

# SUBJECT OUTLINE



Subject Name:

## Human Biological Science 1

Subject Code:

**BIOH111**

### SECTION 1 - GENERAL INFORMATION

<b>Award/s:</b>	<b>Total Course Credit Points:</b>	<b>Level:</b>
Bachelor of Health Science (Acupuncture)	128	1 <sup>st</sup> Year
Bachelor of Health Science (Naturopathy)	128	1 <sup>st</sup> Year
Bachelor of Health Science (Nutritional and Dietetic Medicine)	96	1 <sup>st</sup> Year
Bachelor of Health Science (Myotherapy)	96	1 <sup>st</sup> Year
Bachelor of Complementary Medicine	48	2 <sup>nd</sup> Year
<b>Duration:</b>	1 Semester	
<b>Subject Coordinator:</b>	Robyn Friend (Brisbane campus)	
<b>Subject is:</b>	Core	<b>Subject Credit Points:</b> 4

### Student Workload:

<b>No. timetabled hours per week:</b>	<b>No. personal study hours per week:</b>	<b>Total hours per week:</b>
<b>6</b>	<b>4</b>	<b>10</b>

### Delivery Mode:

Face to Face (On campus)	2 x 2 hour lectures	2 x 1 hour tutorials
e-Learning (Online)	Narrated PowerPoint presentations Tutorials: Asynchronous tutor moderated discussion forum and activities Student handouts and web-based resources	
Intensive Delivery (Summer School)	Contact hours are delivered over 4 weeks with 3 x 6.5 hour days delivered per week Content: Combination lecture and tutorial activities Assessment: Online Quiz - Week 2; e-Workbook - Week 4; Final Written Exam - Week 5	
	Full Time	
	Part Time	
<b>Pre-requisites:</b>	Nil	
<b>Co-requisites:</b>	Nil	

### SECTION 2 – ACADEMIC DETAILS

#### Subject Rationale

Human Biological Science 1 introduces students to the concepts of human anatomy and physiology, from the scientific concept of the cell, through the various levels of structural organisation to the organism as a whole. Students will develop conceptual understanding of the skeletal, muscular, nervous, endocrine and integumentary systems by considering their components, structure and functions. This subject also explores how these body systems integrate to maintain homeostasis within the body and participate in control mechanisms, growth, development and replacement. A basic knowledge and understanding of the structure and functioning of cells, tissues and organs of healthy people is essential for subsequent studies in pharmacology and pathology, and for laying the foundation for developing problem solving skills required in the clinical setting.

## Learning Outcomes

1. Identify and describe components of the cells, relate them to their individual functions and apply this to define and describe cellular processes essential to life, including transcription, translation and cell division.
2. Define and discuss the different types of tissue structure and function.
3. Describe the anatomy and physiology of the integumentary system and relate this to the process of wound healing and burns.
4. Identify and apply appropriate anatomical terminology, including anatomical positions, directional terms, planes and sections to describe position of the different systems in the human body.
5. Describe the anatomy and physiology of the skeletal system, and extend this into the importance of blood calcium levels and facilitation of movement.
6. Explain the sliding filament theory in the context of muscle physiology and describe muscle anatomy and metabolism.
7. Explain the mechanism of action potential and release of neurotransmitters and relate this to the anatomy and physiology of the whole nervous system, including CNS, PNS and ANS.
8. Describe and relate the structure and function of reflex arcs and explain their importance in facilitating information between PNS and CNS or ANS.
9. Describe the anatomy and physiology of the endocrine system and apply this to the importance of homeostasis and its maintenance by feedback systems.
10. Demonstrate an integrated knowledge of the anatomy and physiology of the skeletal, muscular, nervous and endocrine systems, and how they contribute to homeostasis in the human body.

## Assessment Tasks

Type	Learning Outcomes Assessed	Session Content Delivered	Due	Weighting
<b>Online Quiz</b> multiple choice, definitions and diagrams (50 minutes)	1-3	1-6	Week 6	20%
<b>e-Workbook</b> (group assessment)	10	7-21, 23-25	Week 14	35%
<b>Final Written Exam</b> multiple choice, matching questions and short answers (2 hours)	1-9	1-21, 23-25	Final Examination Period	45%

All written assessments and online quizzes are due at 11:55 p.m. and submitted through the LMS

