ITEC Level 3 Anatomy & Physiology

Unit 30 Skeletal System
Overall Recommended guided learning hours – 100

Learning outcome	Underpinning knowledge
Learners will be able to: 1) Understand and 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
2) Understand and explain the structure of bone tissues	• Compact • Cancellous
3) Understand and explain the types of bone	• Long • Short • Flat • Irregular • Sesamoid ◆ Give examples of where in the body they would be found
4) Understand and explain 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
5) Understand and explain different types of joints	• Fixed • Slightly moveable • Freely moveable • Ball and Socket • Hinge • Pivot • Gliding • Saddle
6) Understand, recognise and give possible causes of postural deformities	• Kyphosis • Lordosis • Scoliosis
Pathology:	
7) Understand, explain and recognise the symptoms, causes and effects of the following diseases and disorders of the skeletal system:	• Arthritis: Osteo and Rheumatoid • Gout • Osteoporosis • Stress

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Unit 31 Muscular System

Learning outcome	**Underpinning knowledge**
8) Understand and explain the structure and function of the different types of muscle with examples	• Voluntary • Involuntary • Cardiac
9) Understand and explain the structure and function of the various attachments of muscles:	• Ligament • Tendon • Fascia
10) Understand and explain the terms in relation to the muscular system	• Origin • Insertion • Action • Tone • Tension • Fatigue • Flexion • Extension • Abduction • Adduction • Rotation • Supination • Pronation • Dorsiflexion • Plantarflexion • Eversion • Inversion• Circumduction
11) Understand and 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
12) Understand and explain the formation of lactic acid	To include: • Cause and effect
13) Understand and explain the position (with the aid of diagrams) and action of the following muscles	◆ **Trunk/torso** • Trapezius • Sternocleido mastoid • 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 • Coraco Brachialis • 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 • Deptrssor Labii Oris • Mentalis • Zygomaticus • Temporalis • Nasalis • Procerous • Corrugator • Frontalis • Occipitalis • Pterygoids • Triangularis • Trapezius • Platysma
Pathology:	
14) Understand and explain the cause and effect of the following muscular conditions:	• Fibromyalgia (Fibrositis) • Cramp • Muscle Fatigue • Atony • Atrophy • Myositis • Rupture • Spasm • Spasticity • Sprain • Strain • Stress

ITEC Level 3 Anatomy & Physiology **Unit 32 The Skin**	
Learning outcome	**Underpinning knowledge**
15) Understand and explain (with the aid of a diagram) the position and function of the following parts 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**
16) Understand and explain the functions of the skin	• Secretion • Heat Regulation • Absorption • Protection • Elimination • Sensation • Vitamin D formation (7-dehydro-cholesterol) • Keratinisation • Melanin Formation
17) Understand, explain and recognise skin types	• Dry • Oily • Dehydrated • Sensitive • Combination
Pathology:	
18) Understand and explain skin diseases and disorders and when they are contraindicated to treatment	◆ Recognition points ◆ Whether congenital, bacterial, viral, fungal or an infestation and whether the condition is contraindicated ◆ **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
19) Understand the different skin cancers and their possible causes	To include: • Basal Cell Carcinoma • Squamous Cell Carcinoma • Malignant Melanoma

ITEC Level 3 Anatomy & Physiology **Unit 33 The Cell**	
Learning outcome	**Underpinning knowledge**
20) Understand and explain (with the aid of a diagram) the structures of the cell and their function	To include: • Cell Membrane • Nuclear Membrane • Nucleus • Nucleolus • Cytoplasm • Centrosome • Golgi Apparatus • Mitochondria • Lysosome • Endoplasmic Reticulum • Ribosome • Centrosome • Centromere • Vacuoles • Centrioles • Chromatids
21) Understand and explain the process of Mitosis	To include: • Prophase • Metaphase • Anaphase • Telophase
22) Understand and explain the term Histology	• Define Histology
23) Understand and explain the structure and function of the main types of tissue in the body	To include the following, giving examples: ◆ **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
24) Understand and explain how substances enter and leave the cell	To include: • Diffusion • Osmosis • Dissolution • Active Transport • Filtration

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Unit 34 Circulatory & Lymphatic Systems

Learning outcome	Underpinning knowledge
CIRCULATORY SYSTEM	
25) Understand and explain the structure and function of blood and its components	To include: • Erythrocytes • Leucocytes • Thrombocytes • Plasma and plasma proteins • Platelets ◆ **Describe the vessels in which it is carried** • Arteries • Arterioles • Veins • Venules • Capillaries
26) Understand and explain the position of the main arteries and veins of the body	To include: ◆ **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
27) Understand and explain the structure and function of the various parts of the heart and of the vessels entering and leaving the heart	To include: • 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
28) Understand and explain the pulmonary circulation	To include: • 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
29) Understand and explain the systemic circulation	• Describe the structure and function of the systemic circulation • Describe the coronary circulation
30) Understand and explain blood pressure and pulse	To include: • Define blood pressure • Factors which produce, maintain and effect blood pressure

