ENDEAVOUR College of Natural Health

SUBJECT OUTLINE

Subject Name:

Human Biological Science 2

Subject Code:

BIOH122

SECTION 1 – GENERAL INFORMATION

Award/s:		**Total Course Credit Points:**	**Level:**
	Bachelor of Health Science (Naturopathy)	128	1st Year
	Bachelor of Health Science (Nutritional and Dietetic Medicine)	96	1st Year
	Diploma of Health Science	32	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 online learning modules Tutorials: can include asynchronous tutor moderated discussion forum and activities listed in the 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:	BIOH111
Co-requisites:	Nil

SECTION 2 – ACADEMIC DETAILS

Subject Rationale

BIOH122 builds on knowledge of human biology gained in BIOH111 - Human Biological Science 1 as it examines the haematological, cardiovascular, lymphatic, immune, respiratory, digestive, urinary and reproductive systems.

This is done by considering their structure and functions and understanding how these systems maintain balance within the body to create a coordinated functioning whole. Understanding normal functioning provides a basis for later studies in human disorders.

Learning Outcomes

1. Describe the composition of blood and structure of the heart and blood vessels as they relate to the physiology of blood, the cardiac cycle and blood pressure.
2. Identify the components of the lymphatic and immune system in relation to their contributions to innate and adaptive immunity.
3. Describe the anatomical structures of the respiratory system in relation to pulmonary ventilation and transport of oxygen and carbon dioxide.
4. Describe the role of the digestive system in digestion and absorption of nutrients.
5. Explain the anatomy of the urinary system, including histology of glomerulus, in relation to processes of urine formation, acid-base balance, and regulation of fluid and electrolytes.
6. Describe the anatomy of male and female reproductive systems as they relate to fertilization, pregnancy and childbirth.

Assessment Tasks

Type	Learning Outcomes Assessed	Session Content Delivered	Due	Weighting
Online Quiz Multiple choice, definitions and diagrams (50 minutes)	1 & 2	1-10	Week 7	20%
Written assignment (1500 words)	1 & 3	1-6 & 11-13	Week 10	30%
Final Written Exam Multiple choice, short answers, definitions, extended response questions (2 hours)	1- 6	1-26	Final Examination Period	50%
All written assessments and online quizzes are due at 11:55 p.m. Sunday and submitted through the LMS.				

Pass Requirements

To achieve a passing grade in this subject students must:

- have a cumulative mark of at least 50%, and
- have submitted all assessment items with a value greater than 15%.

Prescribed Readings:

Tortora, G. J., 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:

Hall, J. E., & Guyton, A.C. (2011). *Guyton and Hall textbook of medical physiology* (12th ed.). Saunders Elsevier. [ebook available]

Marieb, E. N., & Brito, S. (2018). *Anatomy & physiology coloring workbook: A complete study guide* (12th ed.). Pearson. [ebook available]

Moore, K. L., Dalley, A. F., & Agur, A. M. R. (2018). *Clinically oriented anatomy* (8th ed.). Wolters Kluwer.

O'Toole, M. T. (Ed.). (2017). *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) **Haematological System** • Functions and properties of blood • Formation of blood cells • Formed elements	Tutorial 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 • Components of whole blood • Haematopoiesis • Blood cell histology and function
	Session 2 **Haematological System (Continued)** • Haemostasis • Blood groups and blood types	• Protection from disease and loss of blood • Platelet plug formation • Coagulation cascade, blood clot formation and dissolution • Blood grouping and cross-matching
2.	Session 3 **Cardiovascular System: The Heart** • Anatomy and histology	• Anatomy of the heart • Blood circulations • Heart conduction system

	• Heart valves and circulation • Cardiac muscle physiology • The cardiac conduction system	
	Session 4 **Cardiovascular System: The Heart (Continued)** • The cardiac cycle • Cardiac output	• The cardiac cycle: systole and diastole • Factors affecting cardiac output • Electrical activity in the heart and electrocardiograph (ECG) tracings • Regulation of heart rate
3.	Session 5 **Cardiovascular System: Vasculature** • Structure and function of blood vessels • Capillary exchange	• Structure and function of blood vessels • Blood distribution routes • Microcirculation and the dynamics of blood flow • Capillary exchange
	Session 6 **Cardiovascular System: Vasculature (Continued)** • Haemodynamics: Factors affecting blood flow • Blood pressure • Circulatory routes	• Haemodynamics and blood flow • Control of blood pressure • Use of worksheets and 3D computer animations to explore blood vessels and circulatory routes
4.	Session 7 **Revision and assessment support**	
	Session 8 **Lymphatic and Immune System** • Lymphatic system structure and function • Non-specific resistance	• Components of the lymphatic system • Lymph vessels and the circulation of lymph • Lymphatic organs and tissues • Immune responses and the first line of defence
5.	Session 9 **Immune System (Continued)** • Specific resistance • Immunity • Cell-mediated immunity	• Properties of the immune system • Innate and adaptive immunity • Hallmark features of the three lines of immunological defence • Principles of phagocytosis • Cardinal signs of inflammation and the inflammatory response
	Session 10 **Immune System (Continued)** • Antigen-mediated immunity • Self-recognition and self-tolerance • Aging and the immune system	• Use of animation to review the processes of self-recognition and tolerance and their relationship to disease • Antigen processing and recognition • T and B lymphocytes • Immunoglobulins: class, prime location and function

