iUBT435 – Anatomy and physiology

URN – J/617/7257

Guided Learning Hours: 100

Learning outcome	Assessment criteria	Taught content to include
LO1 Know the structure, function and pathology of the skeletal system	1.1. The learner will be able to explain the functions of the skeletal system	• Support framework • Provides attachments for muscles • Forms joints to provide movement • Forms erythrocytes in the bone marrow • Stores calcium • Protection
	1.2. Describe the structure of bone tissues	• Compact • Cancellous
	1.3. Describe the types of bone and identify where they can be found in the body	• Long • Short • Flat • Irregular • Sesamoid
	1.4. Describe the position of the bones of the skeleton	• Cranium - Parietal - Frontal - Ethmoid - Sphenoid - Occipital - Temporal • Facial - Nasal - Zygomatic - Maxilla

		- Lacrimal - Turbinator - Palatine - Mandible - Vomer - Hyoid • Vertebrae - Cervical - Thoracic - Lumbar - Sacrum - Coccyx • Shoulder girdle - Scapula - Clavicle • Thoracic cage - Ribs - Sternum • Pelvic girdle - Innominate bones ▪ Ischium ▪ Ilium ▪ Pubis • Upper limb - Humerus - Ulna - Radius - Carpals ▪ Scaphoid ▪ Lunate ▪ Triquetral ▪ Pisiform ▪ Trapezium ▪ Trapezoid ▪ Capitate ▪ Hamate - Metacarpals

		- Phalanges • Lower limb - Femur - Tibia - Fibula - Patella - Tarsals ▪ Talus ▪ Calcaneus ▪ Navicular ▪ Cuneiforms (medial, intermediate, lateral) ▪ Cuboid - Metatarsals - Phalanges
	1.5. Explain different types of joints	• Fixed • Slightly moveable • Freely moveable • Ball and socket • Hinge • Pivot • Gliding • Saddle
	1.6. Describe and identify possible causes of postural deformities	• Kyphosis • Lordosis • Scoliosis
	1.7. Explain and identify the symptoms, causes and effects of diseases and disorders of the skeletal system	• Arthritis - Osteo - Rheumatoid • Gout • Osteoporosis • Stress

LO2 Know the structure, function and pathology of the muscular system	2.1. Describe the structure and explain the function of the different types of muscle	• Voluntary • Involuntary • Cardiac

	2.2. Describe the structure and explain the function of the various attachments of muscles	• Ligament • Tendon • Fascia
	2.3. Explain the terms used in relation to the muscular system	• Origin • Insertion • Action • Tone • Tension • Fatigue • Flexion • Extension • Abduction • Adduction • Rotation • Supination • Pronation • Dorsiflexion • Plantarflexion • Eversion • Inversion • Circumduction
	2.4. Explain muscular contraction	• How a muscle works • How it provides movement • How a muscle knows when to contract • The source of energy to create a contraction • Different stages of contraction, i.e. tone and relaxation • Over contraction, i.e. causes of muscle tension and muscle fatigue
	2.5. Explain the formation of lactic acid	• Cause and effect
	2.6. Describe the position and explain the action of the muscles	• Trunk/torso - Trapezius - Erector spinae - Splenius capitis - Latissimus dorsi - Serratus anterior - Gluteus maximus

		- Gluteus medius - Gluteus minimus - Psoas - Pectoralis major and minor - Rectus abdominus - Internal oblique - External oblique - Transversus abdominus - Rhomboid major and minor - Infraspinatis - Supraspinatis - Teres major - Teres minor - Iliacus - Subscapularis - Quadratus lumborum • Arm - Deltoid - Biceps - Triceps - Brachialis - Coracobrachialis - Brachioradialis - Pronator teres - Supinator radii brevis - Flexor carpi radialis - Extensor carpi radialis - Extensor - Carpi ulnaris - Flexor carpi ulnaris - Flexor carpi digitorum - Extensor carpi digitorum - Muscles of Thenar eminence - Muscles of hypothenar eminence • Leg/thigh - Quadriceps ▪ Rectus femoris

		▪ Vastus lateralis ▪ Vastus medialis ▪ Vastus intermedius - Hamstrings ▪ Biceps femoris ▪ Semimembranosus ▪ Semitendinosus - Adductor longus - Adductor magnus - Adductor brevis - Gracilis - Sartorius - Piriformis - Gluteus maximus - Gluteus medius - Gluteus minimus • Lower leg - Gastrocnemius - Tibialis anterior - Peroneus longus - Flexor digitorum longus - Extensor digitorum longus - Soleus - Extensor hallucis longus • Face, neck and scalp - Orbicularis oculi - Orbicularis oris - Masseter - Buccinator - Levator anguli oris - Levator labii superioris - Depressor anguli oris - Depressor labii inferioris - Depressor labii oris - Mentalis - Zygomaticus - Temporalis

