

## COMMECS COLLEGE

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Subject: Zoology (Biology)

Class: XII- Pre Medical

Macro Plan (2024-2025)

Unit No.	Start Date	End Date	Number Of Periods	Chapter	Contents	Objectives By the end of the unit S.W.A.T.:
1	Aug 01 2024	Aug 26 2024	09	Chapter # 01 Homeostasis	<b>1.Homeostasis</b> a) Elements of homeostasis b) feedback mechanism  <b>2.Osmoregulation</b> a) osmoconformers b) osmoregulators c) osmoregulation in fresh water, marine and terrestrial habitat.  <b>3.Excretion</b> a) excretory product in relation to habitat  <b>4.Urinary system of man</b> a) urinary system b) structure of kidney c) structure of nephron d) functions of kidney(urine	<ul style="list-style-type: none"><li>● Describe three elements i.e. receptors, control center and effectors which operate homeostatic mechanisms.</li><li>● Relate the homeostatic mechanisms with the negative and positive feedback systems.</li><li>● Define osmoregulation</li><li>● Differentiate between osmoconformers and osmoregulators</li><li>● Explain the problems faced by osmoregulators.(hypertonic, hypotonic and isotonic condition)</li><li>● Explain the different methods of osmoregulation found in freshwater, marine water and terrestrial habitats.</li><li>● Explain different organs of urinary system. Describe the structure of kidney and relate it with its function.</li></ul>

					<p>formation)</p> <p><b>5. Disorders of urinary tract</b></p> <p>a) urinary tract infections</p> <p>b) kidney stones</p> <p>c) kidney failure</p> <p>d) dialysis</p> <p>e) kidney transplant</p> <p><b>6. Thermoregulation</b></p> <p>a) animal classification on the basis of thermoregulation</p> <p>b) thermoregulation in humans</p>	<ul style="list-style-type: none"> <li>● Explain the detailed structure of nephron.</li> <li>● Explain the processes of glomerular filtration, selective re-absorption and tubular secretion as the events in kidney functioning.</li> <li>● Explain that concentration of urine is regulated by counter-current and hormonal mechanisms.</li> <li>● Justify the functioning of kidneys as both excretion and osmoregulation.</li> <li>● Compare the function of two major capillary beds in kidneys i.e. glomerular capillaries and peritubular capillaries.</li> <li>● List urinary tract infections and the bacteria responsible.</li> <li>● Explain the causes and treatments of kidney stones.</li> <li>● Outline the causes of kidney failure.</li> <li>● Explain in detail the mechanism and problems related to dialysis.</li> <li>● Describe the principles and the problems associated with kidney transplant.</li> <li>● Define thermoregulation and explain its needs.</li> </ul>
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2	Aug 27 2024	Sep 23 2024	11	Chapter # 02 Support and movement	<b>1.Human Skeleton</b> <ol style="list-style-type: none"> <li>a) Structure of bone</li> <li>b) Structure of cartilage</li> <li>c) Division of human skeleton (axial &amp; appendicular)</li> <li>d) Types of joints- fibrous, cartilaginous &amp; synovial joints.</li> </ol> <b>2.Disorders of Skeleton</b> <ol style="list-style-type: none"> <li>a) Common skeletal disorders- spondylosis, sciatica, disc slip &amp; arthritis</li> <li>b) Types of bone fracture</li> <li>c) Repair process of simple fractures</li> </ol>	<ul style="list-style-type: none"> <li>● <b>Explain support, movement and locomotion.</b></li> <li>● <b>Describe the structure of bone and compare it with that of cartilage.</b></li> <li>● <b>Explain the functions of osteoblasts, osteoclasts and osteocytes.</b></li> <li>● <b>Identify the main divisions of human skeleton.</b></li> <li>● <b>List the bones of appendicular and axial skeleton of man.</b></li> <li>● <b>Describe three types of joints i.e. fibrous joints, cartilaginous joints and synovial joints and give example of each.</b></li> </ul>

