



SUBJECT OUTLINE

Subject Code:

Subject Name:

Introduction to Human Biology

BIOA111

SECTION 1 – GENERAL INFORMATION

Award/s:	Total Course Credit Points:	Level:
Bachelor of Health Science (Chinese Medicine)	128	1 st Year
Bachelor of Health Science (Acupuncture Therapies)	96	1 st Year
Bachelor of Complementary Medicine	48	1 st Year
Diploma of Health Science (Chinese Remedial Massage)	48	1 st Year
Duration: 1 Semester		
Subject is: Core	Subject Credit Points: 4	

Student Workload:

No. timetabled hours per week: 6	No. personal study hours per week: 4	Total hours per week: 10
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Delivery Mode*:

☐ On campus ☒ Online / Digital ☐ Blended ☐ Intensive

Weekly Session^ Format/s - 2 sessions per week:

<input checked="" type="checkbox"/> eLearning modules:	Lectures: Adaptive online learning modules
	Tutorials: Can include asynchronous tutor moderated discussion forums and activities, learning journal activities or other web-based resources

*All modes are supported by the online learning management system which will include subject documents such as handouts, readings and assessment guides.

^A 'session' is made up of 3 hours of timetabled / online study time per week unless otherwise specified. Each subject has a set number of sessions as outlined above.

Study Pattern: ☒ Full Time ☒ Part Time

Pre-requisites: Nil

Co-requisites: Nil



SECTION 2 – ACADEMIC DETAILS

Subject Rationale

This subject introduces students to human anatomy and physiology, chemistry and biochemistry starting with the cell, through the various levels of structural organisation of systems to the organism as a whole. The integration of basic chemistry, cellular biochemistry, and metabolism into the cell function is discussed. Further, students are introduced to the structure and function of the skeletal, muscular, nervous, endocrine, immune, cardiac, respiratory, renal, reproductive, and integumentary systems.

Learning Outcomes

1. Describe components of the cells and tissues and apply their individual functions to cellular biological and chemical processes essential to life.
2. Describe the different elements, atoms, ions, chemical bonding, chemical reactions and discuss the significance of energy transfer and catalysts in biochemical systems.
3. Examine the nature of matter (solid, liquid, and gas). Evaluate solutions, mixtures, and their equilibrium and relate it to how they impact physiological processes and metabolism.
4. Describe the structure and function of major chemical building blocks and biochemical groups including nucleic acids, carbohydrates, lipids and proteins and their contribution to cell division, inheritance, and cellular metabolism.
5. Describe the structure (gross anatomy) and function (physiology) of the skeletal, nervous, endocrine, immune, cardiac, respiratory, renal, reproductive, and integumentary systems.
6. Describe the major biochemical pathways including metabolism of carbohydrates, lipids, and proteins in the human body.
7. Describe the major systems in the human body with respect to how they contribute to overall homeostasis in the human body.

Assessment Tasks

Type	Learning Outcomes Assessed	Session Content Delivered	Due	Weighting
Online Quiz multiple choice, definitions, and diagrams (40 minutes)	1-4	1-6	Week 4	20%
Mid-Semester Written Exam	5-7	7-16	Week 10	30%



Short answers (1 hour)				
Final Written Exam multiple choice, matching questions, and short answers (2 hours)	1-7	17-26	Final Examination Period	50%
All written assessments and online quizzes are due at 11:55 p.m. and submitted through the LMS				
Pass Requirements To achieve a passing grade in this subject students must: <ul style="list-style-type: none"> • have a cumulative mark of at least 50%, and • have submitted all assessment items with a value greater than 15%. 				

Prescribed Readings:

Stoker, H. S. (2016). *General, organic, and biological chemistry* (7th ed.). Cengage Learning. [ebook available]

Tortora, G., Derrickson, B., Burkett, B., Cooke, J., DiPietro, F., Diversi, T., Dye, D., Engel, A., Green, H., Macartney, M., McKean, M., Peoples, G., & Summers, S. (2022). *Principles of anatomy and physiology* (3rd Asia-Pacific ed.). Wiley. [ebook available]

Recommended Readings:

Alberts, B., Johnson, A., Lewis, J., Raff, M., Roberts, K., & Walter, P. (2008). *Molecular biology of the cell* (5th ed.). Garland Science.

Hall, J. E., & Guyton, A.C. (2011). *Guyton and Hall textbook of medical physiology* (13th ed.). Saunders; Elsevier. [ebook available]

Marieb, E. N. (2017). *Anatomy & physiology coloring workbook: A complete study guide* (12th ed.). Pearson. [ebook available]

Moore, K. L., Dalley, A. F., & Agur, A. M. R. (2017). *Clinically oriented anatomy* (8th ed.). Wolters Kluwer.