		- Nasalis - Procerous - Corrugator - Frontalis - Occipitalis - Pterygoids - Triangularis - Trapezius - Sternocleidomastoid - Platysma
	2.7. Explain the cause and effect of muscular conditions	• Fibromyalgia (Fibrositis) • Cramp • Muscle fatigue • Atony • Atrophy • Myositis • Rupture • Spasm • Spasticity • Sprain • Strain • Stress

LO3 Know the structure, function and pathology of the skin	3.1. Describe the structure of the skin	• Epidermis - Stratum corneum - Stratum lucidum - Stratum granulosum - Stratum spinosum/Malphigian layer - Stratum germinativum/Basal layer - Melanocytes • Dermis - Blood supply - Lymphatic supply - Hair follicle - Hair - Sebaceous gland

		- Sweat glands: Eccrine and apocrine - Sensory nerve endings - Dermal papilla - Collagen - Elastin - Histeocytes - Mast cells - Fibroblasts - Erector pili muscle • Subcutaneous layer
	3.2. Explain the functions of the skin	• Secretion • Heat regulation • Absorption • Protection • Elimination • Sensation • Vitamin D formation (7-dehydro-cholesterol) • Keratinisation • Melanin formation
	3.3. Explain and identify the different skin types	• Dry • Oily • Dehydrated • Sensitive • Combination
	3.4. Explain skin diseases and disorders and when they are contra-indicated to treatment	• Recognition points • Whether congenital, bacterial, viral, fungal or an infestation and whether the condition is contra-indicated • Congenital - Eczema - Psoriasis - Dermatitis • Bacterial - Acne vulgaris - Impetigo - Acne rosacea - Folliculitis

		- Boils • Viral - Warts - Verrucas - Herpes simplex - Herpes zoster • Fungal - Tinea corporis - Tinea pedis • Pigmentation disorders - Vitiligo - Albinism - Chloasma - Ephelides - Lentigo - Moles - Naevae - Port wine stain • General disorders - Broken capillaries - UV damage - Urticaria - Allergic reaction - Comedones - Milia
	3.5. Explain the different skin cancers and their possible causes	• Basal cell carcinoma • Squamous cell carcinoma • Malignant melanoma

LO4 Know the structures and functions of cells and tissues in the body	4.1. Describe the structures of the cell and explain their functions	• Cell membrane • Nuclear membrane • Nucleus • Nucleolus • Cytoplasm • Centrosome • Golgi apparatus

		• Mitochondria • Lysosome • Endoplasmic reticulum • Ribosome • Centrosome • Centromere • Vacuoles • Centrioles • Chromatids
	4.2. Describe the process of mitosis	• Prophase • Metaphase • Anaphase • Telophase
	4.3. Explain the term histology	• Definition of histology
	4.4. Describe the structure and explain the function of the main types of tissue in the body	• Epithelial tissue - Simple ▪ Squamous ▪ Cuboidal ▪ Ciliated ▪ Columnar - Compound ▪ Transitional ▪ Stratified • Nervous tissue • Muscular tissue - Striated - Non-striated - Cardiac • Connective tissue - Areolar - Adipose - Cartilage (white fibrous, yellow elastic, hyaline) - Bone - Blood - Lymph • Membranes

		- Serous - Mucus - Synovial
	4.5. Explain how substances enter and leave the cell	• Diffusion • Osmosis • Dissolution • Active transport • Filtration

LO5 Know the structure, function and pathology of the cardiovascular system	5.1. Describe the structure and explain the function of blood and its components	• Erythrocytes • Leucocytes • Thrombocytes • Plasma and plasma proteins • Platelets • Describe the vessels in which it is carried - Arteries - Arterioles - Veins - Venules - Capillaries
	5.2. Describe the position of the main arteries and veins of the body	• Main arteries of the head and neck - Innominate - Common carotid - Internal carotid - External carotid - Facial - Occipital - Superficial temporal • Main veins of the head and neck - Posterior external jugular - Occipital - Superficial temporal - Maxillary - Anterior facial - Common facial - Internal jugular

