



SUBJECT OUTLINE

Subject Name:

Human Biological Science 2

Subject Code:

BIOH2

SECTION 1 – GENERAL INFORMATION

Award/s:	Total Course Credit Points:	Level:
Undergraduate Certificate in Human Biology	14	1 st Year
Duration:	1 Semester	
Subject Coordinator:	Dr Sara Zangana (Gold Coast Campus)	
Subject is:	Subject Credit Points:	4
Core		

Student Workload:

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

Delivery Mode:

e-Learning (Online)	Narrated PowerPoint presentations Tutorials: Asynchronous tutor moderated discussion forum and activities Virtual laboratories: Data and student handouts
Blended Learning (Online and On Campus)	2 x 2 hour lectures on campus - content delivery plus revision through lectures / interactive tutorial activities / workshop / discussion; PLUS 2 x 1 hour online tutorials / workshops - pre-reading activities with revision through quizzes Full Time

Pre-requisites: Nil

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, respiratory, lymphatic, immune, digestive, urinary and reproductive systems. This is done by considering their structure and functions, and integration of these systems to maintain balance within the body to create a coordinated functioning whole. The course also covers how the normal function of these systems are measured. Understanding normal functioning provides a basis for later studies in human disorders. Hence, this subject is a pre-requisite for BIOC211 - Pathology and Clinical Science 1.



Learning Outcomes

1. Describe the formation, functions and interrelationship of different blood components and apply this to the basis for blood types classification, intrinsic and extrinsic clotting pathway and the process of haemostasis in health and disease.
2. Describe the anatomy, function and physiology of the circulatory system, and explain homeostasis and regulation of cardiac output, blood pressure, stroke volume, cardiac cycle and the process of 'bulk flow'.
3. Describe the anatomy, components and function of the lymphatic and immune systems and discuss their contributions to innate and adaptive immunity, regulation of inflammation, process of phagocytosis, self-recognition and self-tolerance.
4. Describe the anatomy, function and physiology of the respiratory system, and apply it to the mechanics and regulation of pulmonary ventilation, gas transport and external/internal respiration.
5. Describe the anatomy, function and physiology of the digestive system, and apply it to the digestion and absorption of nutrients together with the regulation of the cephalic, gastric and intestinal phases of digestion.
6. Describe the anatomy, function and physiology of the urinary/renal system, apply them to the function and regulation of glomerular filtration, tubular reabsorption or secretion and analyse their contribution to the regulation of blood volume, pH and osmolarity in healthy and diseased states.
7. Describe the anatomy, function and physiology of female and male reproductive systems, explain the process and regulation of oogenesis and spermatogenesis and apply it to the process of fertilisation, embryogenesis, pregnancy and childbirth.
8. Examine electrocardiogram (ECG) and blood pressure measurements and compare them to what is seen in the healthy and altered states.
9. Examine measurements of different lung capacities and volumes and compare the changes in the healthy and altered states.
10. Examine the normal and abnormal blood and urine results as they relate to the renal and cardiovascular system and how these changes in in the healthy and diseased state.

Assessment Tasks

Type	Learning Outcomes Assessed	Session Content Delivered	Due	Weighting
Group Laboratory Report 1 (structured lab report)	2 & 8	1-6	Week 5	10%
Online Quiz Multiple choice, definitions and diagrams (50 minutes)	1-3	1-9	Week 7	20%
Group Laboratory Report 2 (structured lab report)	2, 4 & 9	1-6, 10-13	Week 8	10%



Group Laboratory Report 3 (structured lab report)	2, 4, 6 & 10	1-6, 17-20	Week 13	10%
Final Written Exam Multiple choice, short answers, definitions, extended response questions (2 hours)	1-7	1-23	Final Examination Period	50%
All written assessments and online quizzes are due at 11:55 p.m. Sunday and submitted through the LMS				

Prescribed Readings:

- Summers, J., & Smith, B. (2014). *Communication skills handbook* (4th ed.). Milton, QLD: Wiley. [ebook available]
- Tortora, G. J., Derrickson, B., Burkett, B., Peoples, G., Dye, D., Cooke, J., Diversi, T., McKean, M., Samalia, L., & Mellifont, R. (2019). *Principles of anatomy and physiology* (2nd 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.
- Marieb, E. N. (2015). *Anatomy & physiology coloring workbook: A complete study guide* (11th ed.). Pearson.
- Moore, K. L., Dalley, A. F., & Agur, A. M. R. (2014). *Clinically oriented anatomy* (7th ed.). Wolters Kluwer.
- O'Toole, M. T. (Ed.). (2013). *Mosby's dictionary of medicine, nursing and health professions* (9th ed.). Elsevier. [ebook available]

