies, self tolerance, blood typing, immune system pathology.</p> <p><u>The cardiovascular system:</u> 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.</p> <p><u>The excitable tissues - brain and muscle:</u> 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</p>

	<p>contraction, communication systems in muscle, neural muscular junction, physics of joint movement, muscle metabolism, muscle fibre types, adaptive changes in muscle.</p> <p><u>Bone and Cartilage</u>: functions, types, anatomy, extracellular matrix composition, cellular component, growth and repair, skeletal pathologies, concept of bone as an organ, pathologies of bone and cartilage.</p> <p><u>The Endocrine System</u>: components, functions, control systems, abnormal endocrine function, pancreatic hormones, insulin, diabetes.</p> <p><u>The Renal and Digestive Systems</u>: 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).</p> <p><u>Specialist lectures*</u>:  <b>PAEDIATRIC DIABETES PATIENTS- BENEFITS OF TECHNOLOGY, ORTHOPAEDICS, CANCER, HISTOPATHOLOGY.</b></p>
<b>Assessment</b>	<p><b>ASSESSMENT MODES</b></p> <p>(a) <b>Summative – Written Examination (100%)</b>  This course will be assessed <i>via</i> a written examination in the Trinity Term. The duration of the examination will be 2 hours. The Examinations Office will announce the exam time and venue.</p> <p><b>The paper will consist of 2 sections:</b></p> <ol style="list-style-type: none"> <li>1. A <b>written section</b> consisting of short essay questions. This section is allocated 60% of the time and is worth 60% of the marks.</li> <li>2. A <b>multiple-choice/fill in the blanks section</b>. This section is allocated 40% of the time and is worth 40% of the marks. There is no negative marking.</li> </ol>
<b>Bibliography</b>	<p><b>RECOMMENDED TEXTS</b></p> <p><b>Human Physiology</b>  by Lauralee Sherwood 2010 Brooks &amp; Cole.</p> <p><b>Fundamentals of anatomy &amp; physiology</b>  by Martini, Nath &amp; Bartholomew</p> <p><b>Wheater's functional histology: a text &amp; colour atlas</b></p>

	<p>by Burkitt, Young &amp; Heath</p> <p><b>Essential cell biology</b> by Bruce Alberts et al.</p> <p><b>Gray's anatomy for students</b> by Drake et al.</p>
<b>Website</b>	<p>Lecture notes <i>etc.</i>, are available at:</p> <p><a href="https://medicine.tcd.ie/physiology/student/">https://medicine.tcd.ie/physiology/student/</a></p> <p>Please also check Blackboard (mymodule.tcd.ie) for 3BIO1</p>

## Appendix I: Timetable

Date	Time	Topic, speaker	Location
9th October	2-5pm	<b>Introduction to module</b> Cells, tissues & organs Dr Deirdre Edge	Stanley Quek LT
		The immune system & Blood Dr Deirdre Edge	
16 <sup>th</sup> October	2-5pm	Cardiovascular & Respiratory systems Dr Deirdre Edge	Stanley Quek LT
23rd October	2-5pm	<b>Specialist Lecture:</b> Histopathology Prof O Sheils	Stanley Quek LT
		Endocrine system Dr Deirdre Edge	
30 <sup>th</sup> October	2-3.00pm	Introduction to the Brain	Stanley Quek LT
	3-5pm	<b>Specialist Lecture:</b> Cancer Dr Martin Barr	
6 <sup>th</sup> November	2-5.00pm	Connective tissues Bone, Cartilage, Muscle Dr Deirdre Edge	Stanley Quek LT
20 <sup>th</sup> November	2-3.30pm	The digestive system Dr Deirdre Edge	Tercentenary Hall LT
	4-5.30pm	<b>Specialist Lecture:</b> Bioengineering a solution to faecal incontinence, Prof James Jones	

<b>27<sup>th</sup> November</b>			Stanley Quek LT
	3-4.00pm	<b>Specialist lecture:</b> Orthopaedic implant surgery, Mr Richard Downey [time to be confirmed]	
	4-5.00pm	Exam Review Session – Dr. Edge	

<b>4<sup>th</sup> December</b>	2-3.30pm	<b>Specialist lecture:</b> Paediatric diabetes patients- benefits of technology, Prof E Roche	Stanley Quek LT
	4-5pm	The renal system, Dr Deirdre Edge	

<b>11<sup>th</sup> December</b>	2-3.30pm	Physiological measurement of respiratory function – laboratory class	Physiology Teaching Lab, Level 2, TBSI
	3.30-5pm	The cardiac ECG – laboratory class	