O'Toole, M. T. (Eds.). (2013). *Mosby's dictionary of medicine, nursing and health professions* (10th ed.). Elsevier. [ebook available]

Subject Content

Week	Lectures	Tutorials / Practicals
1.	Session 1 Introduction (Subject Outline / Subject Aims / Assessment / Teaching Resources)	Activities, tutorials and discussions are developed to allow the students to explore relevant content, expand on ideas and encourage peer interaction. Activities also allow for formative assessment and feedback.



	Cells <ul style="list-style-type: none"> What are cells and why do we have them? Basic anatomy and physiology of a generalised cell (nucleus / cytoplasm) 	
	Session 2 Cells <ul style="list-style-type: none"> Organelles Introduction to plasma membrane and transport Introduction to cell division (mitosis) 	Use of virtual technologies to demonstrate cell and organelle structure and function. Use of virtual technologies to demonstrate membrane transport and cell division.
2.	Session 3 Chemicals and Chemical Reactions in Cells <ul style="list-style-type: none"> Matter definition Acids, bases, and pH Chemical bonding Chemical reactions in cells Organic molecules and their properties / functional groups 	Review of the periodic table and elements, octet rule and chemical bonds Review of chemical reactions in cells and how they are controlled
	Session 4 Introduction to Nucleic Acids and Replication <ul style="list-style-type: none"> Nucleic acids and nucleotides DNA double helix DNA replication 	Use of 3D models & virtual technologies to demonstrate process of replication
3.	Session 5 Gene Expression and Genetics <ul style="list-style-type: none"> Genes as a hereditary unit Amino acids: Building blocks for proteins Gene-protein link – gene expression Characteristics of proteins Primary, secondary, tertiary & quaternary structure of proteins 	Use of 3D models and virtual technologies to demonstrate process of transcription
	Session 6 Proteins and their Functions <ul style="list-style-type: none"> Function of proteins 	Tutorial: DNA to genes to proteins and inheritance of traits. Tutorial: Duchenne muscular dystrophy and cystic fibrosis case studies in protein function in cells and systems



	<ul style="list-style-type: none"> Enzymes, receptors, ion channels, transporters, support 	
4.	<p>Session 7</p> <p>Tissues and Integumentary System</p> <ul style="list-style-type: none"> Four principal tissue types, structure, and function Integumentary system gross anatomy and physiology 	
	<p>Session 8</p> <p>Nervous System I</p> <ul style="list-style-type: none"> Gross anatomy and general function of nervous system Central Nervous System: Brain and spinal cord Peripheral Nervous System Autonomic Nervous System Enteric Nervous System 	Use of virtual technologies to demonstrate gross anatomy of nervous system and structure of nervous tissue
5.	<p>Session 9</p> <p>Nervous System II</p> <ul style="list-style-type: none"> Structure of nervous tissue Neurons, neuroglia, and myelination Electrical signals – The action potential The synapse and neurotransmitters 	Use of virtual technologies to understand neurotransmission
	<p>Session 10</p> <p>Endocrine System I</p> <ul style="list-style-type: none"> Gross anatomy of endocrine system Endocrine glands Hormone activity Hormone mechanisms and control 	Discussion: How is the endocrine system involved in homeostasis?
6.	<p>Session 11</p> <p>Endocrine System II</p> <ul style="list-style-type: none"> Integration of hormone actions into hormonal system axes The HPA axis 	Tutorial: Humoral vs axis regulation examples



	<p>Session 12</p> <p>Musculoskeletal System</p> <ul style="list-style-type: none"> ➤ Muscle types (skeletal, cardiac smooth) ➤ Muscle contraction ➤ Muscle control ➤ Bones, structure, and type ➤ Movement – function of musculoskeletal system 	<p>Interactive tutorials on muscle types and contraction</p>
7.	<p>Session 13</p> <p>Cardiovascular and Respiratory Systems</p> <ul style="list-style-type: none"> ➤ Gross anatomy of cardiovascular system ➤ Gross anatomy of respiratory system ➤ Breathing (Boyle's and Dalton's law) 	<p>Tutorial: Understanding anatomy of the heart and blood vessels.</p> <p>Use of virtual technologies to demonstrate gross blood vessel location / pulse points</p> <p>Use of Virtual technologies to demonstrate mechanics of breathing</p>
	<p>Session 14</p> <p>Cardiovascular and Respiratory Systems</p> <ul style="list-style-type: none"> ➤ Blood cells: Red blood cells (RBC) ➤ Body's oxygen supply – integrating CV and respiratory systems and control ➤ Buffers & pH biological buffers 	<p>Tutorial: Understanding the anatomy of the heart and blood vessels and flow of oxygenated vs non-oxygenated blood</p> <p>Discussion: Relating gas exchange to breathing</p>
<p>NON-TEACHING WEEK (note that make-up classes may be scheduled in this week)</p> <p>Semester 1 – This aligns with the week after Easter so it may fall between Weeks 6 to 8</p> <p>Semester 2 & Online students – The non-teaching week falls between Weeks 7 and 8</p>		
8.	<p>Session 15</p> <p>Immunity</p> <ul style="list-style-type: none"> ➤ Blood cells: White blood cells (WBC) ➤ Immune cells: B cells and T cells ➤ Immune response types and body defences 	<p>Tutorial: Overview of the immune response</p> <p>Discussion: Immune response and inflammation</p> <p>Use of virtual technologies to demonstrate the immune response to infection</p>
	<p>Session 16</p> <p>Digestive System</p> <ul style="list-style-type: none"> ➤ Gross anatomy of digestive system ➤ Digestion process' & enzymes of stomach pancreas and small intestine. ➤ Carbohydrates, lipids, protein digestion/metabolism overview 	<p>Tutorial: Use of virtual technologies to understand the digestive system</p> <p>Discussion: How is digestion linked to energy production?</p>