Subject Content

Week	Lectures	Tutorials / Practicals
1.	<p>Session 1</p> <p>Introduction (Subject Outline / Subject Aims / Assessment / Teaching Resources)</p> <p>Haematological System</p> <ul style="list-style-type: none"> ➤ Functions and properties of blood ➤ Formation of blood cells ➤ Formed elements 	<p>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</p> <p>Post lectures</p> <ul style="list-style-type: none"> ➤ Components of whole blood ➤ Haematopoiesis ➤ Blood cell histology and function
	<p>Session 2</p> <p>Haematological System (Continued)</p> <ul style="list-style-type: none"> ➤ Haemostasis 	<p>Post lectures</p> <ul style="list-style-type: none"> ➤ Protection from disease and loss of blood ➤ Platelet plug formation



	<ul style="list-style-type: none"> ➤ Blood groups and blood types 	<ul style="list-style-type: none"> ➤ Coagulation cascade, blood clot formation and dissolution ➤ Blood grouping and cross-matching
2.	<p>Session 3</p> <p>Cardiovascular System: The Heart</p> <ul style="list-style-type: none"> ➤ Anatomy and histology ➤ Heart valves and circulation ➤ Cardiac muscle physiology ➤ The cardiac conduction system 	<p>Pre lectures</p> <ul style="list-style-type: none"> ➤ Serous membranes ➤ Action potentials <p>Post lectures</p> <ul style="list-style-type: none"> ➤ Anatomy of the heart ➤ Blood circulations ➤ Heart conduction system <p><i>Optional</i></p> <ul style="list-style-type: none"> ➤ Video recorded heart dissection
	<p>Session 4</p> <p>Cardiovascular System: The Heart (Continued)</p> <ul style="list-style-type: none"> ➤ The cardiac cycle ➤ Cardiac output 	<p>Post lectures</p> <ul style="list-style-type: none"> ➤ The cardiac cycle: systole and diastole ➤ Factors affecting cardiac output ➤ Electrical activity in the heart and electrocardiograph (ECG) tracings ➤ Regulation of heart rate
3.	<p>Session 5</p> <p>Cardiovascular System: Vasculature</p> <ul style="list-style-type: none"> ➤ Structure and function of blood vessels ➤ Capillary exchange 	<p>Pre lectures</p> <ul style="list-style-type: none"> ➤ Solute transportation and tonicity <p>Post lectures</p> <ul style="list-style-type: none"> ➤ Structure and function of blood vessels ➤ Blood distribution routes ➤ Microcirculation and the dynamics of blood flow ➤ Capillary exchange
	<p>Session 6</p> <p>Cardiovascular System: Vasculature (Continued)</p> <ul style="list-style-type: none"> ➤ Haemodynamics: Factors affecting blood flow ➤ Blood pressure ➤ Circulatory routes 	<p>Post lectures</p> <ul style="list-style-type: none"> ➤ Haemodynamics and blood flow ➤ Control of blood pressure ➤ Use of worksheets and 3D computer animations to explore blood vessels and circulatory routes
4.	<p>Virtual Laboratory Session 1</p> <p>Cardiovascular Effects of Exercise</p> <ul style="list-style-type: none"> ➤ Measurement of ECG, pulse, heart sounds, blood pressure before and following exercise 	
	<p>Session 7</p> <p>Lymphatic and Immune System</p> <ul style="list-style-type: none"> ➤ Lymphatic system structure and function ➤ Non-specific resistance 	<p>Post lectures</p> <ul style="list-style-type: none"> ➤ Components of the lymphatic system ➤ Lymph vessels and the circulation of lymph ➤ Lymphatic organs and tissues



