

**Course III: Animal Physiology & Endocrinology (MSZO -503)****Course objectives:**

The course objectives include (1) to provide an understanding of the fundamental principles of animal physiology; (2) to understand how these principles are incorporated into the adaptations of different animal groups; (3) to provide experience in researching, discussing, and answering questions about animal physiology; (4) to provide practical experience in investigating physiological questions, and collecting, analyzing, interpreting, and reporting experimental data; and (5) to understand the source, significance and deficiency and dysfunctions of enzymes, vitamins, protein, carbohydrates and lipids.

**Syllabus:**

Concept of poikilothermy, homeothermy, cold resistance and cold death, heat resistance and heat death. Respiration: Respiratory organs in different animals Transport of O<sub>2</sub> and CO<sub>2</sub>, respiratory pigments and control of respiratory activity. Circulation: Types of heart, Cardiac cycle, haemodynamics and Homeostasis. Nutrition & Digestion: Patterns of digestion, absorption and role of digestive enzymes in animals. Excretion: Functions of kidney, types of nitrogenous wastes, Urea production and osmoregulation in reptiles, Aves and mammals. Nervous system: Structure of a neuron, Generation of nerve impulsion and propagation and Concept of sensory receptors. Muscle stimulation: Structure, kinds, functions and characteristics of muscles. Brief history and scope of endocrinology, Characteristic feature, structural organization, hormone secretion and functions of Pituitary gland, Thyroid gland, Adrenal gland, Pancreas, mammalian testes and ovary hormones. General study of pheromones.

**Unit Schedule****Block I. Response to Cell & Functional Physiology**

**Unit 1:** Thermoregulation and Respiration

**Unit 2:** Circulation and Cardiovascular System

**Unit 3:** Physiology of Digestion and Excretion

**Unit 4:** Physiology of Nervous system and Muscle stimulation

**Block II: Endocrinology**

**Unit 5:** History and Scope of Endocrinology

**Unit 6:** Pituitary and Thyroid Gland

**Unit 7:** Pancreas and Adrenal Gland

**Unit 8:** Vertebrate Reproductive Endocrinology

**Course III: Animal Physiology & Endocrinology (MSCZO -503)**  
**UNIT WISE CONTENTS (MSCZO-503)**

**Block I. Response to Cell & Functional Physiology**

**Unit 1: Thermoregulation and Respiration**

- 1.1 Objectives
- 1.2 Introduction
- 1.3 Concept of Poikilothermy and Homeothermy
- 1.4 Survival Mechanism in Poikilotherms and Homeotherms
- 1.5 Cold Resistance and Cold Death, Heat Resistance and Heat Death
- 1.6 Respiratory Organs in Different Animals
- 1.7 Transport of Oxygen and Carbon dioxide
- 1.8 Respiratory Pigments
- 1.9 Summary
- 1.10 Terminal Questions and Answers

**Unit 2: Circulation and Cardiovascular System**

- 2.1 Objectives
- 2.2 Introduction
- 2.3 Types of heart
  - 2.3.1 Concepts of Neurogenic and Myogenic Hearts
- 2.4 Cardiac cycle, ECG patterns in Mammals
- 2.5 Homeostasis and Blood Clot Formation
- 2.6 Summary
- 2.7 Terminal Questions and Answers

**Unit 3: Physiology of Digestion and Excretion**

- 3.1 Objectives
- 3.2 Introduction
- 3.3 Patterns of Digestion and Absorption in Animals
- 3.4 Role of Digestive Enzymes
- 3.5 Digestion, Absorption and Assimilation of Various Food Stuffs
- 3.6 Functions of Kidney
- 3.7 Types of Nitrogenous Wastes in Different Animal Groups and their Excretion
- 3.8 Urea production – Hans *Krebs* and Kurt *Henseleit* cycle, Urine Formation
- 3.9 Osmoregulation
  - 3.9.1 Reptiles, Aves & Mammals
- 3.10 Summary
- 3.11 Terminal Questions and Answers

**Unit 4: Physiology of Nervous system and Muscle stimulation**

- 4.1 Objectives
- 4.2 Introduction
- 4.3 Structure of a Neuron
- 4.4 Generation of Nerve Impulsion and Propagation
- 4.5 Synaptic Transmission and Neurotransmitters

- 4.6 Concept of Sensory Receptors (Chemo and Photo)
- 4.7 Structure, Kinds and Characteristics of Muscles
- 4.8 Mechanism of Muscle Stimulation and Contraction
- 4.9 Neuro - Muscular Junction
- 4.7 Summary
- 4.8 Terminal Questions and Answers

## **Block II: Endocrinology**

### **Unit 5: History and Scope of Endocrinology**

- 5.1 Objectives
- 5.2 Introduction
- 5.3 Brief history and Scope of Endocrinology
- 5.4 Classification and Chemical Nature of Hormones
- 5.5 Summary
- 5.6 Terminal Questions and Answers

### **Unit6: Pituitary and Thyroid Glands**

- 6.1 Objectives
- 6.2 Introduction
- 6.3 Structural organization
- 6.4 Hormone secretion and its functions - Hypothalamic control
- 6.5 Thyroid Gland - Structural Organizations
- 6.6 Parathyroid its Structure and Functions
- 6.7 Summary
- 6.8 Terminal Questions and Answers

### **Unit 7: Pancreas and Adrenal Glands**

- 7.1 Objectives
- 7.2 Introduction
- 7.3 Structure of pancreas
  - 7.3.1 Pancreatic hormones and their functions
  - 7.3.2 Dysfunction and disease of pancreatic hormones
- 7.4 Structural Organizations of Adrenals
- 7.5 Functions of Cortical and Medullary Hormones
- 7.6 Summary
- 7.7 Terminal Questions and Answers

### **Unit 8: Vertebrate Reproductive Endocrinology**

- 8.1 Objectives
- 8.2 Introduction
- 8.3 Structure of Mammalian Testes and Ovary
- 8.4 Male and Female Sex Accessory Organs
- 8.5 Hormones of Testes and Ovary – Estrous and Menstrual Cycle
- 8.6 Hormones of Pregnancy - Parturition
- 8.7 Hormonal Control of Lactation
- 8.8 Pheromones
- 8.8 Summary
- 8.9 Terminal Questions and Answers