

Multimedia Appendix 2. Module 1 basic medical training program, quizzes results and duration.

Unit [no.]	Organ system [name]	Khan academy® videos [title]	Anatomy and Physiology, book chapters [title]	Quiz questions [n]	Mean quiz [%]	Duration [week]
1	Cardiovascular	<ul style="list-style-type: none"> - Meet the heart! - Flow through the heart - Two circulations in the body - Lub dub - Layers of the heart - Thermoregulation in the circulatory system - Arteries vs. veins - what's the difference? - Arteries, arterioles, venules, and veins - Circulatory system and the heart 	<ul style="list-style-type: none"> - The Cardiovascular System: The Heart - The Cardiovascular System: Blood Vessels and Circulation 	12 ^a ,12 ^b ,11 ^c	73 ^a ,61 ^b ,51 ^c	2
2	Respiratory	<ul style="list-style-type: none"> - Meet the lungs - People and plants - The bronchial tree - Inhaling and exhaling - How does lung volume change? - Thermoregulation in the lungs - The lungs and pulmonary system 	<ul style="list-style-type: none"> - The Respiratory System - Fluid, Electrolyte, and Acid-Base Balance 	13 ^a ,14 ^b ,12 ^c	71 ^a ,59 ^b ,65 ^c	1
3	Urinary	<ul style="list-style-type: none"> - Meet the kidneys! - Kidney function and anatomy - Glomerular filtration in the nephron - Changing glomerular filtration rate - Countercurrent multiplication in the kidney - Urination - The kidney and nephron - Secondary active transport in the nephron 	<ul style="list-style-type: none"> - The Urinary System 	8 ^a ,8 ^b ,8 ^c	68 ^a ,67 ^b ,54 ^c	1
4	Digestive	<ul style="list-style-type: none"> - Meet the gastrointestinal tract! - Mouth - Teeth - Esophagus - Stomach - Small intestine 1: Structure - Small intestine 2: Digestion - Small intestine 3: Absorption - Liver - Hepatic lobule - Biliary tree - Exocrine pancreas - Endocrine pancreas - Colon, rectum, and anus - Control of the GI tract 	<ul style="list-style-type: none"> - The Digestive System - Metabolism and Nutrition 	13 ^a ,13 ^b ,12 ^c	61 ^a ,49 ^b ,36 ^c	2
5	Hematologic	<ul style="list-style-type: none"> - What's inside of blood? - Red blood cells - Blood types - Blood cell lineages - Life and times of RBCs and platelets - Hemoglobin - Hemoglobin moves O₂ and CO₂ - Fetal hemoglobin and hematocrit - Oxygen content - How do we make blood clots? - Coagulation cascade - Bohr effect vs. Haldane effect 	<ul style="list-style-type: none"> - The Cardiovascular System: Blood 	10 ^a ,36 ^{b+c}	74 ^a ,44 ^{b+c}	1
6	Immune	<ul style="list-style-type: none"> - Role of phagocytes in innate or nonspecific immunity - Types of immune responses: Innate and adaptive, humoral vs. cell-mediated - B lymphocytes (B cells) - Professional antigen presenting cells (APC) and MHC II complexes - Helper T cells - Cytotoxic T cells - Review of B cells, CD4+ T cells and CD8+ T cells - Clonal selection - Self vs. non-self immunity - How white blood cells move around - Inflammatory response - Blood cell lineages 	<ul style="list-style-type: none"> - The Lymphatic and Immune System 	10 ^a ,10 ^{b+c}	78 ^a ,48 ^{b+c}	1
7	Nervous	<ul style="list-style-type: none"> - Introduction to neural cell types - Anatomy of a neuron - Overview of neuron structure - Overview of neuron function - Sodium-potassium pump - Correction to sodium-potassium pump video - Electrotonic and action potentials - Saltatory conduction in neurons - Synapse structure - Neuronal synapses (chemical) 	<ul style="list-style-type: none"> - The Nervous System and Nervous Tissue - Anatomy of the Nervous System - The Somatic Nervous System - The Autonomic Nervous System - The Neurological Exam 	16 ^a ,16 ^b ,16 ^c	57 ^a ,47 ^b ,49 ^c	3