					<p>d) The injuries in joints</p> <p>3.Muscles</p> <p>a) Smooth muscles</p> <p>b) Cardiac muscles</p> <p>c) Skeletal muscles</p> <p>4.structure of skeletal muscle</p> <p>a) Ultra structure of skeletal muscle fibre</p> <p>b) Sliding filament theory</p> <p>c) Action of antagonistic muscles in movement</p> <p>d) Muscle fatigue</p> <p>e) Difference between tetany &amp; tetanus.</p>	<ul style="list-style-type: none"> <li>● Describe the disorders of human skeleton (disc-slip, spondylosis, sciatica, arthritis) and their causes.</li> <li>● State different types of fractures (simple, compound and complicated) and describe the repair process of simple fractures.</li> <li>● Describe the injuries in joints (dislocation and sprain) and their first aid treatment.</li> <li>● Describe the first-aid treatment for fracture.</li> <li>● Define muscle and its types.</li> <li>● Compare smooth muscles, cardiac muscles and skeletal muscles.</li> <li>● Explain the ultra-structure of the skeletal muscle.</li> <li>● Explain the sliding filaments model of muscle contraction.</li> <li>● Describe the action of antagonistic muscles in the movement of knee joint.</li> <li>● Explain muscle fatigue, cramps and tetany.</li> <li>● Differentiate between tetanus and muscle tetany.</li> </ul>
3	Sep 24 2024	Oct 26 2024	07	Chapter # 05 Animal behaviour	<p>1.The Nature of Behavior</p> <p>a) Relationship between stimuli and behaviour</p>	<ul style="list-style-type: none"> <li>● Define behaviour as the series of activities performed by an organism in response to stimuli.</li> </ul>

				<p>b) <b>Relationship between heredity and behaviour</b></p> <p>c) <b>Biological rhythms</b></p> <p><b>2.Innate Behavior</b></p> <p>a) <b>Taxis</b></p> <p>b) <b>Reflexes</b></p> <p>c) <b>Instincts</b></p> <p><b>3.Learning</b></p> <p>a) <b>Habituation</b></p> <p>b) <b>Imprinting</b></p> <p>c) <b>Classic conditioning</b></p> <p>d) <b>Instrumental conditioning</b></p> <p>e) <b>Latent learning</b></p> <p>f) <b>Insight learning</b></p> <p><b>4.Social Behaviour</b></p> <p>a) <b>Aggregation and animal societies</b></p> <p>b) <b>Hostile and helpful intraspecific interaction</b></p> <p>c) <b>Agonistic behaviour</b></p> <p>d) <b>Territory</b></p> <p>e) <b>Dominance hierarchy</b></p> <p>f) <b>Altruism</b></p>	<ul style="list-style-type: none"> <li>● <b>Explain relationship between stimuli and behaviour.</b></li> <li>● <b>Describe the relationship between heredity and behaviour.</b></li> <li>● <b>Explain, through examples, the biological rhythms.</b></li> <li>● <b>Define innate (inborn) behaviour.</b></li> <li>● <b>Describe examples of innate behaviour in terms of taxis shown by unicellular organisms.</b></li> <li>● <b>Justify reflexes as a type of innate behavior, by giving examples from man and invertebrates.</b></li> <li>● <b>Define instincts and justify these as a type of innate behaviour</b></li> <li>● <b>Justify the fact that each species displays its own characteristic instinctive behaviour through following examples; migration of salmon, dances of bees, construction of hanging nest by birds, construction of intricate web by spider and mating behaviour of stickleback fish.</b></li> <li>● <b>Define learning and distinguish between learning and innate behaviour.</b></li> <li>● <b>Define habituation and illustrate it through the example of squirrels' adjustment in a park.</b></li> </ul>
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					<ul style="list-style-type: none"><li>● <b>Explain imprinting by narrating the work of Lorenz.</b></li><li>● <b>Differentiate habituation and imprinting as reversible and irreversible learned behaviours.</b></li><li>● <b>Describe classical conditioning by narrating the work of Pavlov on salivary reflex in dogs.</b></li><li>● <b>Describe instrumental conditioning (trial-and-error learning) by narrating the work of Skinner on rats' learning.</b></li><li>● <b>Describe latent learning, through the example of a rat in a maze with no reward.</b></li><li>● <b>Interpret Kohler's work on chimpanzee's insight learning to justify that reasoning and planning are involved in the insight learning.</b></li><li>● <b>Differentiate between animal aggregations and animal societies.</b></li><li>● <b>Describe social behaviour in terms of hostile and helpful interactions between animals belonging to the same species.</b></li><li>● <b>Describe agonistic behaviour and relate it with the maintenance of social order in</b></li></ul>
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						<ul style="list-style-type: none"> <li>• terms of territories and dominance hierarchies.</li> <li>• Explain territorial behaviour by quoting example of the territories of monkeys and gorillas.</li> <li>• Explain dominance hierarchy by quoting example of the pecking order of chicken.</li> <li>• Define altruism and illustrate it through the organization of a honeybee society.</li> </ul>
	Oct 21 2023		01	Revision		
	Oct 23 2023	Nov 3 2023		First term examination		
				Paper discussion		
		Total	28	Classes Conducted : bot + zoo : 28 + 27= 55		40.14%
4	Oct 28 2024	Nov 30 2024	13	Chapter # 03 Nervous Coordination	1.Nervous coordination a) Steps involved in Nervous coordination b) Receptors as Transducers c) Effectors	<ul style="list-style-type: none"> <li>• Recognize receptors as transducers sensitive to various stimuli.</li> <li>• Trace the path of a message transmitted to the CNS for processing.</li> </ul>

