



COURSE OUTLINE

GHBY – GENERAL HUMAN BIOLOGY YEAR 12 2021

UNIT 3 AND UNIT 4



This course will run the two units, 3 and 4, concurrently. The student Semester 1 grade will therefore be an estimate.

Term	Week	Topic and key teaching points	Syllabus content	Assessment
1	1	<p>Science Inquiry Skills</p> <ul style="list-style-type: none"> Distribute programs, syllabus, assessment outline, discuss expectations, etc. Review: What is 'Human Biology? What topics did you do last year? Why is Human Biology is important? What careers relate to Human biology? Review Scientific Method including Hypothesis, Variables, Graphing and Interpretation 	<ul style="list-style-type: none"> Identify, research and construct questions for investigation; propose hypotheses; and predict possible outcomes 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 and select, synthesise and use evidence to make and justify conclusions 	
1	2 - 4	<p>Skeletal System</p> <ul style="list-style-type: none"> Function of Skeletal System The main bones of the human skeleton Long Bone Dissection Macroscopic structure of a long bone Microscopic structure of a long bone Bone growth and remodeling Long bone graphing activity Types of Bones based on shape and/or divisions Types of Cartilage Define Joints Types of joints e.g. Fibrous/Fixed/Cartilaginous Types of joints – Synovial, Hinge, Ball & socket, Gliding, Pivot, Saddle and Condylod Structure of synovial joints Typical joint injuries in sports caused by movement beyond the capabilities of joints. Treatment for joint and bone damage/injury 	<ul style="list-style-type: none"> The support and movement of the body is facilitated by the structure and function of the bones and joints in the skeletal system. The structure and development of long bones provide for strength, growth and repair The location and structure of joints in the skeleton allow for a range of movement 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 	<p>Task 1: Science Inquiry - Breaking point of Bone Investigation (7%)</p>



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1	5 - 7	<p><u>Muscular System</u></p> <ul style="list-style-type: none"> • Function of Muscular System • Terms of motion (adduction, abduction, extension flexion, rotation, circumduction) • Elasticity, extension and contractibility • Major muscles • Common paired (antagonistic) muscles and their typical movements • Muscle structure including sliding filament model • Development of exercise routine including the effects of possible drug use • Common dysfunctions of the skeletal and muscular system 	<ul style="list-style-type: none"> • 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 	<p>Task 2: Extended Response – Sports Injury Research and Model (10%)</p> <p>Task 3: Test – Skeletal and Muscular System Week 7 (7.5%)</p>
1 2	8 – 9 1 - 2	<p><u>Nervous System</u></p> <ul style="list-style-type: none"> • Function of Nervous System • Divisions of the Nervous System • Structures of the CNS • CNS protection: Skull and spine, cerebrospinal fluid, meninges • Spinal Cord structure and function • Structure and divisions of the PNS • Structure and function of the nerve cell • Types of neurons - multi, bi and unipolar • Describe the transmission of nervous impulses • Define stimuli and receptor • Structure of Eyes, Ears and Skin • Describe how we eye, ear and 'feel • Reflex and Reaction time Practical 	<ul style="list-style-type: none"> • The structures of the brain facilitates coordination of responses, including the central nervous system (brain, cerebellum, cerebrum, spinal cord, brainstem including hypothalamus and medulla and the peripheral nervous system • The nervous system enables us to responds to external changes. Information from receptors passes along nerves to the brain where the brain coordinates the response • The central nervous system is protected by bone, meninges and cerebrospinal fluid • The structure of the eye, ear and receptors in the skin allow the body to react to changes in the external environment 	<p>Task 4: Science Inquiry - Reaction Times Investigation (8%)</p>



