

LEARNING OBJECTIVES: To enable the students to

- Understand the various aspects of physiological systems and their functioning in animals.
- Instill the concept of hormonal regulation of physiology, metabolism and reproduction in animals.
- Gain insight on the disorders associated with the deficiency of hormones
- Gain insightful knowledge on the structure and classification of carbohydrates, proteins, lipids and enzymes
- Demonstrate an understanding of fundamental biochemical principles such as the function of biomolecules, metabolic pathways and the regulation of biochemical processes.
- Gain comprehensive knowledge on the concepts of vertebrate embryonic development.

COURSE OUTCOMES: By the end of the course, students will be able to

- CO1** Understand the functions of important animal physiological systems including digestion, cardio-respiratory and renal systems.
- CO2** Gain insight into the muscular system and the neuro-endocrine regulation of animal growth, development and metabolism with a special knowledge of hormonal control of human reproduction.
- CO3** Describe the structure, classification and chemistry of biomolecules and enzymes responsible for sustenance of life in living organisms
- CO4** Develop broad understanding of the basic metabolic activities pertaining to the catabolism and anabolism of various biomolecules
- CO5** Describe the key events in early embryonic development starting from the formation of gametes up to gastrulation and formation of primary germ layers.

UNIT I ANIMAL PHYSIOLOGY - I

- 1.1 Process of digestion and assimilation
- 1.2 Respiration - Pulmonary ventilation, transport of oxygen and CO₂ (Note: Need not study cellular respiration here)
- 1.3 Circulation-Structure and functioning of heart, Cardiac cycle
- 1.4 Excretion - Structure and functions of kidney urine formation, counter current Mechanism

UNIT II ANIMAL PHYSIOLOGY-II

- 2.1 Nerve impulse transmission –Resting membrane potential, origin and propagation of action potentials along myelinated and non-myelinated nerve fibers, Synaptic transmission.
- 2.2 Muscle contraction - Ultra structure of skeletal muscle, molecular and chemical basis of muscle contraction.
- 2.3 Endocrine glands - Structure, functions of hormones of pituitary, thyroid, parathyroid, adrenal glands and pancreas
- 2.4 Hormonal control of reproduction in a mammal

UNIT III CELLULAR METABOLISM-I (BIOMOLECULES)

- 3.1 Carbohydrates-Classification of carbohydrates. Structure of glucose
- 3.2 Proteins-Classification of proteins. General properties of amino acids
- 3.3 Lipids-Classification of lipids
- 3.4 Enzymes: Classification and Mechanism of Action

UNIT IV CELLULAR METABOLISM –II

4.1 Carbohydrate Metabolism - Glycolysis, Krebs cycle, Electron Transport Chain, Glycogen metabolism, Gluconeogenesis

4.2 Lipid Metabolism – β -oxidation of palmitic acid

4.3 Protein metabolism-Transamination, Deamination and Urea Cycle

UNIT-V EMBRYOLOGY

5.1 Gametogenesis

5.2 Fertilization

5.3 Types of eggs

5.4 Types of cleavages

5.5 Development of Frog upto formation of primary germ layers

CO-CURRICULAR ACTIVITIES (SUGGESTED):

- Chart on cardiac cycle, human lung, kidney / nephron structure etc.
- Working model of human/any mammalian heart.
- Chart of sarcomere /location of endocrine glands in human body
- Chart affixing of photos of people suffering from hormonal disorders
- Student study projects such as identification of incidence of hormonal disorders in the local primary health centre, studying the reasons there of and measures to curb or any other as the lecturer feels good in nurturing health awareness among students
- Chart structures of biomolecules / types of amino acids (essential and non-essential) Chart preparation by students on Glycolysis / kreb "cycle / urea cycle etc.
- Model of electron transport chain
- Preparation of models of different types of eggs in animals
- Chart on frog embryonic development, fate map of frog blastula, cleavage etc.

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7. Developmental Biology by Balinsky
8. Developmental Biology by Gerard Karp
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