9.	<p>Session 17</p> <p>Structure of Carbohydrates</p> <ul style="list-style-type: none"> ➤ Digestion of carbohydrates ➤ Mono, di and polysaccharides 	Review of carbohydrates, structure and function
	<p>Session 18</p> <p>Structure of Lipids</p> <ul style="list-style-type: none"> ➤ Structure and function ➤ Fatty acids, triacylglycerols and phospholipids 	Review of lipids: classification, structure and function.
10.	<p>Session 19</p> <p>Overview of Metabolic Pathways</p> <ul style="list-style-type: none"> ➤ Significance and contribution of main metabolic pathways for homeostasis ➤ Control of metabolic reactions 	Interactive tutorial on the major metabolic pathways and their role in homeostasis
	<p>Session 20</p> <p>Carbohydrate Metabolism I</p> <ul style="list-style-type: none"> ➤ Digestion of carbohydrates ➤ Glycolysis ➤ Glycogen metabolism ➤ Pyruvate pathways 	Tutorial: Implications of metabolic disease in health and disease
11.	<p>Session 21</p> <p>Carbohydrate Metabolism II & Energy Production</p> <ul style="list-style-type: none"> ➤ Krebs cycle ➤ Electron transport chain 	<p>Review of carbohydrate metabolism, Krebs cycle and energy production</p> <p>Use of virtual technologies to demonstrate ATP production</p>
	<p>Session 22</p> <p>Lipid Metabolism</p> <ul style="list-style-type: none"> ➤ Lipid digestion ➤ Lipolysis and beta oxidation, energy yield ➤ Ketogenesis ➤ Lipogenesis <p>Protein Digestion</p> <ul style="list-style-type: none"> ➤ Protein digestion ➤ Protein metabolism 	Review of lipid metabolism, beta oxidation and lipogenesis



12.	<p>Session 23</p> <p>Integration of Metabolic Pathways</p> <ul style="list-style-type: none"> ➤ The fed state ➤ The fasted state 	<p>Interactive tutorials of metabolic pathways in fed & fasted state</p>
	<p>Session 24</p> <p>Renal System</p> <ul style="list-style-type: none"> ➤ Renal system anatomy and functions ➤ Renal system and elimination of waste ➤ Renal system and control of Blood Volume 	<p>Tutorial: Use of virtual technologies to understand the anatomy of urinary systems</p> <p>Discussion: Fluid, electrolyte and acid-base balance and cardiovascular system</p>
13.	<p>Session 25</p> <p>Reproductive System I</p> <ul style="list-style-type: none"> ➤ Introduction to meiosis ➤ General anatomy of male and female ➤ Male reproductive physiology 	<p>Reproductive system interactive tutorial spermatogenesis and oogenesis</p>
	<p>Session 26</p> <p>Reproductive System II</p> <ul style="list-style-type: none"> ➤ Female reproductive physiology ➤ Pregnancy 	<p>Tutorial: Female reproductive cycle and pregnancy</p>
14.	<p>Non-Teaching Week/Practical Examination Week 1</p> <p>Note that make-up classes may be scheduled in this week</p>	
15.	<p>Non-Teaching Week/Practical Examination Week 2</p> <p>Note that make-up classes may be scheduled in this week</p>	
16.	<p>Final Examination Week 1</p> <p>Students are required to sit examinations using the Respondus Lockdown Browser software per the <u>Examination Policy – Higher Education</u>. Refer to your local campus calendar for exam opening and closing times.</p>	
17.	<p>Final Examination Week 2</p> <p>Students are required to sit examinations using the Respondus Lockdown Browser software per the <u>Examination Policy – Higher Education</u>. Refer to your local campus calendar for exam opening and closing times.</p>	