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			<ul style="list-style-type: none"> Receptors detect stimuli which include light, sound, changes in position, chemicals, touch, pressure, pain and temperature 	
2	2	<u>Nervous System</u> <ul style="list-style-type: none"> Reflex arc steps Reflexes of the eye, ear and skin Conditions and treatment of nervous system Stem cell therapy 	<ul style="list-style-type: none"> 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 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 	
2	3 - 5	<u>EST Revision</u> <ul style="list-style-type: none"> Practice EST 2017 Practice EST 2018 Practice EST 2019 	<ul style="list-style-type: none"> Inquiry - Represent data in meaningful and useful ways; organise and analyse data to identify trends, patterns and relationships; qualitatively describe sources of measurement 	Task 5: Externally Set Task (15%)
2	4 – 7	<u>Endocrine System</u> <ul style="list-style-type: none"> The endocrine system consists of glands and hormones Its function is to maintain internal conditions (homeostasis) Describe hormones as chemical messengers in the body Label the glands of the endocrine system Pair the glands with the hormones they produce Negative feedback loop maintains internal conditions Understand the negative feedback loop and it's components (receptor, modulator, effector, response and feedback) 	<ul style="list-style-type: none"> Many processes within the body are coordinated by hormones, which are secreted by glands and are transported to their target organs in the blood The endocrine glands of the body include hypothalamus, pituitary, adrenal gland, pancreas, thyroid, pineal and parathyroid glands, testes, ovaries and placenta Hormone replacement therapies can be used for the treatment of endocrine disorders to help improve the quality of life of affected individuals 	



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		<ul style="list-style-type: none"> Give examples of negative feedback in the thyroid, adrenal glands and pituitary gland Explain the role of thyroxine, cortisol, growth hormone and, to a lesser extent, adrenaline in regulating the metabolism The metabolic effects and negative feedback loops for cortisol, growth hormone and adrenaline Explain the use of Hormone Replacement Therapy in endocrine disorders Conditions: Diabetes, Graves' disease, Growth Hormone Deficiency, infertility issues 	<ul style="list-style-type: none"> 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 Thyroxine, cortisol, growth hormone and, to a lesser extent, adrenaline, all play a role in the regulation of metabolism 	
2	8	<p><u>History of Disease and Microscopes</u></p> <ul style="list-style-type: none"> Disease myths and misconceptions Interesting history of infectious disease Use of microscopes to focus and draw micro organisms Timeline for microscope development Set-up 5 second Rule Lab 	<ul style="list-style-type: none"> Use of microscopes to dispel myths and misconceptions of disease Timeline for microscope development and its impact on identifying the link between pathogens and the diseases they cause 	<p><u>Task 6:</u> Test – Endocrine and Nervous Systems Week 7 (7.5%)</p>
2	9 - 10	<p><u>Disease Causing Pathogens</u></p> <ul style="list-style-type: none"> Types of pathogens and examples of the diseases they cause (bacteria, virus, fungi, parasite, protozoa) Specific examples of common diseases - Ross River virus, influenza, food poisoning, tuberculosis, hepatitis, tinea & malaria. Host examples (reservoir, vector and incidental) 5 second Rule Results and Discussion Set up Micro-organism growth investigation 	<ul style="list-style-type: none"> Infectious Disease is caused by invasion of a pathogen, and can be transmitted from one host to another. Pathogens include bacteria, viruses, fungi, parasites, and are the causes of common diseases including Ross River disease, influenza, food poisoning, tinea and malaria 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 	<p><u>Task 7:</u> Science Inquiry – Microscopes and 5 Second Lab Week 9 (7%)</p>

