



SUBJECT OUTLINE

Subject Name:

Systems Physiology

Subject Code:

BIOA122

SECTION 1 – GENERAL INFORMATION

| Award/s: | Total Course Credit Points: | Level: |
|--|---------------------------------|---------------------------|
| Bachelor of Health Science (Chinese Medicine) | 128 | Core 1 st Year |
| Bachelor of Health Science (Acupuncture Therapies) | 96 | Core 1 st Year |
| Diploma of Health Science (Chinese Remedial Massage) | 48 | Core 1 st Year |
| Duration: 1 Semester | | |
| Subject is: Core or Elective as noted | Subject Credit Points: 4 | |

Student Workload:

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

Delivery Mode*:

☐ On campus ☒ Online / Digital ☐ Blended ☐ Intensive

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

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| <input checked="" type="checkbox"/> eLearning modules / tutorial: | Lectures: Interactive online learning modules |
| | Tutorials: can include asynchronous tutor moderated discussion forums and activities, learning journal 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: BIOA111

Co-requisites: Nil

SECTION 2 – ACADEMIC DETAILS

Subject Rationale

This subject is designed to build on the knowledge gained in Introduction to Human Biology (BIOA111) by providing the student with the principles of physiology that underpin natural medicine. Students will explore physiology of



the human skeletal, muscular, nervous, endocrine, immune, cardiac, respiratory, renal, and reproductive systems. This subject also explores how these body systems are integrated to maintain homeostasis within the body in a coordinated manner. The study of systems physiology is fundamental to the development of student's understanding of the normal physiological function. Being able to integrate the normal physiology of the systems provides a strong foundation for ongoing studies where students will develop a deeper insight into diseases that affect these systems.

Learning Outcomes

1. Describe how the skeletal and muscular systems function in bone remodelling and movement respectively.
2. Discuss how the nervous and endocrine systems communicate with different parts of the body and maintain homeostasis using feedback loops.
3. Discuss the physiology of the haematological, cardiovascular, lymphatic, and immune system in relation to haemostasis, the cardiac cycle, control of blood pressure and immune responses.
4. Discuss the physiology of the respiratory system in relation to pulmonary ventilation and gas transport.
5. Explain the role of the digestive system in digestion and absorption of nutrients.
6. Discuss the physiology of the urinary system, in relation to urine formation, fluid, and acid-base balance.
7. Discuss how the male and female reproductive systems function in fertilization, pregnancy, and childbirth.

Assessment Tasks

| Type | Learning Outcomes Assessed | Session Content Delivered | Due | Weighting |
|---|----------------------------|---------------------------|--------------------------|-----------|
| Mid-semester exam Multiple choice, definitions, and short answers (1.5 hours) | 1-2 | 1-10 | Week 7 | 30% |
| Written Assignment (1200 words) | 3 | 12-17 | Week 11 | 25% |
| Final Written Exam Multiple choice, matching and extended response answers (2 hours) | 3-7 | 12-17 and 19-26 | Final Examination Period | 45% |

All written assessments and online quizzes are due at 11:55 p.m. 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., 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.

Marieb, E. N. (2017). *Anatomy & physiology coloring workbook: A complete study guide* (12th ed.). Pearson. [ebook available]

Moore, K. L., Dalley, A. F., & Agur, A. M. R. (2017). *Clinically oriented anatomy* (8th ed.). Wolters Kluwer.

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 |
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| 1. | <p>Session 1</p> <p>Introduction (Subject Outline / Subject Aims / Assessment / Teaching Resources)</p> <p>Introduction to Systems Physiology</p> <ul style="list-style-type: none"> ➤ Cells and homeostasis ➤ Introduction to organ systems | <ul style="list-style-type: none"> ➤ Learning activities on cell homeostasis and organ systems |
| | <p>Session 2</p> <p>The Skeletal System</p> <ul style="list-style-type: none"> ➤ Bone physiology: properties and functions ➤ Bone growth and remodelling ➤ Function of joints ➤ Movements at synovial joints | <ul style="list-style-type: none"> ➤ Learning activities on bone remodelling ➤ Learning activities on movement at synovial joints |
| 2. | <p>Session 3</p> <p>The Muscular System I</p> | <ul style="list-style-type: none"> ➤ Learning activities on the contraction and relaxation cycle |



