Module Code	EEU33BM1
Module Name	Anatomy & Physiology
ECTS Weighting[1]	5 ECTS
Semester taught	Semester 1
Module Coordinator/s	Dr Roisin McMackin, Dr Eoin O'Neill, Dr Zsuzsanna Barad
Module Learning Outcomes (LO) with reference to the Graduate Attributes and how they are developed in discipline	On successful completion of this module, students should: 1. Understand the basic organisation of human biological systems, including an understanding of organelles, major cell types and categories of tissue types. 2. Understand the basic functions of the human nervous, musculoskeletal, cardiovascular, immune and respiratory systems. 3. Understand how the form of the tissues in these systems fits their function. 4. Appreciate how these cells interact in the various organ systems. 5. Be able to differentiate normal and pathological anatomy and physiology. 6. Be able to explain the mechanisms of diseases affecting these systems (e.g., cancer, neurodegeneration, etc.). 7. Be familiar with diagnostic procedures and medical interventions for diseases. 8. Analyse the BMS material and integrate with information from their own discipline. **Graduate Attributes: levels of attainment** To act responsibly - Introduced To think independently - Enhanced To develop continuously - Enhanced To communicate effectively - Introduced

Module Content	**Introduction:** The cell as a basic unit of life, cellular ultrastructure, intracellular organelles, integration of organ function, levels of biological organization, concepts of form fitting function, homeostasis (mechanisms of control and disturbances). **The Nervous System:** 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, **Musculoskeletal system:** 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, functions, types and anatomy of bone and cartilage, extracellular matrix composition, cellular component, growth and repair, skeletal pathologies, concept of bone as an organ, pathologies of bone and cartilage. **Blood**: 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). **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 **The Respiratory System:** Anatomy of the respiratory system, mechanics of breathing, gas transport. **Specialist lectures (*e.g.*):** Lung cancer, Nanodiagnostics, etc.
Teaching and Learning Methods	Lecture notes as well as supplemental learning material will be uploaded on Blackboard. Dates on the appendix table indicate when the lectures will take place, notes will be available to the students on Blackboard after the lecture. The module aims to give an introduction to human biology and disease, such that students can appreciate the basis of scientific/technical procedures in the diagnosis, treatment and basic research associated with human disease. A basic understanding of terminology and practice is emphasized. The lecture series will outline the physiology and anatomy of several 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.

The module is aimed at students who have no prior knowledge of physiology and/or biology. In addition to Undergraduate Engineering students, the following participate in the module: Bioengineering and Medical Device Design MSc programme students.

Appendix: Anatomy & Physiology timetable

Intro to module (mention essay structure)	**ROISIN MCMACKIN**	**13th Oct**	**2-3**
Nervous System I	**ROISIN MCMACKIN**	**13th Oct**	**3-4**
Nervous System II	**ROISIN MCMACKIN**	**13th Oct**	**4-5**
Nervous System III	**ROISIN MCMACKIN**	**13th Oct**	**5-6**
Musculoskeletal system I	**ZSUSZANNA BARAD**	**20th Oct**	**3-4**
Musculoskeletal system II	**ZSUSZANNA BARAD**	**20th Oct**	**4-5**
Specialist lecture: Tissue engineering	**Caroline Curtin**	**20th Oct**	**5-6**
Muscle excitability lab	**ROISIN MCMACKIN**	**1st Nov**	**11-1**
Cardiovascular system I	**ZSUSZANNA BARAD**	**3rd Nov**	**2-3**
Cardiovascular system II	**ZSUSZANNA BARAD**	**3rd Nov**	**3-4**
Specialist lecture: Deep brain stimulation and spectral electromyography	**Jeremy Liegey**	**3rd Nov**	**4-5**
The Respiratory System	**Suzanne Cloonan**	**10th Nov**	**12-1**

Blood and Immune System I	**EOIN O'NEILL**	**10th Nov**	**4-5**
Blood and Immune System II	**EOIN O'NEILL**	**10th Nov**	**5-6**
Specialist lecture: Lung Cancer	**Martin Barr**	**17th Nov**	**2-3**
Specialist lecture: Measuring motor function and impairment	**Conor Hayden**	**17th Nov**	**4-5**
Specialist lecture: Neurocardiovascular regulation in Health and Age-Related Disorders	**Ciaran Finucane**	**24th Nov**	**2-3**
Specialist lecture: Nanodiagnostics	**Adriele Prina-Mello**	**24th Nov**	**3-4**
Exam breakdown and Q&A with module coordinators	**EOIN O'NEILL, ROISIN MCMACKIN, ZSUSZANNA BARAD**	**24th Nov**	**4-5**

Assessment Details
Please include the following:

- **Assessment Component**
- **Assessment description**
- **Learning Outcome(s) addressed**
- **% of total**
- **Assessment due date**

Assessment Component	Assessment Description	LO Addressed	% of total	Week due
Summative – Written Examination (100%) This course will be assessed *via* an in-person written exam	**The exam paper will consist of 2 sections:** 1. A written section consisting of short answer questions. This section is allocated 50% of the time and is worth 50% of the marks. 2. A multiple-choice/fill in the blanks section. This section is allocated 50% of the time and is worth 50% of the marks. There is no negative marking.	1-9	100	December 2023 (date to be confirmed).

Reassessment Requirements	
Contact Hours and Indicative Student Workload.	**Contact hours/Online Lectures:** 20 **Independent Study (preparation for course and review of materials):** 32.5 **Independent Study (preparation for assessment, incl. completion of assessment):** 72.5
Recommended Reading List	**Human Physiology (Primary)** 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.
Module Pre-requisite	
Module Co-requisite	
Module Website	
Are other Schools/Departments involved in the delivery of this module? If yes, please provide details.	School of Medicine, Department of Physiology
Module Approval Date	

Approved by
Academic Start Year
Academic Year of Date