### Prescribed Readings:

1. Hiller-Sturmhofel, S., & Bartke, A. (1998). The endocrine system: An overview. *Alcohol Health & Research World*, 22(3), 153-164. Retrieved from <https://login.ezproxy.endeavour.edu.au:2443/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=107200973&site=eds-live&scope=site>
2. Summers, J., & Smith, B. (2014). *Communication skills handbook* (4th ed.). Milton, QLD: Wiley. [ebook available]
3. Tortora, G. J., Derrickson, B., Burkett, B., Peoples, G., Dye, D., Cooke, J., Mellifont, R. (2019). *Principles of anatomy and physiology* (2nd Asia-Pacific ed.). Milton, QLD: Wiley

**Recommended Readings:**

1. Alberts, B., Johnson, A., Lewis, J., Raff, M., Roberts, K., & Walter, P. (2008). *Molecular biology of the cell* (5th ed.). New York, NY: Garland Science.
2. Hall, J. E., & Guyton, A. C. (2011). *Guyton and Hall textbook of medical physiology* (13th ed.). Philadelphia, PA: Saunders Elsevier. [ebook available]
3. Marieb, E. N. (2015). *Anatomy & physiology coloring workbook: A complete study guide* (11th ed.). Upper Saddle River, NJ: Pearson.
4. Moore, K. L., Dalley, A. F., & Agur, A. M. R. (2014). *Clinically oriented anatomy* (8th ed.). Philadelphia, PA: Wolters Kluwer.
5. O'Toole, M. T. (Eds.). (2013). *Mosby's dictionary of medicine, nursing and health professions* (10th ed.). St. Louis, MO: Elsevier. [ebook available]

Subject Content		
Week	Lectures	Tutorials
1.	Session 1 <b>Introduction</b> (Subject Outline / Subject Aims / Assessment / Teaching Resources) <b>Levels of Organisation</b> <b>Homeostasis</b> <b>The Cellular Level of Organisation</b> <ul style="list-style-type: none"> <li>• Cytoplasm, organelles and nucleus</li> </ul>	Activities are developed to allow the students to explore relevant concepts, expand on ideas and have peer and lecturer interaction. Activities also allow for formative assessment and feedback <ul style="list-style-type: none"> <li>• Interconnection of cellular organelles</li> <li>• Hands-on activity: DNA extraction</li> </ul>
	Session 2 <b>The Cellular Level of Organisation (Continued)</b> <ul style="list-style-type: none"> <li>• Central dogma: Transcription and translation</li> <li>• Plasma membrane structure</li> <li>• Plasma membrane function: Passive and active transport</li> </ul>	<ul style="list-style-type: none"> <li>• Revision of transcription and translation processes</li> <li>• Model of plasma membrane</li> <li>• Hands-on activity: Osmosis/ Diffusion experiments</li> </ul>
2.	Session 3 <b>The Cellular Level of Organisation (Continued)</b> <ul style="list-style-type: none"> <li>• Cellular communication – vesicular transport               <ul style="list-style-type: none"> <li>○ Endocytosis</li> <li>○ Exocytosis</li> <li>○ Extracellular matrix</li> </ul> </li> </ul>	
	Session 4 <b>The Cellular Level of Organisation (Continued)</b> <ul style="list-style-type: none"> <li>• Cellular communication – signalling               <ul style="list-style-type: none"> <li>○ Cell division: Mitosis and meiosis</li> <li>○ Cell death</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Online activity describing the process of cell signalling</li> <li>• Microscope-based activity with worksheets describing process of mitosis</li> </ul>
3.	Session 5 <b>The Tissue Level of Organisation</b> <ul style="list-style-type: none"> <li>• Tissue types and their organisation               <ul style="list-style-type: none"> <li>○ Epithelial tissue organisation</li> <li>○ Connective tissue organisation</li> </ul> </li> <li>• Overview of muscle and nervous tissue</li> </ul>	<ul style="list-style-type: none"> <li>• Microscope-based activity with worksheets describing epithelial, connective, muscle and nervous tissue</li> </ul>
	Session 6 <b>The Integumentary System – Structure and Function of the Skin</b> <ul style="list-style-type: none"> <li>• The epidermis and dermis</li> </ul>	<ul style="list-style-type: none"> <li>• Microscope-based activity with worksheets describing epithelial, connective, muscle and nervous tissue</li> </ul>