				<p><b>d) The path of a message transmitted to CNS</b></p> <p><b>2.Neuron structure and types</b></p> <p><b>3.Nerve impulse</b></p> <p><b>4. Transmission of action potential between cells</b></p> <p><b>5.Classification of neurotransmitters</b></p> <p><b>6.Basic organization of human nervous system</b></p> <p><b>7.Central nervous system</b></p> <p>a) Brain b) Spinal cord c) Cranial and spinal nerves in man</p> <p><b>8.peripheral nervous system</b></p> <p>a) Somatic and autonomic nervous system</p>	<ul style="list-style-type: none"> <li>● <b>Identify the three neurons (sensory, intermediate, motor) involved in nervous transmission.</b></li> <li>● <b>Identify muscles and glands as the effectors</b></li> <li>● <b>Describe the detailed structure of a sensory neuron, associative and a motor neuron and relate the specialization in structures with functions.</b></li> <li>● <b>Differentiate between myelinated and non-myelinated neurons.</b></li> <li>● <b>Explain the process of reflex action and the function of the different types of neurons with the help of a reflex arc</b></li> <li>● <b>Define nerve impulse.</b></li> <li>● <b>Describe the generation and transmission of nerve impulse.</b></li> <li>● <b>Name the factors responsible for the resting membrane potential of neuron.</b></li> <li>● <b>Evaluate from a graph the phenomena of polarization, depolarization and hyperpolarisation of membrane.</b></li> <li>● <b>Compare the velocities of nerve impulse in the axon membrane and in the synaptic cleft.</b></li> <li>● <b>Describe the role of local circuits in propagation of nerve impulse node to</b></li> </ul>
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				<p><b>b) Sympathetic and parasympathetic nervous system</b></p> <p><b>9.Sensory receptors and their working</b></p> <p>a) Smell (olfactory) receptors</p> <p>b) Taste (gustatory) receptors</p> <p>c) Human skin (mechanoreceptors)</p> <p><b>10.Effects of drugs on nervous coordination</b></p> <p>a) Narcotic drugs</p> <p>b) Drug addiction and drug tolerance</p> <p><b>11.Disorders of nervous system</b></p> <p>a) Vascular disorders of CNS</p> <p>b) Infectious disorders of CNS</p> <p>c) Structural disorders of CNS</p> <p>d) Functional disorders of CNS</p> <p>e) Degenerative disorders of CNS</p>	<p><b>node (saltatory conduction) of nerve impulse</b></p> <ul style="list-style-type: none"> <li>● Describe the structure of synapse.</li> <li>● Explain synaptic transmission of nerve impulse.</li> <li>● Classify neurotransmitters as inhibitory and excitatory and list some common examples</li> <li>● Identify the main components of the nervous system.</li> <li>● Explain briefly the functions of major divisions of brain.</li> <li>● Describe the architecture of human brain and compare its sectional view with that of the spinal cord.</li> <li>● Describe cranial and spinal nerves in man.</li> <li>● Explain the structure, types and functions of autonomic nervous system.</li> <li>● Explain the structure and functioning of the receptors for smell, taste and touch/ pain.</li> <li>● Define narcotic drugs as agents that interact with the normal nervous activity.</li> <li>● Compare the use and abuse of drugs with respect to heroine, Cannabis, nicotine, alcohol and inhalants like nail polish remover and glue.</li> </ul>
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					<p><b>12.Diagnostic tests for nervous disorders</b></p>	<ul style="list-style-type: none"> <li>● Define and explain the terms; drug addiction and drug tolerance with reference to caffeine and nicotine</li> <li>● Classify nervous disorders into vascular, infectious, structural, functional and degenerative disorders.</li> <li>● Describe the causes, symptoms and treatment one type of each category of disorders outlined above. (e.g., stroke as vascular, meningitis as infectious, brain tumor as structural, headache as functional, and Alzheimer disease as degenerative disorder).</li> <li>● Explain the principles of the important diagnostic tests for nervous disorders i.e. EEG, CT scan and MRI.</li> </ul>
5	Dec 02 2024	Dec 20 2024	06	Chap # 04 Chemical Coordination	<p><b>1. Chemical coordination</b></p> <p>a) chemical nature of hormone</p> <p>b) mode of hormone action</p> <p><b>2.Endocrine system of Man</b></p> <p>a) hypothalamus</p> <p>b) pituitary gland</p> <p>c) thyroid gland</p> <p>d) parathyroid gland</p>	<ul style="list-style-type: none"> <li>● State the role of hormones as chemical messengers.</li> <li>● Describe the chemical nature of hormones and correlate it with important hormones.</li> <li>● Trace the path of the chemical message from its release from the endocrine gland to its action at the target site.</li> <li>● Explain the two modes of hormone action at the cells of target site.</li> <li>● Locate the following endocrine glands in human body; pituitary, thyroid,</li> </ul>

