

Subject Description Form

Subject Code	ABCT2332
Subject Title	Human Biology for Biomedical Engineering II
Credit Value	3
Level	2
Prerequisite	Nil
Objectives	By completing this subject using an organ system-based approach in teaching and learning, students will be able to demonstrate a basic understanding of the anatomical structure, physiological mechanisms and basic pathology related to the operation of the selected body systems.
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> a. Recall the basic anatomical structures of the selected organ systems; b. Understand the normal physiological mechanisms and control of the systems studied; c. Evaluate the quantitative nature of the selected organ systems; d. Explain the basic pathological basis involving the selected body systems; e. Collect and interpret the data derived from scientific experimentation to address physiological questions.
Contribution to Programme Outcomes (Refer to Part I Section 10)	<ul style="list-style-type: none"> ▪ Programme Outcome 1: Demonstrate an ability to apply knowledge of mathematics, science, and engineering appropriate to the Biomedical Engineering (BME) discipline. (Teach) ▪ Programme Outcome 2: Demonstrate an ability to design and conduct BME experiments, as well as to analyze and interpret data. (Teach and Practice) ▪ Programme Outcome 4: Demonstrate an ability to identify, formulate, and solve BME problems. (Teach) ▪ Programme Outcome 5: Demonstrate an ability to understand the impact of BME solutions in a global and societal context, especially the importance of health, safety and environmental considerations to both workers and the general public. (Teach) ▪ Programme Outcome 11: Demonstrate an ability to communicate effectively and advise clients, professional colleagues and other members of the community. (Teach and Practice)

<p>Subject Synopsis/ Indicative Syllabus</p>	<p>Cardiovascular System: Basic anatomical structure of the cardiovascular system; cardiac cycle; electrical activity of heart; nervous and endocrine control of cardiac function; blood composition; overview of blood vessels; systemic, pulmonary, and lymphatic circulations; cardiac output; hemodynamics and regulation of blood flow; and basic modeling and quantitative evaluation.</p> <p>Musculoskeletal System: Basic anatomical structure of the musculoskeletal system; classification of muscle and muscle contraction; mechanism of muscle contraction; energy requirement of skeletal muscle; neural control of muscle contraction; structure of bone and cartilage; growth and remodeling of bone; calcium homeostasis; functional anatomy of the limbs and spine; basic quantitative evaluation; and pathogenesis and manifestations of common musculoskeletal disorders: fractures, dislocation, sprain and strains, osteoporosis, rickets and osteomalacia, bone tumours, osteoarthritis, rheumatoid arthritis, gout, ankylosing spondylitis, and muscular dystrophy.</p> <p>Endocrine System: Basic anatomical structures of the endocrine system; classification of hormones; controlling mechanisms of hormone secretion; function of hormones; physiological link between the endocrine and nervous system; and pathogenesis and manifestations of diabetes mellitus.</p> <p>Reproductive System: Basic anatomical structures of reproductive systems; principles of gametogenesis; male reproductive physiology; female reproductive physiology; female sex cycle; and pregnancy.</p> <p>Immune System: Defense mechanisms; B and T lymphocytes; active and passive immunity; and diseases caused by immune system.</p>
<p>Teaching and Learning Methodology</p>	<p>Lecture will be used to explain and impart understanding of the factual material including basic concepts and principles. Mass lecturing with the aids of multimedia tools such as animations will be adopted to facilitate the conceptual learning of the students.</p> <p>Tutorial will be used to supplement lectures. Tutorial will include the use of interactive multimedia, online activities and case study to reinforce important concepts. Class activities involving physiological problems in health professions will be designed to engage students' learning.</p> <p>Laboratory Practical will be used to introduce the scientific experimentation consisting of data collection and interpretation for addressing physiological questions.</p>

Assessment Methods in Alignment with Intended Learning Outcomes	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)								
			a	b	c	d	e				
	Continuous assessment	50%	√	√	√	√	√				
	Examination	50%	√	√	√	√	√				
Total	100%										
<p><i>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</i></p> <p><u>Continuous Assessment</u></p> <p>In-class quizzes will be used to assess the intended learning outcomes (a) to (d). The continuous assessment will also consist of practical laboratory reports which will assess the intended learning outcome (e).</p> <p><u>Examination</u></p> <p>The examination will consist of multiple choice and short questions. The questions will be designed to assess the intended learning outcomes (a) to (e).</p>											
Student Study Effort Required	Class contact:										
	▪ Lecture										26 Hrs.
	▪ Tutorial										11 Hrs.
	▪ Laboratory										2 Hrs.
	Other student study effort:										
	▪ Independent study and online activities										40 Hrs.
	▪ Preparation for assessment and assignments										47 Hrs.
	Total student study effort										126 Hrs.
Reading List and References	<u>Textbook</u>										
	<ul style="list-style-type: none"> ▪ Human Form, Human Function: Essentials of Anatomy & Physiology (2011) 1st Ed. McConnell T & Hull K. Publisher: Lippincott Williams & Wilkins. ▪ Pathophysiology for the Health Professions (2011) 4th Edition. Gould B. E. & Dyer R. M. Publisher: Elsevier. 										

	<p><u>Suggested Reference Books</u></p> <ul style="list-style-type: none"> ▪ Basic Pathology: An Introduction to the Mechanisms of Disease (2009) 4th Ed. Sunil R. Lakhani, <i>et al.</i> Publisher: London: Hodder Arnold. ▪ Human Physiology (2013) 13th Ed. Fox SI. Publisher: McGraw Hill. ▪ Quantitative Human Physiology: An Introduction (2012) 1st Ed. Feher J. Publisher: Elsevier Inc. ▪ Vander’s Human Physiology: The Mechanisms of Body Function (2010) 12th Ed. Widmaier EP, Raff H & Strang KT. Publisher: McGraw Hill. ▪ Fundamentals of Physiology: A Human Perspective (2011) 4th Ed. Sherwood L. Publisher: Brooks Cole. ▪ Human Physiology: From Cells to Systems (2008) 7th Ed. Sherwood L. Publisher: Brooks Cole. ▪ Human Physiology: An Integrated Approach (2009) 5th Ed. Silverthorn DU. Publisher: Benjamin Cummings. ▪ Fundamentals of Anatomy & Physiology (2008) 8th Ed. Martini FH & Nath JL. Publisher: Benjamin Cummings. ▪ Laboratory Manual for Anatomy and Physiology (2009) 3rd Ed. Allen C & Harper V. Publisher: Wiley.
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Date of Last Minor Revision	