

# SUBJECT OUTLINE

Subject Name:

## Human Biological Science 2

Subject Code:

## BIOH122

### SECTION 1 – GENERAL INFORMATION

**Award/s:**

Bachelor of Health Science (Naturopathy)	128	1 <sup>st</sup> Year
Bachelor of Health Science (Acupuncture)	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

**Total course credit points:**

**Level:**

**Duration:** 1 Semester

**Subject Coordinator:** Dr Mike Watson ( Gold Coast Campus)

**Subject is:** Core

**Subject Credit Points:** 4

### Student Workload:

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

Face to face	2 x 3 hour sessions per week:	23 sessions - 2 hour lecture, 1 hour tutorial 3 sessions - 3 hour Laboratory Session
E-Learning	Details:	Narrated Powerpoint presentations Tutorial - Asynchronous tutor moderated discussion forum and activities Virtual laboratories – Data and handouts Student handouts, web resources
Intensive	Details:	Summer school - offered 4 x 4hrs per week for 5 weeks combination lecture and tutorial activities. Quizzes offered in Weeks 3 and 5. Final exam conducted in Week 6.
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, 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 disease 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	Sessions Content Delivered	Week Due	Weighting
<b>Online Quiz 1</b> Multiple choice, definitions and diagrams (50 minutes)	1-3	1-9	Sunday following Session 14	20%
<b>Group laboratory report I</b> Structured lab report	2 & 8	1-6	Week 5	10%
<b>Group laboratory report II</b> Structured lab report	2, 4 & 9	1-6 and 10-13	Week 8	10%
<b>Group laboratory report III</b> Structured lab report	2, 4, 6 & 10	1-6 and 17-20	Week 13	10%
<b>Final Examination</b> Multiple choice, short answers, definitions, extended response questions (2 hours)	1-7	1-24	Final Exam Period	50%

#### Prescribed readings:

1. Summers, J., & Smith, B. (2014). *Communication skills handbook* (4th ed.). Milton, QLD: Wiley.
2. Tortora, G. J., & Derrickson, B. (2014). *Principles of anatomy and physiology* (14th ed.). Danvers, MA: Wiley.

#### Recommended readings:

1. Hall, J. E., & Guyton, A.C. (2011). *Guyton and Hall textbook of medical physiology* (12th ed.). Philadelphia, PA: Saunders Elsevier.

2. Marieb, E. N. (2012). *Anatomy & physiology coloring workbook: a complete study guide* (10th ed.). San Francisco, CA: Benjamin Cummings.
3. Moore, K. L., Dalley, A. F., & Agur, A. M. R. (2014). *Clinically oriented anatomy* (7th ed.). Philadelphia, PA: Wolters Kluwer.
4. O'Toole, M. T. (Eds.). (2013). *Mosby's dictionary of medicine, nursing and health professions* (9th ed.). St. Louis, MO: Elsevier. [ebook available]

Subject Content		
Week	Lecture	Tutorial
1.	Session 1 Introduction (Subject Outline / Subject Aims / Assessment / Teaching Resources) <b>Haematological System</b> <ul style="list-style-type: none"> <li>• Functions and properties of blood</li> <li>• Formation of blood cells</li> <li>• Formed Elements</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>• Discussion on the assessment required for the subject</li> <li>• Formed elements of blood</li> <li>• Worksheets reviewing the role and varieties of formed elements found in blood</li> </ul>
	Session 2 <b>Haematological System</b> <ul style="list-style-type: none"> <li>• Haemostasis</li> <li>• Blood groups and blood types</li> </ul>	<ul style="list-style-type: none"> <li>• Blood Groups</li> <li>• Group work involving the use of computer animations plus learning activity worksheets</li> </ul>
2.	Session 3 <b>Cardiovascular System: The Heart</b> <ul style="list-style-type: none"> <li>• Anatomy and histology</li> <li>• Heart valves and circulation</li> <li>• Cardiac muscle physiology</li> <li>• The cardiac conduction system</li> </ul>	<ul style="list-style-type: none"> <li>• Anatomy of the Heart</li> <li>• Worksheets reviewing the anatomy of the heart</li> <li>• Computer animations showing the anatomy and functioning of the heart</li> <li>• Web sites showing heart dissections</li> <li>• Optional - Dissection of a pig's heart</li> </ul>
	Session 4 <b>Cardiovascular System: The Heart</b> <ul style="list-style-type: none"> <li>• The cardiac cycle</li> <li>• Cardiac output</li> </ul>	<ul style="list-style-type: none"> <li>• Factors affecting cardiac output</li> <li>• Facilitated in class group discussion on the factors that can affect cardiac output</li> </ul>
3.	Session 5 <b>Cardiovascular System: Vasculature</b> <ul style="list-style-type: none"> <li>• Structure and function of blood vessels</li> <li>• Capillary exchange</li> </ul>	<ul style="list-style-type: none"> <li>• Factors affecting capillary exchange</li> <li>• Use of worksheets and computer animations to explore the scientific principles of capillary exchange</li> </ul>
	Session 6 <b>Cardiovascular System: Vasculature</b> <ul style="list-style-type: none"> <li>• Haemodynamics: factors affecting blood flow</li> <li>• Blood pressure</li> <li>• Circulatory routes</li> </ul>	<ul style="list-style-type: none"> <li>• Blood pressure</li> <li>• Use of worksheets and computer animations to explore the scientific principles of capillary exchange</li> </ul>
4.	<u>Laboratory session I:</u> <b>Cardiovascular Effects of Exercise</b> Measurement of ECG, Pulse, Heart Sounds, Blood Pressure before and following exercise.	
	Session 7 <b>Lymphatic and Immune system</b> <ul style="list-style-type: none"> <li>• Lymphatic system structure and function</li> <li>• Non-specific resistance</li> </ul>	<ul style="list-style-type: none"> <li>• Lymphatic flow</li> <li>• Non-specific and Innate Immunity</li> <li>• Stages of inflammation</li> </ul>