	<ul style="list-style-type: none"> <li>• Accessory structures</li> <li>• Wound healing</li> <li>• Burns</li> </ul>	
4.	Session 7 <b>Support for the e-Workbook</b>	
	Session 8 <b>An Introduction to Medical Terminology</b> <ul style="list-style-type: none"> <li>• Organisation and characteristics</li> </ul>	<ul style="list-style-type: none"> <li>• Discussion of the role of medical terminology in reading and writing science information</li> <li>• Practising the use of and interpretation of medical terminology using worksheets in class</li> </ul>
5.	Session 9 <b>The Skeletal System</b> <ul style="list-style-type: none"> <li>• Bone physiology</li> <li>• Gross structure and histology of bone</li> <li>• Bone growth and remodelling</li> </ul>	<ul style="list-style-type: none"> <li>• Interactive activity on normal bone structure and histology</li> </ul>
	<b>The Skeletal System (Continued)</b> <ul style="list-style-type: none"> <li>• Organisation of the skeletal system</li> <li>• Major bones of the axial and appendicular skeleton</li> <li>• Classification of joints               <ul style="list-style-type: none"> <li>○ Synovial joints</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Use of the Virtual Body for learning skeletal system anatomy (components axial and appendicular skeleton)</li> <li>• Types of movement around specific joints</li> </ul>
6.	Session 11 <b>The Muscular System</b> <ul style="list-style-type: none"> <li>• Overview of muscle tissue types</li> <li>• Skeletal muscle histology</li> <li>• Contraction and relaxation</li> <li>• The sliding filament theory of muscle contraction</li> </ul>	<ul style="list-style-type: none"> <li>• Interactive activity on normal muscle structure and histology</li> <li>• Construction of concept map on Sliding Filament theory and contraction cycle – source of calcium</li> <li>• Use of online animations</li> </ul>
	Session 12 <b>The Muscular System (Continued)</b> <ul style="list-style-type: none"> <li>• Skeletal muscle metabolism</li> <li>• Types of skeletal muscle fibres</li> <li>• Control of muscle tension</li> </ul>	<ul style="list-style-type: none"> <li>• Construction of concept map on Sliding Filament theory and contraction cycle – source of ATP</li> <li>• Comparison of muscle fibre types</li> <li>• Group/forum discussion and debate on the similarities and differences between different muscle types</li> <li>• Hands-on activity: Use of AD Instruments for demonstrating muscle contraction and muscle fatigue</li> </ul>
7.	Session 13 <b>The Muscular System (Continued)</b> <ul style="list-style-type: none"> <li>• Major muscles and their groups</li> </ul>	<ul style="list-style-type: none"> <li>• Use of the Virtual Body for learning muscular system anatomy (only major muscle groups)</li> <li>• Use of the interactive online resources to demonstrate how muscles produce movement (levers and joint movement)</li> </ul>
	Session 14 <b>Revision Session</b>	<ul style="list-style-type: none"> <li>• Revision and integration of cell, tissue, integumentary, skeletal and muscle knowledge</li> <li>• Support for the written assignment</li> </ul>
<b>NON-TEACHING WEEK</b> (note that make-up classes may be scheduled in this week) <b>Semester 1</b> - This aligns with the week after Easter so it may fall between Weeks 6 to 8 <b>Semester 2 &amp; Online students</b> - The non-teaching week falls between Weeks 7 and 8		
8.	Session 15 <b>The Nervous System</b> <ul style="list-style-type: none"> <li>• Overview to the major components and organisation of the nervous system</li> </ul>	<ul style="list-style-type: none"> <li>• Interactive tutorial around division of nervous system and neuron structure/function relationship</li> <li>• Interactive myelination tutorial followed by</li> </ul>