31) Understand and explain the conditions of high and low blood pressure	To include: • Causes and effects of hypo and hyper tension • Way in which blood pressure is measured • Way in which blood pressure can be affected by massage
Pathology:	
32) Understand and 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
LYMPHATIC SYSTEM	
33) Understand and explain the structure and functions of the Lymph	Describe the formation and composition of lymph and it's function to include: • Leucocytes • Lymphocytes • Waste products
34) Understand and explain the structure and function of the lymphatic system	To include: • Lymphatic capillaries • Lymphatic vessels • Lymphatic nodes • Lymphatic ducts • Describe the way in which Lymph is moved around the body
35) Understand and explain Lymphatic tissue	Describe the structure function of all lymphatic tissue and the areas in which it can be found in the body: • Spleen • Lymph nodes • Tonsils • Peyer's Patches • Appendix
36) Understand and explain the position of the lymph nodes of the body	To include: • Superficial and deep cervical • Submandibular • Thoracic duct • Right lymphatic duct • Axillary • Supratrochlear • Inguinal • Popliteal • Superficial and deep cervical • Anterior auricular • Posterior auricular • Occipital
37) Understand and explain the interrelationship between the circulatory/ lymphatic systems and the muscular, digestive and immune systems	To include: • 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
Pathology:	
38) Understand and explain the diseases and disorders of the lymphatic system	To include: • Oedema/Water retention • Hodgkin's disease • Lymphoedema

ITEC Level 3 Anatomy & Physiology **Unit 35 Neurological System**	
Learning outcome	**Underpinning knowledge**
Learners will be able to:	
39) Understand and explain the structure and functions of the following parts of the nervous system:	To include: • 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
40) Understand and explain the structure and functions of the Central Nervous System (CNS), the Peripheral and the Autonomic Nervous System (ANS)	To include: ◆ **Central Nervous System** • Brain • Spinal Cord ◆ **Peripheral Nervous System** • 31 pairs of spinal nerves • 12 pairs of cranial nerves ◆ **Autonomic Nervous System** • Sympathetic • Parasympathetic
41) Understand and explain the effect of stress on the nervous system	• Demonstrate the way in which stress affects the fear, fight, flight syndrome • Describe the way in which various parts of the sympathetic and parasympathetic nervous systems can be affected by stress and possible diseases and disorders caused by stress
42) Understand and briefly explain the structure and function of the brain and spinal cord	To include: ◆ **Brain** • Meninges – Pia, Arachnoid and Dura mater • Cerebrospinal Fluid • Cerebrum • Cerebellum • Pons varolii • Medulla Oblongata • Hypothalamus • Brain Stem ◆ **Spinal cord** • White Matter • Grey Matter • Dura, Arachnoid and Pia Mater • Cerebrospinal Fluid
43) Understand and explain how a nerve impulse is created	To include: • Changes in temperature, pressure and chemicals • Potassium and sodium ions
44) Understand and explain the position and function of the spinal and cranial nerves	To include: • 8 cervical • 12 thoracic • 5 lumbar • 5 sacral • 1 coccygeal ◆ **5^{th}, 7^{th} & 11^{th} cranial nerves** • Facial • Trigeminal • Accessory
45) Understand and briefly explain the Olfactory system	To include: • Nose • Olfactory Membranes (contain smell-sense cells) • Olfactory Plexus
Pathology:	
46) Understand and explain the causes and effects of diseases and disorders of the nervous system	To include: • Neuritis • Bells Palsy • Neuralgia • Parkinsons Disease • Stress • Myalgic Encephalomyelitis (ME) • Cerebral Palsy • Multiple Sclerosis • Sciatica • Motor Neurone Disease

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Unit 36 Endocrine System

Learning outcome	**Underpinning knowledge**
Learners will be able to:	
47) Understand and explain (with the aid of a diagram) the position of the main Endocrine glands, hormones secreted and the result of hypo and hyper secretion of each	To include the following: ◆ **Pituitary** *Posterior Lobe* • Oxytocin • Antidiuretic hormone (ADH or vasopressin) *Anterior lobe* • Prolactin • Human growth Hormone (HGH) • Thyroid Stimulating Hormone (TSH) • Adrenocorticotrophin hormone (ACTH) • Luteinising Hormone (LH) • Follicle Stimulating hormone (FSH) • Interstitial cell stimulating hormone (ICH) • 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
48) Understand and 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
49) Understand and explain the interrelationship of the endocrine system with other systems	To include: • Nervous system • Circulatory system • Digestive system • Reproductive system • Skin
Pathology:	
50) Understand and explain the causes and effects of various endocrine diseases and disorders	To include: • Addison's syndrome • Amenorrhoea • Cushings syndrome • Pre-menstrual Syndrome • Polycystic Ovarian Syndrome • Stress • Diabetes Mellitus • Diabetes Insipidus • Endometriosis