5.	Session 8 <b>Immune System</b> <ul style="list-style-type: none"> <li>• Specific resistance</li> <li>• Immunity</li> <li>• Cell mediated immunity</li> </ul>	<ul style="list-style-type: none"> <li>• Development of the immune processes</li> <li>• Use of interactive worksheets to review how the immune system develops its properties</li> </ul>
	Session 9 <b>Immune System</b> <ul style="list-style-type: none"> <li>• Antigen mediated immunity</li> <li>• Self-recognition and self-tolerance</li> <li>• Aging and the immune system</li> </ul>	<ul style="list-style-type: none"> <li>• Use of worksheets to review the processes of self-recognition and tolerance and their relationship to disease</li> </ul>
6.	Session 10 <b>The Respiratory System</b> <ul style="list-style-type: none"> <li>• Anatomy and histology</li> </ul>	<ul style="list-style-type: none"> <li>• The alveoli of the lung – structure and function</li> <li>• Group work involving the use of computer animations plus learning activity worksheets</li> </ul>
	Session 11 <b>The Respiratory System</b> <ul style="list-style-type: none"> <li>• Pulmonary ventilation</li> <li>• Lung volumes</li> <li>• Exchange of oxygen and carbon dioxide: external respiration</li> </ul>	<ul style="list-style-type: none"> <li>• Mechanics of breathing</li> <li>• Group work involving the use of computer animations plus learning activity worksheets</li> <li>• Practical demonstration of the mechanics of breathing and factors that can affect them</li> </ul>
7.	Session 12 <b>The Respiratory System</b> <ul style="list-style-type: none"> <li>• Transport of oxygen and carbon dioxide in blood</li> <li>• Internal respiration</li> <li>• Control of respiration</li> </ul>	<ul style="list-style-type: none"> <li>• Respiratory control and the factors that can affect it</li> <li>• Group work involving the use of computer animations plus learning activity worksheets</li> </ul>
<u>Laboratory session II:</u> <b>Respiratory Physiology</b> <ul style="list-style-type: none"> <li>• Measurement of Respiration before and after exercise</li> <li>• Measurement of Airway Resistance and Dead space</li> <li>• Respiratory function in Health and Disease</li> </ul>		
<b>NON-TEACHING WEEK</b> <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 break week falls between Weeks 7 and 8.		
8.	Session 13 <b>The Digestive System</b> <ul style="list-style-type: none"> <li>• Layers and innervation of the GIT</li> <li>• The peritoneum</li> <li>• Mouth to stomach             <ul style="list-style-type: none"> <li>• Mouth</li> <li>• Pharynx</li> <li>• Oesophagus</li> </ul> </li> <li>• Stomach Anatomy &amp; Physiology</li> <li>• Secretions and enzymes of the Stomach</li> <li>• Deglutition</li> </ul>	<ul style="list-style-type: none"> <li>• Oesophagus and stomach Function</li> <li>• Group work involving the use of computer animations plus learning activity worksheets</li> </ul>
	Session 14 <b>The Digestive System</b>	<ul style="list-style-type: none"> <li>• The use of computer animations plus learning activity worksheets</li> </ul>

