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PHYSIOLOGY CURRICULUM

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COURSE TOPIC:FOUNDATION

S. No	Lecture Topic	Topic Objectives	Mode of Teaching	Assessment Tools
1	Homeostasis 1	- Define Importance of Physiology in modern medicine - Describe the basic life processes and survival needs of the body - Discuss the principle of homeostasis as a central theme of Physiology	• Lectures • Tutorial • Practical performance (To study different parts of a compound microscope)	• Quiz • Class Test • Class Participation • Final Examination
2	Homeostasis 2	- Describe negative and positive feedback systems with examples	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination

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3	Body fluid compartments	- Describe the body fluid compartments - Discuss the composition of body fluid compartments	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
4	Cell membrane	- Define the term cell and explain the cells importance as the basic unit of life - Discuss the composition of cell membrane & the fluid mosaic model of membrane structure - Discuss the functional importance of cell membrane.	• Lectures • Tutorial • Practical (To study the methods of drawing a sample of blood for hematological investigation	• Quiz • Class Test • Class Participation • Final Examination
5	Cell organelle 1	- Describe the structure & functions of different cytoplasmic organelles o Golgi apparatus o Endoplasmic reticulum o Peroxisomes o Lysosomes o Mitochondria o Ribosomes	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination

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6	Cell organelle 2	- Discuss cytoskeleton - Describe the structure of nucleus and its function	• Lectures • Tutorial • Practical (To test the osmotic fragility of red blood cells)	• Quiz • Class Test • Class Participation • Final Examination
7	Membrane transport 1	- Discuss different types of membrane transport - Define and give examples of passive transport - Define osmosis & osmotic pressure - Define the term tonicity & distinguish between isotonic, hypotonic and hypertonic solutions	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
8	Membrane transport 2	- Define and give types of active transport with examples	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
				• Quiz • Class Test

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9	Membrane transport 3	Describe the following processes: - Bulk transport - Phagocytosis - Pinocytosis	• Lectures • Tutorial	• Class Participation • Final Examination

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COURSE TOPIC: Nerve and Muscle

S. No	Lecture Topic	Topic Objectives	Mode of Teaching	Assessment Tools
1	Resting membrane potential	- Discuss the distribution of ions across the plasma - Define membrane potential and resting membrane potential - Discuss how the resting potential is created & maintained across the membrane - Define Nernst potential & memorize Nernst equation - Discuss the importance of resting membrane potential	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
2	Structure of neuron & synapse	- Explain the basic structure and functioning of different parts of neuron - Define synapse - Discuss electrical synapse - Discuss chemical synapse	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination

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3	Graded potential	- Discuss graded potential with examples	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
4	Action potential	- Define action potential and its ionic basis - Discuss the action potential phases - Describe the graph of action potential. - Differentiate b/w graded and action potentials	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final examination
5	Action potential properties & propagation	- Discuss the properties of action potential (all or none principal & refractory period) - Discuss the propagation of action potential in both myelinated & non myelinated nerve fibers	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
6	Structure of skeletal muscle	- Describe muscle tissue and its functions - Describe the organizational levels of skeletal muscle	• Lectures	• Quiz • Class Test • Class Participation

		- Discus the molecular structures of skeletal muscle	• Tutorial	• Final Examination
7	Neuromuscular junction	- Discuss the parts of neuromuscular junction (NMJ) - Discuss the steps of impulse transmission through neuromuscular junction - Explain the physiological basis of disorders of NMJ	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination

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8	Excitation contraction coupling	- Discuss how the excitation leads to muscle contraction in the skeletal muscle - Discuss the structure of sarcoplasmic reticulum and its function - Discuss the function of T- Tubules	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
9	Skeletal muscle contraction	- Discuss the mechanism of skeletal muscle contraction at molecular level - Define power stroke - Discuss the role of ATP in muscle contraction - Discuss how the skeletal muscle is relaxed	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination