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| | <ul style="list-style-type: none"> ➤ Contraction and relaxation ➤ The sliding filament theory of muscle contraction ➤ Neuromuscular junction | |
| | <p>Session 4</p> <p>The Muscular System II</p> <ul style="list-style-type: none"> ➤ Skeletal muscle metabolism ➤ Control of muscle tension ➤ Function of skeletal muscle fibre types | <ul style="list-style-type: none"> ➤ Learning activities on integration of types of skeletal muscles fibres and metabolism |
| 3. | <p>Session 5</p> <p>The Nervous System I</p> <ul style="list-style-type: none"> ➤ Generation of action potentials ➤ Propagation of action potentials ➤ Signal transmission at synapses ➤ Regeneration of the nervous tissue | <ul style="list-style-type: none"> ➤ Learning activities on events that occur at the synapse ➤ Learning activities on neurotransmitter function |
| | <p>Session 6</p> <p>The Nervous System II</p> <ul style="list-style-type: none"> ➤ Sensation ➤ Somatic sensations | <ul style="list-style-type: none"> ➤ Learning activities on the initiation of the action potential through sensation |
| 4. | <p>Session 7</p> <p>The Nervous System III</p> <ul style="list-style-type: none"> ➤ The special senses ➤ Olfaction ➤ Gustation ➤ Vision ➤ Hearing and equilibrium | <ul style="list-style-type: none"> ➤ Learning activities on the function of the special senses ➤ Learning activities on adaptation of special senses |
| | <p>Session 8</p> <p>The Nervous System IV</p> <ul style="list-style-type: none"> ➤ The spinal cord physiology ➤ Reflex arcs <p>The Autonomic Nervous System (ANS)</p> <ul style="list-style-type: none"> ➤ Physiology of the ANS ➤ Reflex arcs ➤ Neurotransmitters of the ANS | <ul style="list-style-type: none"> ➤ Learning activities on the somatic reflex arc ➤ Learning activities on the function of the ANS |



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| | <ul style="list-style-type: none"> ➤ Physiological effects and control of the ANS | |
| 5. | <p>Session 9</p> <p>The Endocrine System I</p> <ul style="list-style-type: none"> ➤ Regulation of hormone secretion ➤ Hypothalamus, pituitary, thyroid, and parathyroid glands ➤ Formation, actions, and control of hormone secretion | <ul style="list-style-type: none"> ➤ Learning activities on specific glands |
| | <p>Session 10</p> <p>The Endocrine System II</p> <ul style="list-style-type: none"> ➤ Pancreas, adrenals, and other glands ➤ Formation, actions, and control of hormone secretion ➤ Axes | <ul style="list-style-type: none"> ➤ Learning activities on specific glands and hormonal axes |
| 6. | <p>Session 11</p> <p>Integration of Nervous and Endocrine Systems</p> <ul style="list-style-type: none"> ➤ Stress response | <ul style="list-style-type: none"> ➤ Learning activities on stress and homeostasis |
| | <p>Session 12</p> <p>Haematological System</p> <ul style="list-style-type: none"> ➤ Formation of blood cells ➤ Haemostasis ➤ Blood groups and blood types | <ul style="list-style-type: none"> ➤ Learning activities on the regulation of erythropoiesis ➤ Learning activities on haemostasis and cross-matching blood types |
| 7. | <p>Session 13</p> <p>Cardiovascular System: The Heart I</p> <ul style="list-style-type: none"> ➤ Cardiac muscle physiology ➤ The cardiac conduction system | <ul style="list-style-type: none"> ➤ Learning activities on the cardiac conduction system |
| | <p>Session 14</p> <p>Cardiovascular System: The Heart II</p> <ul style="list-style-type: none"> ➤ The cardiac cycle ➤ Cardiac output | <ul style="list-style-type: none"> ➤ Learning activities on the cardiac cycle and factors affecting cardiac output |
| | <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 15</p> <p>Cardiovascular System: Vasculature</p> | <ul style="list-style-type: none"> ➤ Learning activities on capillary exchange |