		<ul style="list-style-type: none"> ➤ Immune responses and the first line of defence
5.	<p>Session 8</p> <p>Immune System (Continued)</p> <ul style="list-style-type: none"> ➤ Specific resistance ➤ Immunity ➤ Cell mediated immunity 	<p>Pre lectures</p> <ul style="list-style-type: none"> ➤ Transportation: endocytosis ➤ Types of white blood cells <p>Post lectures</p> <ul style="list-style-type: none"> ➤ 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
	<p>Session 9</p> <p>Immune System (Continued)</p> <ul style="list-style-type: none"> ➤ Antigen mediated immunity ➤ Self-recognition and self-tolerance ➤ Aging and the immune system 	<p>Post lectures</p> <ul style="list-style-type: none"> ➤ 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.	<p>Session 10</p> <p>The Respiratory System</p> <ul style="list-style-type: none"> ➤ Anatomy and histology 	<p>Pre lectures</p> <ul style="list-style-type: none"> ➤ Serous membranes <p>Post lectures</p> <ul style="list-style-type: none"> ➤ 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
	<p>Session 11</p> <p>The Respiratory System (Continued)</p> <ul style="list-style-type: none"> ➤ Pulmonary ventilation ➤ Lung volumes ➤ Exchange of oxygen and carbon dioxide: External respiration 	<p>Pre lectures</p> <ul style="list-style-type: none"> ➤ Gaseous laws and partial pressure <p>Post lectures</p> <ul style="list-style-type: none"> ➤ Pulmonary ventilation ➤ Breathing mechanics and respiratory muscles ➤ Spirometry for the measurement of lung volumes and capacities <p><i>Optional</i></p> <ul style="list-style-type: none"> ➤ Breathing, blood composition and adaptation to the environment
7.	<p>Session 12</p>	<p>Post lectures</p>



	<p>The Respiratory System (Continued)</p> <ul style="list-style-type: none"> ➤ Transport of oxygen and carbon dioxide in blood ➤ Internal respiration ➤ Control of respiration 	<ul style="list-style-type: none"> ➤ 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
	<p>Laboratory Session 2</p> <p>Respiratory Physiology</p> <ul style="list-style-type: none"> ➤ Measurement of respiration before and after exercise ➤ Measurement of airway resistance and dead space ➤ Respiratory function in health and disease 	
<p>NON-TEACHING WEEK (note that make-up classes may be scheduled in this week)</p> <p>Online students – The non-teaching week falls between Weeks 7 and 8</p>		
8.	<p>Session 13</p> <p>The Digestive System</p> <ul style="list-style-type: none"> ➤ Layers and innervation of the GIT ➤ The peritoneum ➤ Mouth to stomach ➤ Mouth ➤ Pharynx ➤ Oesophagus ➤ Stomach anatomy & physiology ➤ Secretions and enzymes of the stomach ➤ Deglutition 	<p>Pre lectures</p> <ul style="list-style-type: none"> ➤ Autonomic nervous system ➤ Enzymes in digestion <p>Post lectures</p> <ul style="list-style-type: none"> ➤ Anatomy and function of the digestive system ➤ Neural innervation of the digestive tract ➤ Digestion in the mouth and stomach <p><i>Optional</i></p> <ul style="list-style-type: none"> ➤ Exploring the role of microbes in the gut
	<p>Session 14</p> <p>The Digestive System (Continued)</p> <ul style="list-style-type: none"> ➤ Pancreas and liver ➤ Anatomy and histology of the small intestine ➤ Digestion and absorption of the small intestine 	<p>Pre lectures</p> <ul style="list-style-type: none"> ➤ Pancreas anatomy and function <p>Post lectures</p> <ul style="list-style-type: none"> ➤ Accessory organs of the digestive system ➤ The use of computer animations plus learning activity worksheets for examination of the gastric mucosa structure and its function ➤ Pancreas structure, secretions, and hormonal control of function ➤ Adaptation of the small intestine to digestion and absorption <p><i>Optional</i></p> <ul style="list-style-type: none"> ➤ Exploring the gut-brain axis
9.	<p>Session 15</p> <p>The Digestive System (Continued)</p> <ul style="list-style-type: none"> ➤ Anatomy and histology of the large intestine 	<p>Post lectures</p>



	<ul style="list-style-type: none"> ➤ Functions of the large intestine ➤ Defecation ➤ Phases of digestion 	<ul style="list-style-type: none"> ➤ 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
	<p>Session 16</p> <p>The Urinary System</p> <ul style="list-style-type: none"> ➤ Anatomy and histology of the kidneys ➤ The nephron 	<p>Pre lectures</p> <ul style="list-style-type: none"> ➤ Blood supply to kidney <p>Post lectures</p> <ul style="list-style-type: none"> ➤ 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 <p><i>Optional</i></p> <ul style="list-style-type: none"> ➤ Video recorded kidney dissection
10.	<p>Session 17</p> <p>The Urinary System (Continued)</p> <ul style="list-style-type: none"> ➤ Overview of renal physiology ➤ Glomerular filtration ➤ Histology of the glomerulus ➤ Glomerular filtration and its control 	<p>Pre lectures</p> <ul style="list-style-type: none"> ➤ Principles of hydrostatic and osmotic pressures ➤ Renin-angiotensin-aldosterone system (RAAS) ➤ Autonomic innervation of the kidney <p>Post lectures</p> <ul style="list-style-type: none"> ➤ Glomerular filtration and structural adaptations of the renal corpuscle ➤ The use of computer animations plus learning activity worksheets to understand net filtration pressure and the regulation of glomerular filtration rate (GFR) ➤ Relationship between GFR and blood pressure
	<p>Session 18</p> <p>The Urinary System (Continued)</p> <ul style="list-style-type: none"> ➤ Tubular reabsorption and tubular secretion ➤ Histology of the tubule ➤ Resorption and secretion at the tubule 	<p>Pre lectures</p> <ul style="list-style-type: none"> ➤ Primary and secondary modes of active transport <p>Post lectures</p> <ul style="list-style-type: none"> ➤ Adaptation of nephron tubules to reabsorption and secretion ➤ Modes of transport for the movement of solutes and water