		- External jugular • Main arteries of the body - Descending aorta - Left common carotid - Left subclavian - Right common carotid - Right subclavian - Pulmonary - Right hepatic - Splenic - Right renal - Superior mesenteric - Right iliac - Inferior mesenteric - Left iliac - Vertebral - Axillary - Brachial - Right ulnar - Left ulnar - Right radial - Left radial - Right deep palmar arch - Left deep palmar arch - Right superficial palmar arch - Left superficial palmar arch - External iliac - Left femoral - Right femoral - Left popliteal - Right popliteal - Left anterior tibial - Right anterior tibial - Plantar arch • Main veins of the body - Inferior vena cava - 4 Pulmonary

		- Right hepatic - Splenic - Right renal - Right iliac - Left iliac - Right axillary - Left axillary - Right brachial - Left brachial - Right basilic - Left basilic - Right cephalic - Left cephalic - Right subclavian - Long saphenous - Left short saphenous - Right short saphenous - Dorsal venous arch - Left femoral - Right femoral - Left popliteal - Right popliteal - Right posterior tibial - Left posterior tibial - Right anterior tibial - Left anterior tibial
	5.3. Describe the structure and explain the function of the heart and the vessels entering and leaving the heart	• Superior vena cava • Aortic arch • Inferior vena cava • Aorta • Right atrium • Right ventricle • Left atrium • Left ventricle • Septum • Pulmonary valve • Pulmonary artery

		• Pulmonary veins • Mitral (bicuspid) valve • Tricuspid valve • Endocardium • Myocardium • Pericardium
	5.4. Explain the pulmonary circulation	• The way in which the blood circulates from the heart to the lungs and back to the heart • Vessels in which the blood is carried • Whether the blood is oxygenated or deoxygenated • Process of gaseous exchange
	5.5. Describe the structure and explain the function of the systemic and coronary circulation	• Systemic circulation - Heart - Body - Aorta - Inferior vena cava - Superior vena cava • Coronary circulation - Heart - Coronary arteries - Coronary veins
	5.6. Explain blood pressure and pulse	• Systolic • Diastolic • Cardiac output • Resistance by the arterioles • Total blood volume • Viscosity of blood • Elasticity of artery walls • Heart rate
	5.7. Explain the conditions of high and low blood pressure	• Causes and effects of hypo and hypertension • Way in which blood pressure is measured • Way in which blood pressure can be affected by massage
	5.8. Explain the diseases and disorders of the circulatory system	• To include the cause and effects of the following: - Anaemia - Varicose veins - Haemophilia

		- Arteriosclerosis - Atherosclerosis - HIV/AIDS - High blood pressure (hypertension) - Low blood pressure (hypotension) - High cholesterol - Hepatitis A,B & C - Coronary thrombosis - Septicaemia - Haemorrhoids - Phlebitis - Thrombus - Leukaemia - Aneurism - Stress

LO6 Know the structure, function and pathology of the lymphatic system	6.1. Describe the structure and explain the function of the lymph	• Formation and composition of lymph and its function to include: - Leucocytes - Lymphocytes - Waste products
	6.2. Describe the structure and explain the function of the lymphatic system	• Lymphatic capillaries • Lymphatic vessels • Lymphatic nodes • Lymphatic ducts • Describe the way in which lymph is moved around the body
	6.3. Describe the structure and position of lymphatic tissue and explain its function	• Spleen • Lymph nodes • Tonsils • Peyer's patches • Appendix
	6.4. Describe the position of the lymph nodes of the body	• Superficial and deep cervical • Submandibular • Thoracic duct • Right lymphatic duct • Axillary • Supratrochlear

		• Inguinal • Popliteal • Superficial and deep cervical • Anterior auricular • Posterior auricular • Occipital
	6.5. Explain the interrelationship between the circulatory/lymphatic systems and the muscular, digestive and immune systems	• Way in which blood becomes tissue fluid • Way in which excess tissue fluid is picked up by the lymphatic capillaries • Route which the lymph takes before it returns to the circulatory system
	6.6. Explain the diseases and disorders of the lymphatic system	• Oedema/water retention • Hodgkin's disease • Lymphoedema

LO7 Know the structure, function and pathology of the neurological system	7.1. Describe the structure and explain the functions of the nervous system	• Neurone • Motor neurone • Sensory neurone • Mixed nerve • Dendrite • Axon • Synapse • Neurilemma • Nodes of Ranvier • White matter • Grey matter • Myelin sheath • End feet/axon terminals • Ganglia • Reflex arc
	7.2. Describe the structure and explain the functions of the Central Nervous System (CNS), the Peripheral and the Autonomic Nervous System (ANS)	• Central nervous system - Brain - Spinal cord • Peripheral nervous system - 31 pairs of spinal nerves - 12 pairs of cranial nerves