					e) pancreas f) adrenal glandgonads g) other endocrine tissues  <b>3.Feedback Mechanism</b>	parathyroid, thymus, pancreas, adrenal, gonads.  <ul style="list-style-type: none"> <li>● Name the hormonal secretions of the above-mentioned glands.</li> <li>● Outline the major functions of the hormones of above mentioned glands and also relate the problems associated with the imbalance of these hormones</li> <li>● Explain the neurosecretory role of hypothalamus.</li> <li>● Outline the concept of Feedback mechanism of hormones.</li> <li>● Describe positive feedback with reference to Oxytocin and negative feedback with reference to Insulin and Glucagon</li> </ul>
						<ul style="list-style-type: none"> <li>●</li> </ul>

	Jan 06 2025	Jan 17 2025		<b>Second term examination</b>
	Jan 13 2025	Jan 17 2025	01	Revision

		<b>Total</b>	<b>20</b>	<b>Classes Conducted of both the subjects (zoo + bot)20+20=40</b> <b>55+40=95</b> <b>69.34%</b>
	<b>Dec232</b> <b>2024</b>	<b>Dec 31</b> <b>2024</b>		<b>Winter vacations</b>

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6	Jan 20 2025	Feb 14 2025	08	Chapter # 6 Reproduction	<p><b>1.Human Reproductive system</b></p> <p><b>2.Male reproductive system</b></p> <p><b>3.Hormonal regulation in males</b></p> <p><b>4.Female reproductive system</b></p> <p><b>5.The ovarian cycle</b></p> <p>a) Oogenesis</p> <p>b) Menstrual cycle</p> <p>c) Fertilization and pregnancy</p> <p>d) Estrogen and progesterone</p> <p><b>6.Disorders of Reproductive System</b></p> <p>a) Causes of male infertility</p> <p>b) Causes of female infertility</p> <p>c) Invitro fertilization (IVF)</p> <p>d) Miscarriage</p>	<ul style="list-style-type: none"> <li>● Describe the structures of male reproductive system identifying their functions.</li> <li>● Explain the principal reproductive hormones of human male and explain their role in the maintenance and functioning of reproductive system.</li> <li>● Explain the structures of female reproductive system and describe their functions.</li> <li>● Describe the menstrual cycle emphasizing the role of hormones</li> <li>● Describe the causes of female and male infertility.</li> <li>● Explain that in-vitro fertilization (test tube babies) is one of the methods to solve the problem of infertility.</li> <li>● Define miscarriage and state its causes.</li> <li>● Relate miscarriage with abortion.</li> <li>● Describe the causes, symptoms and treatment of gonorrhoea and syphilis.</li> <li>● Explain AIDS as a worldwide sexually transmitted disease</li> </ul>
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					<b>8.Sexually Transmitted Diseases</b>  a) Gonorrhea  b) Syphilis  c) AIDS	