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10	Skeletal muscle mechanics	- Define is motor unit and motor unit recruitment - Define the terms simple muscle twitch, summation, tetanization & fatigue - Give the differences B/W isotonic and isometric muscle contraction	• Lectures • Tutorial • Practicals -To record &study simple muscle twitch in frog -To study the effect of repeated stimuli i.e summation & tetanization and production of fatigue in skeletal muscle of frog.	• Quiz • Class Test • Class Participation • Final Examination
11	Energetics of skeletal muscle	- List the sources of energy for muscle contraction - Explain the basis of muscle fatigue - Distinguish between the types of muscle fibers	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination

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12	Smooth muscle	-List the types of smooth muscles with examples - discuss the membrane potential & action potential in smooth muscles - discuss the contractile mechanism & regulation of contraction by calcium ions in smooth muscles - Discuss the nervous and hormonal control of smooth muscle contraction	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
13	Diff. b/w smooth & skeletal muscle	- Discuss the structural and functional differences between skeletal and smooth muscles	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination

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COURSE TOPIC: Blood

S. No	Lecture Topic	Topic Objectives	Mode of Teaching	Assessment Tools
1	Composition of blood	- Describe the components of blood and their functions - Describe the functions of blood	• Lectures • Tutorial • Practical (determination of ESR)	• Quiz • Class Test • Class Participation • Final Examination
2	Erythropoiesis	- Describe the structure and functions of erythrocytes - Draw the flow chart showing the steps of RBCs production - Discuss the sites of erythropoiesis	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination

3	Factors affecting erythropoiesis	- Explain the humoral, maturation & nutritional factors which can affect the production of erythrocytes	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
4	Hemoglobin	- Discuss the formation of hemoglobin - Discuss the functions & fate of hemoglobin - Discuss hemoglobinopathies	• Lectures • Tutorial • Practical performance (estimation of hemoglobin by Sahli's method)	• Quiz • Class Test • Class Participation • Final Examination

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5	Anemia 1	- Define anemia - Classify anemia on the basis of Morphology	• Lectures • Tutorial • PBL	• Quiz • Class Test • Class Participation • Final Examination
6	Anemia 2& Polycythemia	- Classify anemia according to ethology - Define polycythemia and describe its types	• Lectures • Tutorial • PBL	• Quiz • Class Test • Class Participation • Final Examination

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7	Blood groups	- Discuss ABO blood types - Discuss Rh blood types - Discuss hazards of mismatched blood transfusion - Discuss erythroblastosis fetalis	• Lectures • Tutorial • PBL • Practical (to determine the blood group in the human subject)	• Quiz • Class Test • Class Participation • Final Examination
8	Hemostasis 1	- Define hemostasis and enlist the events of hemostasis - List the contents & functions of platelets	• Lectures • Tutorial • PBL	• Quiz • Class Test • Class Participation • Final Examination

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9	Hemostasis 2	- Discuss the mechanism of blood coagulation - Discuss the intrinsic & extrinsic pathways of blood coagulation	• Lectures • Tutorial • Practical (to determine the bleeding & clotting time in human subject)	• Quiz • Class Test • Class Participation • Final Examination
10	Hemostasis 3	- Describe fibrinolytic mechanism - Discuss the factors which prevent clotting in the normal vascular system - Discuss the conditions which causes excessive bleeding in human beings	• Lectures • Tutorial • PBL	• Quiz • Class Test • Class Participation • Final Examination

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11	White blood cells	- LDescribe the types of white blood cells - Describe the process of leukopoeisis - Compare the physical characteristics and functions of white blood cells - Discuss Inflammation	• Lectures • Tutorial • Practical (to determine the differential leucocyte count DLC)	• Quiz • Class Test • Class Participation • Final Examination
12	Immunity	- Define & classify immunity - Discuss Innate immunity - Discuss adaptive immunity and its types - Discuss the types of T lymphocytes and their functions	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
13	Antigen, antibody structure	- Discuss the structure of antigens - Discuss the structure of antibody	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination

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14	Humoral immunity	- Discuss antigen antibody reaction - Discuss the mechanism of action of antibodies - Discuss complement system	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
15	Cell mediated immunity	- Discuss different types of T lymphocytes and their functions - Discuss allergy and hypersensitivity reactions -	• Lectures • Tutorials	• Quiz • Class Test • Class Participation • Final Examination

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COURSE TOPIC: Cardiovascular System

S. No	Lecture Topic	Topic Objectives	Mode of Teaching	Assessment Tools
1	Structure of heart	- Explain the physiology of cardiac muscle - Describe the structural and physiological differences between cardiac, skeletal & smooth muscle - Explain why intercalated discs are important to cardiac muscle function.	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
2	Properties of cardiac muscle	- Describe the physiological properties of cardiac muscle and relate its structure to its function; - Explain why the heart does not fatigue; - .	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination

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3	Cardiac action potential	- Discuss the phases of action potential and relate them to the contractile behavior of the heart; - Discuss plateau phase - Compare the action potential of heart with the action potential of skeletal muscle	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
4	Conduction system of heart	- Describe the heart's electrical conduction system - Explain why the SA node fires spontaneously and rhythmically; - Explain how the SA node excites the myocardium;	• Lectures • Tutorial • Practical (Examination of arterial pulse)	• Quiz • Class Test • Class Participation • Final Examination

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5	Basic Electrocardiography 1	- Draw and label a normal electrocardiogram - Name the waves of the ECG and explain what myocardial events produce each wave. - Explain different intervals and segments of ECG - Explain 12 ECG leads - What is cardiac vector and axis of heart	• Lectures • Tutorial • Practical (To record and study Electrocardiogram in a human subject.)	• Quiz • Class Test • Class Participation • Final Examination
6	Basic Electrocardiography 2	- Define the following abnormalities in ECG o Tachycardia o Bradycardia o Myocardial infarction/ ischemia o Atrial flutter o Atrial fibrillation o Heart blocks	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
7	Cardiac cycle	- Describe in detail one complete cycle of heart contraction and relaxation - Relate the events of the	• Lectures • Tutorial	• Quiz • Class Test • Class Participation

		cardiac cycle to the volume of blood entering and leaving the heart.		• Final Examination
8	Cardiac cycle / Heart sounds	- Discuss the relationship between electrical activity, ventricular pressure, the opening and closing of heart valves and the heart sounds - Explain what causes the sounds of the heartbeat;	• Lectures • Tutorial • Practical (To demonstrate the auscultation of heart sounds using stethoscope)	• Quiz • Class Test • Class Participation • Final Examination
9	Cardiac output	- Define *cardiac output* and explain its importance; - Explain how cardiac output is calculated - Explain the principle behind the Frank–Starling law of the heart.		• Quiz • Class Test • Class Participation • Final Examination

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10	Factors affecting cardiac output	- - Identify the factors that govern cardiac output; - Discuss nervous and chemical factors that alter heart rate, stroke volume, and cardiac output;	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
11	Hemodynamics	- Discuss the physical characteristics of circulation - Discuss the interrelationships of pressure, blood flow and resistance - Discuss vascular distensibility and functions of the arterial and venous systems	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination

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12	Blood pressure & its regulation 1	- Define
		  o Systolic blood pressure
		  o Diastolic blood pressure
		  o Mean arterial blood pressure
		  o Pulse pressure
		- Describe short term regulation of blood pressure
			• Lectures
			• Tutorial
				• Quiz
				• Class Test
				• Class Participation
				• Final Examination

13	Blood pressure & its regulation 2	- Describe the intermediate regulation of blood pressure	• Lectures • Tutorial • Practical (To record blood pressure in a human subject.)	• Quiz • Class Test • Class Participation • Final Examination

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14	Blood pressure & its regulation 3	- Describe the long term regulation of blood pressure - Explain renin Angiotensin Aldosterone system in controlling arterial pressure	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
15	Local control of blood flow	- Discuss the local control of blood flow in response to tissue needs - Discuss the mechanisms of blood flow control - Explain the humoral control of the circulation	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination

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16	Microcirculation	- Explain the structure of microcirculation and capillary system - Explain how vasomotion influences blood flow. - Describe some local, neural, and hormonal influences on vasomotion. - Discuss fluid filtration across capillaries	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination

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17	Shock	- Discuss the physiological causes of shock	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination

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COURSE TOPIC: Respiratory System

S. No	Lecture Topic	Topic Objectives	Mode of Teaching	Assessment Tools
1	Respiratory passageways, alveoli	- Name the structures that make up the respiratory system and list them in correct order - Discuss the functions of each structure - Differentiate between the conducting and respiratory zones of respiratory passages	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
2	Pulmonary ventilation	- Name the muscles of respiration and describe their roles in breathing - Explain how pressure gradients account for the flow of air in and out of the lungs; how these pressure gradients are produced - Explain Boyle's law - Discuss the significance of dead space	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination

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3	Lung volumes and capacities	- Define different lung volumes and capacities with their average values in adult male	• Lectures • Tutorial • Practical (To study pulmonary function test by measuring lung volumes and capacities using spirometer	• Quiz • Class Test • Class Participation • Final Examination
4	Gas exchange	- Define partial pressure Discuss its relationship to a gas mixture such as air - Contrast composition of inspired air and alveolar air - Discuss the partial pressure of Oxygen and Carbon dioxide in the venous blood, arterial blood, and alveolar air and in tissue cells. - Discuss the effect of partial pressure for gas exchange - Discuss the respiratory membrane and factors affecting exchange through this membrane	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination

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5	Transport of gases	- Explain How partial pressure affects gas transport by the blood - Explain 3 ways in which blood transports CO_2 - Discuss how oxygen is transported in the blood	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
6	Oxygen-Hb dissociation curve	- Discuss role of hemoglobin in the transport of oxygen - Explain the information which can be obtained from the oxygen hemoglobin dissociation curve graph - Discuss the factors that can influence release or binding of oxygen to hemoglobin - Discuss Bohr's and Haldane effects	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination

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7	Regulation of respiration 1	- Describe the role of the four main groups of nuclei in the medulla and pons that control breathing - Discuss the factors that can influence rate and depth of breathing	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
8	Regulation of respiration 2	- Describe locations of chemoreceptors that monitor blood pH and gas concentrations - Discuss the role of chemoreceptors in the regulation of respiration	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
9	Respiratory disorders / Hypoxia	- Define and give the causes of following disorders o Emphysema o Bronchitis o Asthma o Pneumonia o Pulmonary edema - Discuss the causes of hypoxia	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination

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COURSE TOPIC: Neuroscience

S. No	Lecture Topic	Topic Objectives	Mode of Teaching	Assessment Tools
1	Electrical properties of neuron	- Discuss the basic organization of nervous system - Explain how stimulation of a neuron causes local electric change in its membrane - Explain how electrical changes generate an action potential in a neuron - Explain how the nerve signal is transmitted down axons	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
2	Synapse	- Define & list the properties of synapse - Explain how electric signals are transmitted from one neuron to another - Explain how the stimulation of a postsynaptic cell is stopped	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination

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3	Receptors	- Describe the general characteristics of receptors - Classify receptors according to location and stimulus type they detect - Discuss receptor potential and transduction of sensory stimuli into nerve impulses	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
4	Sensory pathways 1	- List the different types of sensory pathways - Discuss the transmission of sensory information into CNS (DCML)	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
5	Sensory pathways 2	- Discuss the transmission of sensory information into	• Lectures	• Quiz

		CNS (Anterolateral system)	• Tutorial	• Class Test • Class Participation • Final Examination
6	Types of pain	- Discuss the types of pain and their qualities - Discuss pain receptors and dual pathways for transmission of pain signals into CNS - Discuss referred pain and its mechanism	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
7	Analgesia system	- Discuss the analgesia system in the brain and spinal cord - Explain the brain opiods system	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination

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8	Spinal level of motor control	- Discuss the organization of the spinal cord for motor functions - Discuss the role of muscle spindles & golgi tendon organs in muscle control - Discuss cord reflexes	• Lectures • Tutorial • Practical (To study superficial reflexes in a subject.)	• Quiz • Class Test • Class Participation • Final Examination
9	Descending tracts (pyramidal)	- Describe the pathway of pyramidal efferent tracts in terms of origin, area of decussating, terminations and function	• Lectures • Tutorial • Practical (To study deep reflexes in a subject.)	• Quiz • Class Test • Class Participation • Final Examination

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10	Descending tracts (extra pyramidal)	- Compare pyramidal and extra pyramidal tracts as to origin, termination and function	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
11	Brainstem	- Outline the major functions of o Mid brain o Pons o Medulla oblongata - Discuss the control of motor functions by the brain stem	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination

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12	Cerebellum	- Explain functional anatomy of cerebellum - Explain the input and output connections of cerebellum - Discuss the functions of cerebellum - Discuss the different cerebellar disorders	• Lectures • Tutorial • Practical (To test the cerebellar functions of a human subject.)	• Quiz • Class Test • Class Participation • Final Examination
13	Basal ganglia	- Explain different types of structures that make the basal ganglia - Explain the functions of basal ganglia and its related disorders - Explain the direct and indirect pathways of basal ganglia	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination

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14	Limbic system	- List the components of limbic system - Describe the functions of hypothalamus - Describe the functions of other parts of limbic system	• Lectures • Tutorial • Practical (To measure the human body temperature, oral, & axillary by using mercury thermometer.)	• Quiz • Class Test • Class Participation • Final Examination
15	Autonomic nervous system 1	- Discuss the general organization of ANS and how it is activated - Discuss the physiological anatomy of sympathetic nervous system - Discuss the different functions of sympathetic nervous system	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination

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16	Autonomic nervous system 2	- Discuss the physiological anatomy of parasympathetic nervous system - Discuss the different functions of parasympathetic nervous system - Compare sympathetic and *parasympathetic divisions of the ANS* as to origin of preganglionic fibers, location of ganglia, and neurotransmitter substances.	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
17	Autonomic nervous system 3	- Discuss the functions of adrenal medulla - Discuss the value of adrenal medullae to the function of the sympathetic nervous system	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination

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18	Cerebrospinal fluid	- Explain the Formation and functions of CSF - Explain the circulation and absorption of CSF - Describe CSF pressure and its regulation	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination

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COURSE TOPIC: Special Senses & Endocrinology

S. No	Lecture Topic	Topic Objectives	Mode of Teaching	Assessment Tools
1	Vision 1	- Draw the eye and describe the physiological functions of each part. - Define refraction and explain the refractory structures of eye - Discuss error of refractions and their corrections - Explain accommodation - Discuss fluid system of eye	• Lectures • Tutorial • Practical (To test the visual acuity of a subject.)	• Quiz • Class Test • Class Participation • Final Examination
2	Vision 2	- Discuss the anatomy & function of the structural elements of the retina - Discus the photochemistry of vision - Discuss the neural function of the retina - Explain in detail visual pathway along with its lesions. - Describe formation of image on retina and further processing on visual cortex.	• Lectures • Tutorial • Practicals - To test the color vision of a subject. - Determination of field of vision (Perimetry).	• Quiz • Class Test • Class Participation • Final Examination

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3	Hearing and equilibrium 1	- Explain the physiological anatomy of ear. - Explain the role of ossicles in the process of hearing. - How sound wave is conducted from tympanic membrane to basilar membrane. - Explain auditory pathway in detail - Explain conductive and perceptive deafness	• Lectures • Tutorial • Practical (To perform the test of hearing in a subject.)	• Quiz • Class Test • Class Participation • Final Examination
4	Hearing and equilibrium 2	- Describe how the vestibular apparatus functions to monitor equilibrium	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
5	Sense of taste	- Different types of taste sensations and their perception on tongue	• Lectures • Tutorial • Practical	• Quiz

