



## **Human Biology General Course Year 12**

### **Selected Unit 3 syllabus content for the**

### **Externally set task 2021**

This document is an extract from the *Human Biology General Course Year 12 syllabus*, featuring all of the content for Unit 3. The content that has been highlighted in the document is the content on which the Externally set task (EST) for 2021 will be based.

All students enrolled in the course are required to complete an EST. The EST is an assessment task which is set by the Authority and distributed to schools for administering to students. The EST will be administered in schools during Term 2, 2021 under standard test conditions. The EST will take 50 minutes.

The EST will be marked by teachers in each school using a marking key provided by the Authority. The EST is included in the assessment table in the syllabus as a separate assessment type with a weighting of 15% for the pair of units.

# Unit 3 – Coordination

## Unit description

This unit explores bones, muscles, nerves and hormones and how they maintain the body to act in a coordinated manner.

The structure and function of the musculoskeletal system provides for human movement, balance and growth as the result of coordinated actions. This is brought about by the interaction of the musculoskeletal system with the nervous and endocrine systems. Conditions affecting these systems, such as sporting injuries, hearing and vision defects, can result in a decrease or loss of function.

Students investigate the musculoskeletal, nervous and endocrine systems through dissections and practical examination of reflexes, vision, hearing and skin sensitivity. They are encouraged to interpret and communicate their findings in a variety of ways.

## Unit content

An understanding of the Year 11 content is assumed knowledge for students in Year 12. It is recommended that students studying Unit 3 and Unit 4 have completed Unit 1 and Unit 2.

This unit includes the knowledge, understandings and skills described below.

### Science Inquiry Skills

- identify, research and construct questions for investigation; propose hypotheses; and predict possible outcomes
- design investigations, including the procedure(s) to be followed, the materials required, and the type and amount of primary and/or secondary data to be collected; conduct risk assessments; and consider research ethics, including animal ethics
- conduct investigations including real or virtual dissections, investigating reaction time and hearing and eyesight tests, safely, competently and methodically, for the collection of valid and reliable data
- represent data in meaningful and useful ways, including the use of mean and median, range and probability; organise and analyse data to identify trends, patterns and relationships; discuss the ways in which measurement error, instrumental accuracy, the nature of the procedure and the sample size may influence uncertainty and limitations in data; and select, synthesise and use evidence to make and justify conclusions
- interpret a range of scientific and media texts, and evaluate models, processes, claims and conclusions by considering the quality of available evidence; and use reasoning to construct scientific arguments
- select, use and/or construct appropriate representations, to communicate conceptual understanding, solve problems and make predictions
- communicate to specific audiences, and for specific purposes, using appropriate language, nomenclature, genres and modes, including scientific reports

## Science as a Human Endeavour

- skeletal damage caused by many sporting injuries are due to movements beyond the capabilities of the bones and joints, and treatment can be by basic first aid and medication, or radical surgery
- dysfunctions of the nervous and/or the muscular systems can be debilitating to affected individuals, and ongoing research needs to occur to discover causes and/or improved treatment
- hormone replacement therapies can be used for the treatment of endocrine disorders to help improve the quality of life of affected individuals
- increased understanding of the central nervous system and muscle coordination have led to innovations in the treatment of injuries

## Science Understanding

### *Skeletal system*

- the support and movement of the body is facilitated by the structure and function of the bones and joints in the skeletal system
- the location and structure of joints in the skeleton allow for a range of movement
- the structure and development of long bones provide for strength, growth and repair

### *Muscular system*

- locomotion and balance is facilitated by the structure and actions of the skeletal muscles
- skeletal muscles work in groups around joints to bring about the desired action, while maintaining stability of the joint and providing strength to the action
- the structure of muscles allow for small movements at cellular level to combine to produce large, strong movements used in walking, balance and arm movements

### *Nervous system*

- the nervous system enables us to respond to external changes. Information from receptors passes along nerves to the brain where the brain coordinates the response
- the structures of the brain facilitate coordination of responses, including the central nervous system (brain, cerebellum, cerebrum, brainstem and spinal cord) and the peripheral nervous system
- the central nervous system is protected by bone, meninges and cerebrospinal fluid
- receptors detect stimuli which include light, sound, changes in position, chemicals, touch, pressure, pain and temperature
- the structure of the eye, ear and receptors in the skin allow the body to react to changes in the external environment
- reflex actions are automatic and rapid, which involve sensory neurons, interneurons and motor neurons

- the nervous system and the musculoskeletal system interact to provide coordinated actions of the body for walking and balance

#### *Endocrine system*

- many processes within the body are coordinated by hormones, which are secreted by glands and are transported to their target organs in the blood
- hormone action can be via negative feedback to maintain internal conditions within tolerance limits; receptor, modulator, effector, response and feedback, are components of a feedback loop
- the endocrine glands of the body include hypothalamus, pituitary, adrenal gland, pancreas, thyroid, pineal and parathyroid glands, testes, ovaries and placenta
- thyroxine, cortisol, growth hormone and, to a lesser extent, adrenaline, all play a role in the regulation of metabolism