ENDEAVOUR College of Natural Health

SUBJECT OUTLINE

Subject Name:

Human Biological Science 1

Subject Code:

BIOH1

SECTION 1 – GENERAL INFORMATION

Award/s:		**Total Course Credit Points:**	**Level:**
	Undergraduate Certificate in Human Biology	14	1st 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**

Delivery Mode*:

☐ **On campus** ☒ **Online / Digital** ☐ **Blended** ☐ **Intensive**

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

☒ eLearning modules:	Lectures: Interactive adaptive online learning modules Tutorials: can include asynchronous tutor moderated discussion forum and activities, subject study guide and interactive 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

Human Biological Science 1 introduces students to of human anatomy and physiology, starting with the cell, through the various levels of structural organisation to the organism as a whole. Students will develop a deeper understanding of the skeletal, muscular, nervous, endocrine and integumentary systems by considering their components, structure and related 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. Fundamental knowledge and understanding of the structure and function of cells, tissues and organs

of healthy people underpins subsequent studies in pharmacology and pathology, and for laying the foundation for developing problem solving skills required in the clinical setting.

Learning Outcomes

1. Relate the structure and function of cells and tissues to cellular processes essential to life.
2. Describe the anatomy and physiology of the integumentary system.
3. Describe how the structure of skeletal system and muscular system relates to their function.
4. Discuss the integration of skeletal and muscular systems in maintenance of homeostasis within the body.
5. Describe how the structure of nervous system and endocrine system relates to their function.
6. Discuss the integration of nervous and endocrine systems in maintenance of homeostasis within the body.

Assessment Tasks

Type	Learning Outcomes Assessed	Session Content Delivered	Due	Weighting
Online Quiz 1 multiple choice (50 minutes)	1, 2, 4	1-8	Week 6	25%
Mid-semester Written Exam short answers (1 hour)	3-4	9-13	Week 10	25%
Final Written Exam multiple choice, matching questions and short answers (2 hours)	5-6	15-26	Final Examination Period	50%
All written assessments and online quizzes are due at 11:55 p.m. (AEST) Sunday and submitted through the LMS				

Prescribed Readings:

1. 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:

1. Alberts, B., Johnson, A., Lewis, J., Raff, M., Roberts, K., & Walter, P. (2008). *Molecular biology of the cell* (5th ed.). Garland Science.
2. Hall, J. E., & Guyton, A.C. (2015). *Guyton and Hall textbook of medical physiology* (13th ed.). Saunders Elsevier.
3. Marieb, E. N. (2017). *Anatomy & physiology coloring workbook: A complete study guide* (12th ed.). Pearson. [ebook available].
4. Moore, K. L., Dalley, A. F., & Agur, A. M. R. (2017). *Clinically oriented anatomy* (8th ed).
5. O'Toole, M. T. (Eds.). (2013). *Mosby's dictionary of medicine, nursing and health professions* (9th ed.). Elsevier. [ebook available]

Subject Content

Week	Lectures	Tutorials / Practicals
1.	Session 1 **Introduction** (Subject Outline / Subject Aims / Assessment / Teaching Resources) **Introduction to Human Body** • Levels of organisation • Characteristics of living organism • Homeostasis • Basic anatomical terminology	• Interactive activity on language of anatomy • Discussion on homeostasis

	Session 2
	The Cellular Level of Organisation
	• Components of the cell
	  ◦ Cytoplasm
	  ◦ Organelles
	  ◦ Nucleus
		• Interactive activity on structure and function of organelles
		• Discussion on genetic material

2.	Session 3
	The Cellular Level of Organisation (continued)
	• Plasma membrane structure
	• Plasma membrane function
	  ◦ Passive transport
	  ◦ Active transport
		• Interactive activity on membrane proteins
		• Discussion on types of transport

	Session 4
	The Cellular Level of Organisation (continued)
	• Cellular communication –
	  ◦ Vesicular transport
	  ◦ Signalling
		• Interactive activity on cell signalling
		• Discussion on cell death

	• Cell death	
3.	Session 5 **The Cellular Level of Organisation (Continued)** • Cell division Mitosis ◦ Meiosis • Protein synthesis	• Interactive activity on cell division • Interactive activity on translation and transcription
	Session 6 **The Tissue Level of Organisation** • Tissue types • Cell junctions • Epithelial tissue	• Interactive activity on structure and function of cell junctions • Interactive activity on structure and function of epithelial tissue
4.	Session 7 **The Tissue Level of Organisation (continued)** • Connective tissue • Membranes	• Interactive activity on structure and function of connective tissue • Discussion on membranes
	Session 8 **The Integumentary System** • Layers of skin • Accessory structures	• Interactive activity on epidermis and dermis
5.	Session 9 **The Skeletal System** • Bone physiology • Gross structure and histology of bone • Bone formation: Bone growth and remodelling • Fracture repair	• Interactive activity on spongy and compact bone • Interactive activity on bone remodelling • Interactive activity on bone growth in length and width
	Session 10 **The Skeletal System (continued)** • Organisation of the skeletal system • Major bones of the axial and appendicular skeleton • Classification of joints ◦ Synovial joints and movements	• Interactive activity on types of movement at synovial joints
6.	Session 11 **The Muscular System** • Overview of muscle tissue types • Skeletal muscle histology: function and properties of muscle tissue • Contraction and relaxation	• Interactive activity on contraction and relaxation cycle • Discussion on sliding filament mechanism