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| | <ul style="list-style-type: none"> ➤ Capillary exchange ➤ Haemodynamics: Factors affecting blood flow ➤ Blood pressure | <ul style="list-style-type: none"> ➤ Learning activities on the control of blood pressure and blood flow |
| | <p>Session 16</p> <p>Lymphatic and Immune System</p> <ul style="list-style-type: none"> ➤ Lymphatic system function ➤ Non-specific resistance | <ul style="list-style-type: none"> ➤ Learning activities on the circulation of lymph ➤ Learning activities on the first and second lines of immune defence |
| 9. | <p>Session 17</p> <p>Immune System (Continued)</p> <ul style="list-style-type: none"> ➤ Specific resistance ➤ Self-recognition and self-tolerance ➤ Cell-mediated Immunity ➤ Antibody-mediated immunity | <ul style="list-style-type: none"> ➤ Learning activities on antigen processing and recognition ➤ Learning activities on immunological memory |
| | <p>Session 18</p> <p>Revision and assessment support</p> | |
| 10. | <p>Session 19</p> <p>The Respiratory System</p> <ul style="list-style-type: none"> ➤ Lung volumes and capacities ➤ Transport of oxygen and carbon dioxide in blood ➤ Internal and external respiration ➤ Control of respiration | <ul style="list-style-type: none"> ➤ Learning activities on exchange of gases in the alveoli and body tissues ➤ Learning activities on principles underlying oxygen affinity for haemoglobin ➤ Learning activities on the control of respiration |
| | <p>Session 20</p> <p>The Digestive System</p> <ul style="list-style-type: none"> ➤ Stomach physiology ➤ Role of pancreas and liver in digestion ➤ Small and large intestine physiology ➤ Phases of digestion | <ul style="list-style-type: none"> ➤ Learning activities on digestion and absorption of food ➤ Learning activities on phases of digestion |
| 11. | <p>Session 21</p> <p>The Urinary System I</p> <ul style="list-style-type: none"> ➤ Overview of renal physiology ➤ Glomerular filtration ➤ Control of Glomerular filtration rate | <ul style="list-style-type: none"> ➤ Learning activities on glomerular filtration and the relationship to blood pressure |



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| | <p>Session 22</p> <p>The Urinary System II</p> <ul style="list-style-type: none"> ➤ Tubular reabsorption and tubular secretion ➤ Production of dilute and concentrated urine | <ul style="list-style-type: none"> ➤ Learning activities on the production of urine |
| 12. | <p>Session 23</p> <p>The Urinary System III</p> <ul style="list-style-type: none"> ➤ Characteristics of normal urine ➤ Fluid compartments and fluid balance ➤ Acid-base balance | <ul style="list-style-type: none"> ➤ Learning activities on the kidney's role in fluid homeostasis and acid-base imbalances |
| | <p>Session 24</p> <p>Male Reproductive System</p> <ul style="list-style-type: none"> ➤ Physiology of the male reproductive system ➤ Hormonal control of testicular function | <ul style="list-style-type: none"> ➤ Learning activities on the male reproductive system ➤ Learning activities on hormones regulating testicular function |
| 13. | <p>Session 25</p> <p>Female Reproductive System</p> <ul style="list-style-type: none"> ➤ Female reproductive cycle | <ul style="list-style-type: none"> ➤ Learning activities on phases of the female reproductive cycle |
| | <p>Session 26</p> <p>Pregnancy and Childbirth</p> <ul style="list-style-type: none"> ➤ Maternal changes during pregnancy ➤ Labour and delivery ➤ Lactation | <ul style="list-style-type: none"> ➤ Learning activities on maternal adaptations to pregnancy ➤ Learning activities on function of hormones during pregnancy |
| 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> | |