		<ul style="list-style-type: none"> ➤ Homeostatic principles of fluid balance ➤ Hormonal regulation of tubular reabsorption and secretion
11.	<p>Session 19</p> <p>The Urinary System (Continued)</p> <ul style="list-style-type: none"> ➤ Production of dilute and concentrated urine ➤ Characteristics of normal urine ➤ Urine transport storage and elimination <p>Fluid, Electrolyte and Acid Base Homeostasis</p> <ul style="list-style-type: none"> ➤ Fluid compartments and fluid balance ➤ Acid base balance 	<p>Pre lectures</p> <ul style="list-style-type: none"> ➤ Acids and bases in solution ➤ Relationship between the hypothalamus and posterior pituitary gland <p>Post lectures</p> <ul style="list-style-type: none"> ➤ Formation of dilute and concentrated urine ➤ Countercurrent mechanism ➤ Abnormal urine constituents and relationship to disease ➤ Acid-base imbalance, buffer systems and compensatory mechanisms to normalise blood pH <p><i>Optional</i></p> <ul style="list-style-type: none"> ➤ Exploring kidney failure and assisted waste removal by dialysis
	<p>Laboratory Session 3</p> <p>Integrative Renal and Cardiac Physiology</p> <ul style="list-style-type: none"> ➤ Effects of diuretics, Na⁺ load, water load, hypertension, chronic kidney disease and diabetes on renal and cardiovascular function 	
12.	<p>Session 20</p> <p>The Male Reproductive System</p> <ul style="list-style-type: none"> ➤ Anatomy, histology and function of the organs and duct system ➤ Spermatogenesis and the mature sperm ➤ Accessory sex glands and semen 	<p>Pre lectures</p> <ul style="list-style-type: none"> ➤ Principles of mitosis and meiosis <p>Post lectures</p> <ul style="list-style-type: none"> ➤ 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
	<p>Session 21</p> <p>The Female Reproductive System</p> <ul style="list-style-type: none"> ➤ Anatomy, histology and functions of the organs ➤ Oogenesis 	<p>Pre lectures</p> <ul style="list-style-type: none"> ➤ Principles of mitosis and meiosis <p>Post lectures</p> <ul style="list-style-type: none"> ➤ Anatomy and function of the female reproductive organs ➤ Oogenesis and the development of ovarian follicles <p><i>Optional</i></p> <ul style="list-style-type: none"> ➤ Exploring ovarian dysfunction and hormonal imbalance



13.	<p>Session 22</p> <p>The Female Reproductive System (Continued)</p> <ul style="list-style-type: none"> ➤ The female reproductive cycle and pregnancy 	<p>Post lectures</p> <ul style="list-style-type: none"> ➤ Phases of the female reproductive cycle ➤ Hormonal changes during the reproductive cycle ➤ The ovarian and uterine cycles
	<p>Session 23</p> <p>Pregnancy and Childbirth</p> <ul style="list-style-type: none"> ➤ Maternal changes ➤ Labour and delivery ➤ Lactation 	<p>Post lectures</p> <ul style="list-style-type: none"> ➤ The first week of pregnancy: from fertilization to implantation ➤ Ectopic pregnancies and twinning ➤ Role of the placenta in hormonal changes in pregnancy and lactation ➤ Maternal adaptations to labour and delivery <p><i>Optional</i></p> <ul style="list-style-type: none"> ➤ Exploring 3D animation of foetal development from conception to birth ➤ Foetal programming and learning
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 Examination Policy - Higher Education. 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 Examination Policy - Higher Education. Refer to your local campus calendar for exam opening and closing times.</p>	