	• The sliding filament mechanism of muscle contraction	
	Session 12 **The Muscular System (continued)** • Skeletal muscle metabolism • Types of skeletal muscle fibres • Control of muscle tension	• Interactive activity on integration of types of skeletal muscle fibres and metabolism • Discussion on muscle tone
7.	Session 13 **The Muscular System (continued)** • Major muscles and their groups • Production of movement: muscle attachment and levers	• Interactive activity on integration of skeletal and muscular systems • Discussion on how levers affect muscle efficiency
	Session 14 **Revision Session**	• Interactive activity on integration of cell, tissue, integumentary, skeletal and muscle knowledge
	NON-TEACHING WEEK (note that make-up classes may be scheduled in this week) **Online students** – The non-teaching week falls between Weeks 7 and 8	
8.	Session 15 **The Nervous System** • Overview to the major components and organisation of the nervous system • Histology of nervous tissue: neurons and neuroglia • Myelination	• Interactive activity on the components of the nervous system • Discussion on dysfunction of the myelin sheath
	Session 16 **The Nervous System (continued)** • Electrical signals – The action potential • The synapse and neurotransmitters • Regeneration and repair of the nervous system	• Interactive activity on events that occur at the synapse • Interactive activity on neurotransmitter function
9.	Session 17 **The Nervous System (continued)** • Spinal cord anatomy • Spinal cord physiology • Reflex arcs	• Interactive activity on components and events of a somatic reflex arc • Discussion on spinal cord damage
	Session 18 **The Nervous System (continued)** • Brain organisation and protection • Brain stem: structure and function • Cerebellum: structure and function	• Interactive structure and function of the brain Discussion on cerebellar dysfunction

10.	Session 19 **The Nervous System (continued)** • Diencephalon: structure and function • Cerebrum: structure and function • Cranial nerves	• Interactive activity on cranial nerves • Discussion on importance of hypothalamus in homeostasis

	Session 20
	The Nervous System (continued)
	• Autonomic nervous system
	  ◦ Anatomy and physiology
	  ◦ Reflex arcs
	  ◦ Neurotransmitters and receptors
	  ◦ Physiological effects and controls
		• Interactive activity on knowledge of reflex arc
		• Interactive activity on neurons within the autonomic nervous system

11.	Session 21 **The Nervous System (continued)** • Sensation • Somatic sensation • Somatic Sensory Pathways • Somatic Motor Pathways	• Interactive activity on somatic senses • Discussion on damage to the sensory and motor pathways

	Session 22
	The Nervous System (continued)
	• Special senses
	  ◦ Olfaction
	  ◦ Gustation
	  ◦ Vision
	  ◦ Hearing and equilibrium
		• Interactive activity on the structure and function of special senses
		• Discussion on adaptation of olfactory receptors

12.	Session 23 **The Endocrine System** • Endocrine glands • Hormone activity • Hormone mechanisms of action	• Interactive activity on lipid and water- soluble hormones • Discussion on endocrine system and homeostasis
	Session 24 **The Endocrine System (continued)** • Hypothalamus, pituitary, thyroid and parathyroid glands • Formation, actions and control of hormone secretion	• Interactive activity on hypothalamus and anterior pituitary activity • Interactive activity on thyroid and parathyroids and their contribution to calcium regulation
13.	Session 25 **The Endocrine System (continued)**	• Interactive activity adrenal gland structure and function • Interactive activity on blood glucose regulation

	• Pancreas, adrenals and other glands • Formation, actions and control of hormone secretion	
	Session 26 **The Endocrine System (continued)** • Hormonal axes • Stress response	• Interactive activity on nervous and endocrine system integration • Discussion on stress and homeostasis
14.	**Non-Teaching Week/Practical Examination Week 1** Note that make-up classes may be scheduled in this week	
15.	**Non-Teaching Week/Practical Examination Week 2** Note that make-up classes may be scheduled in this week	
16.	**Final Examination Week 1** Students are required to sit examinations using the Respondus Lockdown Browser software per the *Examination Policy - Higher Education*. Refer to your local campus calendar for exam opening and closing times.	
17.	**Final Examination Week 2** Students are required to sit examinations using the Respondus Lockdown Browser software per the *Examination Policy - Higher Education*. Refer to your local campus calendar for exam opening and closing times.	