ITEC Level 3 Anatomy & Physiology **Unit 37 Respiratory System**	
Learning outcome	**Underpinning knowledge**
Learners will be able to: 51) Understand and explain the structure of the respiratory system and the function of each organ	To include: • Nose • Nasal cavity • Larynx • Pharynx • Trachea • Bronchi • Bronchioles • Alveoli • Lungs • Pleura (visceral, parietal, pleural cavity) • Diaphragm • Intercostals
52) Understand and explain external respiration, i.e. the process and mechanism of breathing	To include: • Inhalation and the organs involved • Expiration and the organs involved • Process of diffusion in the alveoli
53) Understand and explain internal respiration	• Describe the way in which exchange of gases takes place between the cells and the circulatory system
54) Understand and explain the chemical control of the respiration	To include: • Position, function and role of the chemo-receptors
55) Understand and explain nervous control of respiration	To include: • Role of the brain, i.e. the pons varolii and medulla oblongata in the process of respiration
56) Understand and explain the structure and function of the pulmonary circulation	To include: • Structure and function of the heart • Pulmonary artery • Pulmonary vein • Lungs • Pulmonary alveoli • Process of gaseous exchange
57) Understand and explain the interrelationship of the respiratory system with other systems of the body	To include: • Circulatory system • Nervous system • Muscular system
Pathology:	
58) Understand and explain the causes and effects of diseases and disorders of the respiratory system	To include: • Bronchitis • Emphysema • Pleurisy • Pneumonia • Tuberculosis • Asthma • Rhinitis • Hay fever • Stress • Sinusitis

ITEC Level 3 Anatomy & Physiology **Unit 38 Digestive System**	
Learning outcome	**Underpinning knowledge**
Learners will be able to: 59) Understand and explain the structure and function of the organs and accessory organs of the digestive system	To include: • 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
60) Understand and explain the function of digestion	To include: • Peristalsis • Ingestion • Digestion • Absorption • Defecation
61) Understand and explain the process by which food stuffs are broken down as they pass through the alimentary canal during the digestive process	To include: • 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
62) Understand and explain the process of absorption of nutrients	To include: • Process of absorption of nutrients by the villi and lacteals contained in the small intestine
63) Understand and explain the function and where in the digestive system you would find the following:	• Enzyme • Proteins • Peptones • Polypeptides • Amino acids • Carbohydrates • Disaccharides • Monosaccharides • Fats • Fatty acids
64) Understand and explain the interrelationship of the digestive system with other systems of the body	To include: • Circulatory • Endocrine • Lymphatic • Muscular • Nervous
Pathology:	
65) Understand and explain the causes and symptoms of the following diseases and disorders of the Digestive system	To include: • 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

ITEC Level 3 Anatomy & Physiology **Unit 39 Urinary System**	
Learning outcome	**Underpinning knowledge**
Learners will be able to: 66) Understand and explain the structure and function of the organs of the urinary system	To include: • Kidney (cortex and medulla) • Pelvis • Ureter • Bladder • Urethra
67) Understand and explain the process of filtration.	To include: • Functions of the Bowmans capsule • Filtration • Re-absorption • Secretion/ Micturition
68) Understand and 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)
69) Understand and explain urine production	To include: • Cold and hot weather • Activity and inactivity • Stress
70) Understand and explain the interrelationship of the urinary system with other body systems	To include: • Circulatory system • Endocrine system • Skeletal system • The Skin
Pathology:	
71) Understand and explain the causes and effects of the disorders and diseases of the Urinary system	• Cystitis • Kidney stones • Nephritis • Diabetes Insipidus

ITEC Level 3 Anatomy & Physiology **Unit 40 Reproductive System**	
Learning outcome	**Underpinning knowledge**
Learners will be able to: 72) Understand and explain the structure and function of the male and female reproductive systems	To include: • Prostate • Testes • Testicular vessels • Penis • Scrotum • Uterus • Fallopian tubes • Cervix • Ovary • Vagina • Labia
73) Understand and explain the menstrual cycle	To include: ◆ **Three phases** • Menstrual • Proliferative • Secretory • Formation of the Graafian Follicle • Formation of the Corpus Luteum
74) Understand and explain the structure and function of the breast	To include: • Fatty tissue • Ducts • Nipple • Areolar • Lobules
Pathology:	
75) Understand and explain the causes and effects of the diseases and disorders of the Reproductive system	To include: • Ectopic pregnancy • Amenorrhoea • Dysmenorrhoea • Pre-menstrual syndrome • Polycystic ovarian syndrome • Endometriosis • Mastitis • Stress