		• Autonomic nervous system - Sympathetic - Parasympathetic
	7.3. Explain the effect of stress on the nervous system	• The way in which stress affects the fear, fight, flight syndrome • Effects of stress on the sympathetic and parasympathetic nervous systems • Possible diseases and disorders caused by stress
	7.4. Describe the structure and explain the function of the brain and spinal cord	• Brain - Meninges ▪ Pia mater ▪ Arachnoid mater ▪ Dura mater - Cerebrospinal fluid - Cerebrum - Cerebellum - Pons Varolii - Medulla oblongata - Hypothalamus - Brain stem • Spinal cord - White matter - Grey matter - Meninges ▪ Pia mater ▪ Arachnoid mater ▪ Dura mater - Cerebrospinal fluid
	7.5. Explain how a nerve impulse is created	• Changes in temperature, pressure and chemicals • Potassium and sodium ions
	7.6. Describe the position and explain the function of the spinal and cranial nerves	• 8 cervical • 12 thoracic • 5 lumbar • 5 sacral • 1 coccygeal • 5th, 7th & 11th cranial nerves - Facial

		- Trigeminal - Accessory
	7.7. Describe the olfactory system	• Nose • Olfactory membranes (contain smell-sense cells) • Olfactory plexus
	7.8. Explain the causes and effects of diseases and disorders of the nervous system	• Neuritis • Bell's palsy • Neuralgia • Parkinson's disease • Stress • Myalgic encephalomyelitis (ME) • Cerebral palsy • Multiple sclerosis • Sciatica • Motor neurone disease

LO8 Know the structure, function and pathology of the endocrine system	8.1. Describe the position of the main Endocrine glands and explain the hormones secreted and the hypo and hyper secretion of each	• Pituitary • Posterior lobe - Oxytocin - Antidiuretic hormone (ADH or vasopressin) • Anterior lobe - Prolactin - Human growth hormone (HGH) - Thyroid Stimulating hormone (TSH) - Adrenocorticotropic hormone (ACTH) - Luteinising hormone (LH) - Follicle stimulating hormone (FSH) - Interstitial cell stimulating hormone (ICSH) - Melanin stimulating hormone (MSH) • Thyroid gland - Thyroxin - Triiodothyronine - Calcitonin • Parathyroids - Parathormone • Thymus

		- Secretion of T lymphocytes • Pineal - Releases melatonin • Islets of Langerhans - Insulin - Glucagon - Glycogen • Adrenal medulla - Adrenalin - Noradrenalin • Adrenal cortex - Mineralocorticoids - Glucocorticoids - Sex hormones • Ovaries - Oestrogen - Progesterone • Testes - Testosterone
	8.2. Explain the effects of hormones on the body	• To include knowledge of the effects of specific hormones on the body at puberty, pregnancy, menopause and the menstrual cycle
	8.3. Explain the interrelationship of the endocrine system with other systems	• Nervous system • Circulatory system • Digestive system • Reproductive system • Skin
	8.4. Explain the causes and effects of various endocrine diseases and disorders	• Addison's syndrome • Amenorrhoea • Cushing's syndrome • Pre-menstrual syndrome • Polycystic ovarian syndrome • Stress • Diabetes mellitus • Diabetes insipidus • Endometriosis

LO9 Know the structure, function and pathology of the respiratory system	9.1. Describe the structure of the respiratory system and explain the function of each organ	• Nose • Nasal cavity • Larynx • Pharynx • Trachea • Bronchi • Bronchioles • Alveoli • Lungs • Pleura (visceral, parietal, pleural cavity) • Diaphragm • Intercostals
	9.2. Explain external respiration	• Inhalation and the organs involved • Expiration and the organs involved • Process of diffusion in the alveoli
	9.3. Explain internal respiration	• Exchange of gases between the cells and the circulatory system
	9.4. Explain the chemical control of the respiration	• Position, function and role of the chemo-receptors
	9.5. Explain nervous control of respiration	• Role of the brain, i.e. the pons Varolii and medulla oblongata in the process of respiration
	9.6. Describe the structure and explain the function of the pulmonary circulation	• Structure and function of the heart • Pulmonary artery • Pulmonary vein • Lungs • Pulmonary alveoli • Process of gaseous exchange
	9.7. Explain the interrelationship of the respiratory system with other systems of the body	• Circulatory system • Nervous system • Muscular system
	9.8. Explain the causes and effects of diseases and disorders of the respiratory system	• Bronchitis • Emphysema • Pleurisy • Pneumonia • Tuberculosis • Asthma • Rhinitis