		- Discuss the location and activation of taste buds - Discuss the factors affecting taste sensation - Explain Gustatory pathway	(To test the sense of taste in a person.)	• Class Test • Class Participation • Final Examination
6	Sense of smell	- Describe the location and activation of the olfactory receptors - Discuss the primary sensations of smell - Discuss the olfactory pathway to brain - Define the terms anosmia, hyposmia & dysosmia	• Lectures • Tutorial • Practical (To check the sense of smell in a person.)	• Quiz • Class Test • Class Participation • Final Examination
7	Classification of hormones	- Discuss what are endocrine hormones - Compare endocrine and exocrine glands - List the major endocrine glands and locate them in the body		• Quiz • Class Test • Class Participation • Final Examination

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		- Classify hormones - How is hormone secreted ,transported and cleared from the blood	• Lectures • Tutorial	
8	Mechanism of action of hormones	- Discuss hormone receptors and their activation - Discuss intercellular signaling after receptor activation Discuss mechanism of actions of different hormones -	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
9	Hypothalamo-hypophyseal system	- Describe the structural and functional relationships of the hypothalamus-pituitary unit - Describe the control, site of action and functions of the adenohypophysis hormones - Describe the relationship between the	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination

		neurohypophysis and the hypothalamus - Describe the effects of hypo and hyper secretions of these hormones		
10	Anterior pituitary hormones	- Enlist the hormones secreted by anterior pituitary - Discuss the synthesis and secretions of these hormones - Discuss the effects of these hormones	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
11	Posterior pituitary hormones	- List the hormones secreted by posterior pituitary - Discuss the synthesis and secretions of these hormones - Discuss the effects of these hormones	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination

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12	Thyroid hormones	- Describe the formation, secretion, function and regulation of thyroid hormones - Discuss disorders of thyroid hormones	• Lectures • Tutorial • PBL	• Quiz • Class Test • Class Participation • Final Examination
13	Pancreatic hormones	- Describe the mode of action of insulin release and its mechanism in target cells - Explain physiological functions of insulin - Explain functions of glucagon, somatostatin and pancreatic polypeptide	• Lectures • Tutorial • PBL	• Quiz • Class Test • Class Participation • Final Examination

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14	Calcium homeostasis	- Name the hormones that regulate the calcium and phosphate homeostasis - Explain functions of parathyroid hormone - Explain functions of vitamin D and calcitonin - Discuss hypocalcemia & hypercalcemia	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
15	Adrenal hormones 1	- Describe the site of formation, function and control of secretion of mineralocorticoids - Describe the site of formation, function and control of secretion of glucocorticoids	• Lectures • Tutorial • PBL	• Quiz • Class Test • Class Participation • Final Examination
16	Adrenal hormones 2	- Discuss Cushing syndrome, Cushing disease and Addison's disease	• Lectures • Tutorial • PBL	• Quiz • Class Test • Class Participation • Final Examination

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COURSE TOPIC: Digestive & Urinary System

S. No	Lecture Topic	Topic Objectives	Mode of Teaching	Assessment Tools
1	Digestive system – Introduction	- Describe the structural and functional organization of the digestive system. - Describe the physiological anatomy and the layers of Gastro Intestinal tract. - Give characteristic features of GIT smooth muscle.	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
2	Regulation of digestive system	- Discuss the neural control of GIT - Enteric Nervous System. - Describe the role of "interstitial cells of Cajal" in generation of basic electrical rhythm (BER) of the GIT and its relation to smooth muscle contractile activity. - Contrast the effects of parasympathetic and sympathetic nervous activity in modulating GI activity. - Discuss the hormonal control of GIT. - Describe the types of GIT reflexes.	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination

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3	Salivation	- Describe the composition and functions of saliva. - List the factors that increase salivary secretion. - Discuss the nervous regulation of salivary secretion.	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
4	Mastication & Swallowing	- Discuss the chewing reflex - Discuss the phases of swallowing - Discuss the swallowing reflex. - Describe how larynx is protected during swallowing. - List the functions of lower esophageal sphincter - Describe the mechanisms that prevent food from entering the nasal cavity and larynx during swallowing	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
5	Stomach & its secretions	- List the functions of stomach - Describe the composition of gastric juice & their functions - Describe the phases of gastric secretory activity - Discuss gastric emptying and its regulation	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination

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6	Small intestine 1	- Describe the types of movement in small intestine. - Explain peristaltic rush and migrating motor complex. - What structures increase the absorptive surface area of the small intestine? - Distinguish between segmentation and the migrating motor complex of the small intestine. - Explain how food in the duodenum inhibits motility and secretion in the stomach	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
7	Small intestine 2	- Describe the glands of small intestine with their secretions and functions. - Name enzymes of the intestinal brush border, and identify the substrate or function of each. - Describe how each type of nutrient is absorbed by the small intestine.	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
8	Liver	- Discuss the composition and functions of Bile and Bile salts? - Explain the process and path of bile formation - List functions of Gall Bladder?	• Lectures • Tutorial	• Quiz • Class Test • Class Participation

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9	Pancreas	- Explain how emptying of gallbladder carried out - Describe composition and function of pancreatic secretion - Discuss the role of pancreatic juice in digestion - Liust the factors which affect the pancreatic secretion - Explain how hormones regulate secretions of the pancreas. - Define phases of pancreatic secretion	• Lectures • Tutorial	• Final Examination • Quiz • Class Test • Class Participation • Final Examination
10	Large intestine, defecation reflex	- Describe the structure and functions of large intestine - Describe the major types of movements in large intestine - Define Defecation - Explain the Defecation reflex. - Discuss the functions of internal and external anal sphincters.	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
11	Gastrointestinal hormones	Discuss in detail the secretion and role of following GIT hormones in digestion of food: - Cholecystokinin - Secretin - GIP	• Lectures • Tutorial	• Quiz • Class Test • Class Participation

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		- Gastrin - Gastrin Releasing Peptide - Pancreatic Polypeptide - Somatostatin - Vasoactive Intestinal Polypeptide - Motilin		• Final Examination • Quiz • Class Test • Class Participation • Final Examination
12	Kidney function & Nephron	- Discuss the functional anatomy of kidney. - Define Nephron and its types. - Sketch the structure of Nephron and describe its parts. - Discuss the functions of kidney	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
13	Glomerular filtration rate (GFR)	- Define GFR and its value - Describe the glomerular filtration membrane and how it excludes blood cells and proteins from the filtrate. - Elaborate the dynamics of Glomerular filtration. - Explain the forces that promote and oppose glomerular filtration. - Calculate net filtration pressure.	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination

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14	Regulation of GFR	- Define Auto-regulation of GFR - Give its significance. - Describe how the nervous system and hormones regulate glomerular filtration	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination
15	Tubular reabsorption	- Discuss the passive and active mechanism of transport for tubular reabsorption - Discuss tubular reabsorption along different parts of the nephron and its regulation - Define tubular load and Tubular transport maximum (Tm). - Discuss the reabsorption of fluid by peritubular capillaries.	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination • Quiz • Class Test • Class

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				Participation
16	Tubular secretion	- Discuss the tubular secretion processes - Discuss secretion in different parts of nephron -	• Lectures • Tutorial	• Final Examination • Quiz • Class Test • Class Participation
17	Renal concentrating, diluting mechanism	- Discuss how osmotic gradient is established - Discuss the role f collecting ducts in the formation of concentrated urine. The Counter Current Mechanism.	• Lectures	• Final Examination
		- Discuss renal mechanisms for excreting diluted urine - Discuss the role of anti diuretic hormone & osmoreceptors	• Tutorial	• Quiz • Class Test • Class Participation • Final Examination
18	Micturition reflex	- Explain how bladder accommodates wide range of urine volume - Describe the neural reflex pathway that regulates emptying of bladder	• Lectures • Tutorial	

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19	Hormones acting on kidney	- Discuss the effect of following hormones on kidney: a. ADH b. Aldosterone c. Angiotensin II d. ANP e. PTH -	• Lectures • Tutorial	• Quiz • Class Test • Class Participation • Final Examination

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