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2 3	11 1 - 2	<p><u>Stopping the Spread of Disease</u></p> <ul style="list-style-type: none"> • Types of transmission with examples of pathogens for each: <ul style="list-style-type: none"> • Disease-specific vectors • Methods of preventing transmission - quarantine, immunisation, hygiene, disruption of pathogen life cycle. • Features of a pathogen • Adaptive features of pathogens that enable them to enter host • Immunisation in Australia • How immunisations work • Compare rates of disease and the use of immunization, disruption of pathogen life cycle and hygiene • Antibiotic Resistance • Medical interventions to reduce infection and risks of misuse 	<ul style="list-style-type: none"> • The transmission and spread of infectious disease is facilitated by local, regional and global movement of individuals • Preventing the transmission of disease includes strategies of quarantine, immunization and disruption of pathogen life cycle • Modern medicines which assist in reducing the rate, or the severity of infection, include antiseptics, antibiotics and antivirals • Use and misuse of medicinal treatments against pathogens can cause the development of multi-resistant bacteria that increase risks associated with the infection • Pathogens have adaptations that facilitate their entry into the body and transmission occurs by various mechanisms, including through <ul style="list-style-type: none"> ○ Direct and indirect contact ○ Contaminated food and water ○ Disease-specific vectors, including airborne transmission 	<p>Task 8: Science Inquiry - Microorganism Growth Investigation (8%)</p>
3	3 - 6	<p><u>Immunology</u></p> <ul style="list-style-type: none"> • First line of Immune Defence: External defences of human body and Protective reflexes, coughing, vomiting, sneezing, diarrhoea • Second line of Immune Defence: Inflammatory response • Third line of Immune Defence: Neutrophils, macrophage and white blood cells. • Antigens including production of antibodies 	<ul style="list-style-type: none"> • Immunity to specific diseases is acquired as a result of natural exposure to the pathogen, or through the use of vaccines to produce memory cells • Responses to specific antigens include the production of antibodies and memory cells for short-term and long-term immunity 	<p>Task 9: Test – Disease and Vaccines (10%)</p>



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		<ul style="list-style-type: none"> • Memory cells for short & long-term immunity • Acquired vs. passive immunity • Allergy disorders - possible causes of increase and 'hygiene hypothesis' • Research for Allergy extended response 	<ul style="list-style-type: none"> • Inherent responses in humans target pathogens, including through the inflammatory response, which involves the actions and components of the circulatory system • The 'hygiene hypothesis' proposes that the increase in allergy disorders in modern society, is a consequence of decreased exposure to infection in early childhood 	
3	7	<p>Global Health</p> <ul style="list-style-type: none"> • Compare standards of hygiene, sanitation of water, waste treatment and compare first and third world disease statistics • Hygiene practices in the workplace eg how are child care centres, fast food outlets and hospitals different • Australia's response to recent pandemics like SARS and bird flu. Did it differ from the international response. • Examine disease statistics in countries of different density e.g Australia, Denmark, India & Tokyo • How has global movement affected the spread of foreign disease e.g flights, travel warnings • Discuss how the introduction of foreign disease is more severe in isolated communities using case study. 	<ul style="list-style-type: none"> • Standards of hygiene, including sanitation of water, waste treatment and the presence of pathogens and disease vectors, varies between global communities • Hygiene practices by individuals in work places, especially in places of food preparation and in hospitals, affect the transmission of disease • International collaboration is often required when responding to global issues of disease transmission, such as severe acute respiratory syndrome (SARS) and bird flu, and reducing the impact of disease on isolated populations • Population density and movement patterns influence the transmission of disease • The transmission and spread of infectious disease is facilitated by local, regional and global movement of individuals • The introduction of foreign bacteria and viruses to isolated communities may have a more severe affect than in the outside world 	<p>Task 10: Extended Response Allergy Disorders (10%)</p>



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3	8	<p><u>Sexually Transmitted Diseases</u></p> <ul style="list-style-type: none"> • Common STI's: (Chlamydia, Gonorrhoea, Herpes, Hepatitis B, Syphilis and HIV/AIDS) • Name, signs/symptoms and treatment • Social behavior on the transmission of STI's in countries. • Morals and ethics surrounding intercourse and contraception 	<ul style="list-style-type: none"> • Social behaviour is an important factor in the transmission, spread and persistence of sexually transmitted infections. 	<p>Task 11: Test- Immunology and Infectious Disease (10%)</p>
3	9-10	<p><u>Healthcare Systems</u></p> <ul style="list-style-type: none"> • Sicko Documentary • Compare Healthcare Systems between countries 		