		• Hay fever • Stress • Sinusitis

LO10 Know the structure, function and pathology of the digestive system	10.1. Describe the structure and explain the function of the organs and accessory organs of the digestive system	• Alimentary canal • Salivary glands • Tongue • Teeth • Mouth • Epiglottis • Oesophagus • Stomach • Small intestine (jejunum, ileum, duodenum) • Appendix • Large intestine • Rectum • Anus • Accessory organs • Liver • Gall bladder • Pancreas
	10.2. Explain the function of digestion	• Peristalsis • Ingestion • Digestion • Absorption • Defecation
	10.3. Explain the process by which food stuffs are broken down as they pass through the alimentary canal during the digestive process	• Action of Rennin, hydrochloric acid and pepsin in the stomach • Action of pancreatic juice, i.e. trypsin and trypsinogen, lipase, amylase on peptones, fats and polysaccharides • Action of bile on fat • Action of intestinal juice – maltase, sucrase, lactase on disaccharides
	10.4. Explain the process of absorption of nutrients	• Process of absorption of nutrients by the villi and lacteals contained in the small intestine
	10.5. Describe the structure and explain the function of the digestive system	• Enzyme • Proteins

		• Peptones • Polypeptides • Amino acids • Carbohydrates • Disaccharides • Monosaccharides • Fats • Fatty acids
	10.6. Explain the interrelationship of the digestive system with other systems of the body	• Circulatory • Endocrine • Lymphatic • Muscular • Nervous
	10.7. Explain the causes and symptoms of diseases and disorders of the digestive system	• Appendicitis • Cirrhosis of the liver • Jaundice • Heartburn • Irritable bowel syndrome (IBS) • Ulcer • Hernia • Stress • Anorexia nervosa • Bulimia • Constipation • Gall stones • Diabetes mellitus • Coeliac's disease

LO11 Know the structure, function and pathology of the urinary system	11.1. Describe the structure and explain the function of the organs of the urinary system	• Kidney (cortex and medulla) • Pelvis • Ureter • Bladder • Urethra
	11.2. Explain the process of filtration	• Functions of the Bowman's capsule • Filtration • Re-absorption

		• Secretion/micturition
	11.3. Explain the composition of urine	• 2% urea • 96% water • 2% other substances, e.g. ammonia, sodium, potassium, phosphates, chlorides, sulphates, and excess vitamins • Colour is formed from bilirubin (bile pigment)
	11.4. Explain urine production	• Cold and hot weather • Activity and inactivity • Stress
	11.5. Explain the interrelationship of the urinary system with other body systems	• Circulatory system • Endocrine system • Skeletal system • The skin
	11.6. Explain the causes and effects of the disorders and diseases of the urinary system	• Cystitis • Kidney stones • Nephritis • Diabetes insipidus

LO12 Know the structure, function and pathology of the reproductive system	12.1. Describe the structure and explain the function of the male reproductive system	• Prostate • Testes • Testicular vessels • Penis • Scrotum
	12.2. Describe the structure and explain the function of the female reproductive system	• Uterus • Fallopian tubes • Cervix • Ovary • Vagina • Labia
	12.3. Explain the menstrual cycle	• Three phases - Menstrual - Proliferative - Secretory • Formation of the graafian follicle • Formation of the corpus luteum

	12.4. Describe the structure and explain the function of the breast	• Fatty tissue • Ducts • Nipple • Areola • Lobules
	12.5. Explain the causes and effects of the diseases and disorders of the reproductive system	• Ectopic pregnancy • Amenorrhoea • Dysmenorrhoea • Pre-menstrual syndrome • Polycystic ovarian syndrome • Endometriosis • Mastitis • Stress

Assessment	
MCQ	

Guide to taught content
The content contained within the unit specification is not prescriptive or exhaustive but is intended to provide helpful guidance to teachers and learners with the key areas that will be covered within the unit, and, relating to the kinds of evidence that should be provided for each assessment objective specific to the unit learning outcomes.

Document History

Version	Issue Date	Changes	Role
v1	21/08/2019	First published	Qualifications and Regulation Co-ordinator