		• Immunological memory
6.	Session 11 **The Respiratory System** • Anatomy and histology	• Anatomy of the respiratory system: upper and lower tracts • Zones of conduction and respiration • Lung surface tension and compliance • Alveoli structure and adaptation to gaseous exchange
	Session 12 **The Respiratory System (Continued)** • Pulmonary ventilation • Lung volumes • Exchange of oxygen and carbon dioxide: External respiration	• Pulmonary ventilation • Breathing mechanics and respiratory muscles • Spirometry and lung volumes and capacities
7.	Session 13 **The Respiratory System (Continued)** • Transport of oxygen and carbon dioxide in blood • Internal respiration • Control of respiration	• Transport of blood gases • Exchange of oxygen and carbon dioxide in the alveoli and body tissues • Principles underlying oxygen binding to and dissociation from haemoglobin • Control of respiration
	Session 14 **Revision and assessment support**	
	NON-TEACHING WEEK (note that make-up classes may be scheduled in this week) **Semester 1** – This aligns with the week after Easter so it may fall between Weeks 6 to 8 **Semester 2 & Online students** – The non-teaching week falls between Weeks 7 and 8	
8.	Session 15 **The Digestive System** • Layers and innervation of the GIT • The peritoneum • Mouth • Pharynx • Oesophagus • Stomach anatomy & physiology • Secretions and enzymes of the stomach • Deglutition	• Anatomy and function of the digestive system • Neural innervation of the digestive tract • Digestion in the mouth and stomach
	Session 16 **The Digestive System (Continued)** • Pancreas and liver • Anatomy and histology of the small intestine	• Accessory organs of the digestive system • The use of computer animations plus learning activity worksheets for gastric mucosa structure and function

	• Digestion and absorption of the small intestine	• Pancreas structure, secretions, and hormonal control of function • Adaptation of the small intestine to digestion and absorption
9.	Session 17 **The Digestive System (Continued)** • Anatomy and histology of the large intestine • Functions of the large intestine • Defecation • Phases of digestion	• Interactive learning activity worksheets to review the digestion of carbohydrates, proteins, lipids, and nucleic acids • Absorption and movement of nutrients from the gut into the systemic blood • Mechanical and chemical digestion in the large intestine • Exploring the principles of abnormal bowel movements
	Session 18 **The Urinary System** • Anatomy and histology of the kidneys • The nephron	• Anatomy and function of the urinary system • Use of animation and worksheets for the anatomy and function of the kidney and nephron • Kidney blood distribution • Urine drainage pathway
10.	Session 19 **The Urinary System (Continued)** • Overview of renal physiology • Glomerular filtration • Histology of the glomerulus • Glomerular filtration and its control	• Glomerular filtration and structural adaptations of the renal corpuscle • Relationship between GFR and blood pressure
	Session 20 **The Urinary System (Continued)** • Tubular reabsorption and tubular secretion • Histology of the tubule • Resorption and secretion at the tubule	• Adaptation of nephron tubules to reabsorption and secretion • Modes of transport for the movement of solutes and water • Homeostatic principles of fluid balance • Hormonal regulation of tubular reabsorption and secretion
11.	Session 21 **The Urinary System (Continued)** • Production of dilute and concentrated urine • Characteristics of normal urine • Urine transport storage and elimination	• Formation of dilute and concentrated urine
	Session 22 **The Urinary System (Continued)** • Fluid compartments and fluid balance	• Acid-base imbalance, buffer systems and compensatory mechanisms to normalise blood pH

	• Electrolytes in body fluids • Acid-base balance	
12.	Session 23 **The Male Reproductive System** • Anatomy, histology and function of the organs and duct system • Spermatogenesis and the mature sperm • Accessory sex glands and semen	• Anatomy and function of male reproductive organs • Anatomy of the testes, role of testicular cells and spermatogenesis • Adaptation of sperm • Accessory sex glands and secretions
	Session 24 **The Female Reproductive System** • Anatomy, histology and functions of the organs • Oogenesis	• Anatomy and function of the female reproductive organs • Oogenesis and the development of ovarian follicles
13.	Session 25 **The Female Reproductive System (Continued)** • The female reproductive cycle and pregnancy	• Phases of the female reproductive cycle • Hormonal changes during the reproductive cycle • The ovarian and uterine cycles
	Session 26 **Pregnancy and Childbirth** • Maternal changes • Labour and delivery • Lactation	• The first week of pregnancy: from fertilization to implantation • Role of the placenta in hormonal changes in pregnancy and lactation • Maternal adaptations to labour and delivery
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 the LMS 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 the LMS for exam opening and closing times.	