		<ul style="list-style-type: none"> - Types of neurotransmitters - Types of neurotransmitter receptors - Structure of the nervous system About Transcript - Functions of the nervous system - Motor unit - Peripheral somatosensation - Muscle stretch reflex - Autonomic nervous system - Upper motor neurons - Somatosensory tracts - Cerebral cortex 				
8	Muscular	<ul style="list-style-type: none"> - Myosin and actin - How tropomyosin and troponin regulate muscle contraction - Role of the sarcoplasmic reticulum in muscle cells - Anatomy of a skeletal muscle cell - Three types of muscle - Motor neurons - Neuromuscular junction, motor end-plate - Type 1 and type 2 muscle fibers - Calcium puts myosin to work - Muscle innervation - Autonomic vs somatic nervous system - Thermoregulation by muscles 	<ul style="list-style-type: none"> - The Muscular System - Muscle Tissue 	18 ^a ,20 ^b ,19 ^c	69 ^a ,55 ^b ,49 ^c	1
9	Skeletal	<ul style="list-style-type: none"> - Skeletal structure and function - Microscopic structure of bone - the Haversian system - Cellular structure of bone - Skeletal endocrine control - Cartilage - Ligaments, tendons, and joints 	<ul style="list-style-type: none"> - Bone Tissue and the Skeletal System - Joints - The Appendicular Skeleton - Axial Skeleton 	10 ^{a+b+c}	43 ^{a+b+c}	0.5
10	Endocrine	<ul style="list-style-type: none"> - Endocrine gland hormone review - The hypothalamus and pituitary gland - Hormone concentration metabolism and negative feedback - Types of hormones - Cellular mechanism of hormone action 	<ul style="list-style-type: none"> - The Endocrine System 	10 ^a ,10 ^{b+c}	47 ^a ,55 ^{b+c}	0.5
11	Integumentary	<ul style="list-style-type: none"> - Meet the skin! - What is skin? - What lies beneath the epidermis? (Dermis and Hypodermis) - Where do our nails and hair come from? - What's in sweat? (Holocrine, Apocrine, Merocrine Glands) - LeBron Asks: Why does sweating cool you down? - Overview of Sensation and Meissner's Corpuscle - Pacinian's Corpuscle and Merkel's Disk - Ruffini's Ending and Hair Follicle Receptor - Pain and temperature - Thermoregulation by muscles 	<ul style="list-style-type: none"> - The Integumentary System - The Tissue Level of Organization - The Cellular Level of Organization 	10 ^{a+b+c}	36 ^{a+b+c}	1
12	Lymphatic	<ul style="list-style-type: none"> - Why we need a lymphatic system - How lymphatic vessels move fluid - The lymphatic system's role in immunity - Lipid and protein transport in the lymphatic system - What is actually in lymph 	<ul style="list-style-type: none"> - The Lymphatic and Immune System 	10 ^{a+b+c}	57 ^{a+b+c}	1
13	Reproductive	<ul style="list-style-type: none"> - Welcome to the reproductive system - Anatomy of the male reproductive system - Transport of sperm via erection and ejaculation - Spermatogenesis - Testosterone - Basics of egg development - The ovarian cycle - Meet the placenta! - Reproductive cycle graph - Follicular phase - Reproductive cycle graph - Luteal phase - Estrogen - Maternal changes in pregnancy - Labor (parturition) - Breast anatomy and lactation 	<ul style="list-style-type: none"> - The Reproductive System - Development and Inheritance 	10 ^a ,10 ^b	40 ^a ,39 ^b	1

^a Difficulty level easy

^b Difficulty level medium

^c Difficulty level hard

+ Combination of levels