	<ul style="list-style-type: none"> <li>• Pancreas and Liver</li> <li>• Anatomy and histology of the small intestine</li> <li>• Digestion and absorption of the small intestine</li> </ul>	<ul style="list-style-type: none"> <li>• Use of models to show the relationship of the organs and structures located in the abdomen</li> </ul>
9.	Session 15 <b>The Digestive System</b> <ul style="list-style-type: none"> <li>• Anatomy and histology of the large intestine</li> <li>• Functions of the large intestine</li> <li>• Defecation</li> <li>• Phases of digestion</li> </ul>	<ul style="list-style-type: none"> <li>• Phases and control of digestion</li> <li>• Tutor facilitated classroom discussion and interactive learning activity worksheets</li> </ul>
	Session 16 <b>The Urinary System</b> <ul style="list-style-type: none"> <li>• Anatomy and histology of the kidneys</li> <li>• The Nephron</li> </ul>	<ul style="list-style-type: none"> <li>• General anatomy of the kidney</li> <li>• Worksheets reviewing the anatomy of the kidney</li> <li>• Computer animations showing the anatomy and functioning of the kidney</li> <li>• Web sites showing kidney dissections</li> <li>• Optional - Dissection of pig kidneys</li> </ul>
10.	Session 17 <b>The Urinary System</b> <ul style="list-style-type: none"> <li>• Overview of renal physiology</li> <li>• Glomerular filtration</li> <li>• Histology of the glomerulus</li> <li>• Glomerular filtration and its control</li> </ul>	<ul style="list-style-type: none"> <li>• Control of glomerular filtration</li> <li>• The use of computer animations plus learning activity worksheets</li> </ul>
	Session 18 <b>The Urinary System</b> <ul style="list-style-type: none"> <li>• Tubular reabsorption and tubular secretion</li> <li>• Histology of the tubule</li> <li>• Resorption and secretion at the tubule</li> </ul>	<ul style="list-style-type: none"> <li>• Role of the tubule of the nephron</li> <li>• The use of computer animations plus learning activity worksheets</li> </ul>
11.	Session 19 <b>The Urinary System</b> <ul style="list-style-type: none"> <li>• Production of dilute and concentrated urine</li> <li>• Characteristics of normal urine</li> <li>• Urine transport storage and elimination</li> </ul> <b>Fluid, Electrolyte and Acid Base Homeostasis</b> <ul style="list-style-type: none"> <li>• Fluid compartments and fluid balance</li> <li>• Acid Base Balance</li> </ul>	<ul style="list-style-type: none"> <li>• Urine and its relationship to disease</li> <li>• Interactive learning activities and case studies to introduce the student to the role of the kidney and disease</li> </ul>
	<u>Laboratory session III:</u> <b>Integrative Renal and Cardiac Physiology</b> <ul style="list-style-type: none"> <li>• Effects of diuretics, Na<sup>+</sup> load, water load, hypertension, Chronic Kidney disease and Diabetes on Renal and cardiovascular function</li> </ul>	
12.	Session 20 <b>The Male Reproductive System</b> <ul style="list-style-type: none"> <li>• Anatomy, histology and function of the organs and duct system</li> <li>• Spermatogenesis and the mature sperm</li> <li>• Accessory sex glands and semen</li> </ul>	<ul style="list-style-type: none"> <li>• Interactive review of lecture material</li> <li>• Comparison of spermatogenesis and meiosis</li> </ul>
	Session 21 <b>The Female Reproductive System</b>	<ul style="list-style-type: none"> <li>• Interactive review of lecture material through the use of anatomical models</li> </ul>

	<ul style="list-style-type: none"> <li>Anatomy, histology and functions of the organs</li> <li>Oogenesis</li> </ul>	
<b>13.</b>	Session 22 <b>The Female Reproductive System</b> <ul style="list-style-type: none"> <li>The female reproductive cycle and pregnancy</li> </ul>	<ul style="list-style-type: none"> <li>Interactive review of lecture material through the use of activity sheets and group work</li> </ul>
	Session 23 <b>Pregnancy and Childbirth</b> <ul style="list-style-type: none"> <li>Maternal changes</li> <li>Labour and delivery</li> <li>Lactation</li> </ul>	<ul style="list-style-type: none"> <li>Interactive review of lecture material</li> </ul>
<b>14.</b>	<b>Non-Teaching Week/Practical Exam Week 1. Note that make-up classes may be scheduled in this week.</b>	
<b>15.</b>	<b>Non-Teaching Week/Practical Exam Week 2. Note that make-up classes may be scheduled in this week.</b>	
<b>16.</b>	<b>Final Exam Week 1</b> <b>On campus enrolled students:</b> Please refer to the Exam 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 <b>Examination Policy - Higher Education</b> . The Exam Week for subjects offered online is identified in the Online Calendar.	
<b>17.</b>	<b>Final Exam Week 2</b> Please refer to the Exam Timetable for your local campus for the exact day and time of exam.	