	<ul style="list-style-type: none"> <li>• Histology of nervous tissue</li> <li>• Neurons, neuroglia and myelination</li> </ul>	student summary
	Session 16 <b>The Nervous System (Continued)</b> <ul style="list-style-type: none"> <li>• Electrical signals – The action potential</li> <li>• The synapse and neurotransmitters</li> <li>• Regeneration and repair of the nervous system</li> </ul>	<ul style="list-style-type: none"> <li>• Worksheets describing action potential initiation and propagation</li> <li>• Interactive tutorial on the final actions of the action potential at the synapse – neurotransmitters classes, EPSP and IPSP</li> </ul>
9.	Session 17 <b>The Nervous System (Continued)</b> <ul style="list-style-type: none"> <li>• Brain organisation and protection</li> <li>• The brain stem: Structure &amp; function</li> <li>• The cerebellum: Structure &amp; function</li> <li>• The diencephalon: Structure &amp; function</li> <li>• The cerebrum: Structure &amp; function</li> <li>• Cranial nerves</li> </ul>	<ul style="list-style-type: none"> <li>• Use of the Virtual Body for learning brain anatomy</li> <li>• Cranial nerves and functional neuroanatomy</li> </ul>
	Session 18 <b>The Nervous System (Continued)</b> <ul style="list-style-type: none"> <li>• Sensation</li> <li>• Somatic sensations</li> <li>• The special senses               <ul style="list-style-type: none"> <li>○ Olfaction</li> <li>○ Gustation</li> <li>○ Vision</li> <li>○ Hearing and equilibrium</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Interactive worksheet outlining the initiation of the action potential through sensation</li> <li>• Worksheets outlining physiology of different special senses</li> </ul>
10.	Session 19 <b>The Nervous System (Continued)</b> <ul style="list-style-type: none"> <li>• The spinal cord anatomy</li> <li>• The spinal cord physiology</li> <li>• Reflex arcs</li> </ul>	<ul style="list-style-type: none"> <li>• Use of the Virtual Body for learning spinal cord and spinal nerves anatomy</li> <li>• Worksheet outlining components of the reflex arcs</li> </ul>
	Session 20 <b>The Nervous System (Continued)</b> <ul style="list-style-type: none"> <li>• Spinal nerves</li> <li>• Somatic sensory and motor pathways</li> </ul>	<ul style="list-style-type: none"> <li>• Use of the Virtual Body for learning spinal cord and spinal nerves anatomy</li> <li>• Interactive worksheet from Session 18 consolidating the initiation of action potential with the sensory and motor tracts and final motor output</li> </ul>
11.	Session 21 <b>The Autonomic Nervous System:</b> <ul style="list-style-type: none"> <li>• Anatomy of the ANS</li> <li>• Physiology of ANS               <ul style="list-style-type: none"> <li>○ Reflex arcs</li> <li>○ Neurotransmitters of the ANS</li> </ul> </li> <li>• Physiological effects and control of the ANS</li> </ul>	<ul style="list-style-type: none"> <li>• Worksheet outlining components of the ANS reflex arcs and its comparison with the somatic reflex arcs</li> <li>• Case-based identification and description of two ANS subdivisions</li> <li>• ANS control</li> </ul>
	Session 22 <b>The Endo-cannabinoid System</b>	<ul style="list-style-type: none"> <li>• Interactive session on the contemporary system that integrates nervous system with receptor biology and regulation of homeostasis</li> </ul>
12.	Session 23 <b>The Endocrine System</b> <ul style="list-style-type: none"> <li>• Endocrine glands</li> <li>• Hormone activity</li> </ul>	<ul style="list-style-type: none"> <li>• Biochemical nature of hormones</li> <li>• Worksheet on hormone cellular actions</li> </ul>

	<ul style="list-style-type: none"> <li>Hormone mechanisms and control</li> </ul>	
	Session 24 <b>The Endocrine System (Continued)</b> <ul style="list-style-type: none"> <li>Hypothalamus, pituitary, thyroid and parathyroid glands</li> <li>Formation, actions and control of hormone secretion</li> </ul>	<ul style="list-style-type: none"> <li>Use of interactive worksheets in class outlining anatomy and physiology of specific glands</li> </ul>
13.	Session 25 <b>The Endocrine System (Continued)</b> <ul style="list-style-type: none"> <li>Pancreas, adrenals and other glands</li> <li>Formation, actions and control of hormone secretion</li> <li>Integration of hormone actions into hormonal system axes</li> </ul>	<ul style="list-style-type: none"> <li>Use of interactive worksheets in class outlining anatomy and physiology of specific glands</li> <li>Case studies consolidating endocrine axes</li> </ul>
	Session 26 <b>Integration of Nervous and Endocrine Systems</b> <b>Revision Session</b>	<ul style="list-style-type: none"> <li>Stress response as an example of nervous and endocrine system integration</li> <li>Revision and integration of knowledge – exam preparation</li> </ul>
14.	<b>Non-Teaching Week/Practical Examination Week 1</b> Note that make-up classes may be scheduled in this week	
15.	<b>Non-Teaching Week/Practical Examination Week 2</b> Note that make-up classes may be scheduled in this week	
16.	<b>Final Examination Week 1</b> <b>On campus enrolled students:</b> Refer to the Examination Timetable for your local campus for the exact day and time of exam <b>Online enrolled students:</b> You are required to sit examinations on campus per the <a href="#">Examination Policy - Higher Education</a> . The Examination Weeks for subjects offered online are identified in the Online Calendar	
17.	<b>Final Examination Week 2</b> <b>On campus enrolled students:</b> Refer to the Examination Timetable for your local campus for the exact day and time of exam <b>Online enrolled students:</b> You are required to sit examinations on campus per the <a href="#">Examination Policy - Higher Education</a> . The Examination Weeks for subjects offered online are identified in the Online Calendar	