7	Feb 17 2025	Mar 10 2025	09	Chapter # 07 Development and Aging	<b>1.Human Embryonic Development</b> a) Fertilization and its site b) Cleavage and its types c) Morula and blastula d) Gastrulation e) Neurulation f) Neural crest and neural crest cells  <b>2.Control of Development</b>  a) Role of nucleus in development b) Role of cytoplasm in development c) Embryonic induction d) Organizers	<ul style="list-style-type: none"> <li>● Explain the process and site of fertilization.</li> <li>● Describe cleavage and relate it with amount of yolk.</li> <li>● Explain blastula/blastocyst with emphasis on segmentation cavity.</li> <li>● Explain the events of gastrulation.</li> <li>● List the tissues and organs formed from the three germ layers.</li> <li>● State the events of neurulation.</li> <li>● Describe the formation of neural crest and list the structures that are derived from neural crest cells.</li> <li>● Define organogenesis.</li> <li>● Through experimental narration, describe the role of the nucleus and cytoplasm in controlling development.</li> <li>● Give a brief overview of the work done by Hans Spemann in the discovery of induction.</li> </ul>

				<p><b>3.Pregnancy</b></p> <p>a) Human development in trimesters</p> <p>b) Twins and quadruplets</p> <p>c) Placenta and umbilical cord</p> <p><b>4.Disorders during Embryonic development</b></p> <p>a) The Maternal derived abnormalities</p> <p>b) Genetic abnormalities &amp; spontaneous Abortion</p> <p>c) Foetal surgery</p> <p><b>5.Aging</b></p> <p>a) Aging as part of normal development</p> <p>b) Genetic factors of aging</p> <p>c) Extrinsic factors of aging</p> <p>d) Primary factors of aging</p> <p>e) Secondary factors of aging</p>	<ul style="list-style-type: none"> <li>● Define organizers and differentiate between primary and secondary induction</li> <li>● Describe the events of development in human in terms of first, second and third trimesters.</li> <li>● Describe in brief the development of twins and quadruplets.</li> <li>● Describe the structural details of placenta and umbilical cord.</li> <li>● Differentiate the terms gestation and pregnancy.</li> <li>● Describe the maternal derived abnormalities (rubella, abnormal neural tube, thyroid gland and limb development).</li> <li>● Relate the major genetic abnormalities in embryos with spontaneous abortion.</li> <li>● Describe how fetal surgery helps to correct the detected fetal developmental problems.</li> <li>● Define the term aging. Rationalize aging as a part of normal development.</li> <li>● List the genetic and extrinsic factors responsible for aging.</li> <li>● State the changes (graying, thinning hair, pigmented patches of skin, slowed movements, fading vision, impaired hearing, reduced ability to adapt to stress</li> </ul>
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						<p>and decreased resistance to infections) as primary aging.</p> <ul style="list-style-type: none"> <li>• State the changes that are the result of environmental, lifestyle factors such as disease, disuse (lack of exercise), and abuse (smoking, obesity, malnutrition, and exposure to ultra-violet light) as secondary aging.</li> <li>• List some changes that occur at the system and those that occur at cellular level during aging.</li> </ul>
	<b>Mar13 2025</b>	<b>April 04 2025</b>	<b>04</b>	<b>Revision</b>		
	<b>April 07 2025</b>	<b>April 18 2025</b>		<b>Preliminary Examination</b>		
		<b>Total</b>	<b>21</b>	<b>Class conducted :(Zoo + Bot) 21+21=42</b>		
				<b>95 + 42 =137</b>		
				<b>100%</b>		

**Prepared by: Biology department**