

Course I: Fish and Fisheries (Structure and Functions) (MSZO -606)

UNIT WISE CONTENTS (MSZO -606)

Block I (External Morphology)

Unit 1: Classification and evolutionary trend

- 1.1 Objectives
- 1.2 Introduction
- 1.3 Classification of fishes up to order level
- 1.4 Habit and habitat
- 1.5 Distribution pattern
- 1.6 Summary
- 1.7 Terminal Questions and Answers

Unit 2: Integument and Exoskeleton

- 2.1 Objectives
- 2.2 Introduction
- 2.3 Dermis and Epidermis
- 2.4 Different Scales & their Modification
- 2.5 Uses of Scales
- 2.6 Chromatophores
- 2.7 Significance of Chromatophores
- 2.8 Summary
- 2.9 Terminal Questions and Answers

Unit 3: Fins and Swim bladder

- 3.1 Objectives
- 3.2 Introduction
- 3.3 Origin and evolution of fins
 - 3.3.1 Types of fins
 - 3.3.2 Structure
 - 3.3.3 Modifications and functions of fins
- 3.4 Swim bladder species
- 3.5 Composition of swim bladder gas, its secretion and maintenance
- 3.6 Structure and functions of swim bladder
- 3.7 Summary
- 3.8 Terminal Questions and Answers

Unit 4: Locomotion

- 4.1 Objectives
- 4.2 Introduction
- 4.3 Locomotion by body movements
- 4.4 Locomotion by fins and Tail
- 4.5 Forces acting on the body for locomotion
- 4.6 Types of locomotion
- 4.7 Summary
- 4.8 Terminal Questions and Answers

Block II (Physiology)

Unit 5: Digestive System

- 5.1 Objectives
- 5.2 Introduction
- 5.3 Food resource
 - 5.3.1 Supplementary food and artificial food
- 5.4 Feeding habits and nutrient requirement for various stages

- 5.5 Feeding behavior and adaptations of feeding
- 5.6 Alimentary canal and its modification in relation of food and feeding habits
- 5.7 Digestion and absorption
- 5.8 General characteristics, food and feeding habits of fresh water fishes
- 5.9 Summary
- 5.10 Terminal Questions and Answers

Unit 6: Circulatory system

- 6.1 Objectives
- 6.2 Summary
- 6.3 Blood vascular system: Structure of the heart
- 6.4 Principal blood vessels and circulation of blood (Elasmobranchs, Teleost and Dipnoi)
- 6.5 Hemodynamics
- 6.6 Cardiac output
- 6.7 Circulation time
- 6.8 Fish haemoglobin
- 6.9 Summary
- 6.10 Terminal Questions and Answers

Unit 7: Respiratory system

- 7.1 Objectives
- 7.2 Introduction
- 7.3 Gills and aquatic respiration
- 7.4 Organization of gills
- 7.5 Mechanisms of respiration
- 7.6 Structure of a typical Teleostean gill
 - 7.6.1 Physiology of gill respiration
 - 7.6.2 Gill ventilation
- 7.7 Gill surface area
- 7.8 Counter current principle
- 7.9 Water flow across the gills
- 7.10 Gas exchange
- 7.11 Air-breathing fishes: causative factors and structural adaptations
 - 7.11.1 Accessory respiratory organs and respiratory epithelium
- 7.12 Summary
- 7.13 Terminal Questions and Answers

Unit 8: Excretory System and Osmoregulation

- 8.1 Objectives
- 8.2 Structure and functions of the kidney, nitrogenous waste and excretion
- 8.3 Glomerular and aglomerular kidneys
- 8.4 Excretion of nitrogenous wastes, water and ion balance
- 8.5 Urea cycle
- 8.6 Osmoregulation in Fish
- 8.7 Stenohaline teleosts
- 8.8 Euryhaline teleosts
- 8.9 Migratory teleosts
- 8.10 Water and electrolyte regulation in marine, freshwater and euryhaline fishes
- 8.11 Summary
- 8.12 Terminal Questions and Answers

Unit 9: Nervous and Sensory system

- 9.1 Objectives
- 9.2 Introduction
- 9.3 Structure and functions of the brain and cranial nerves
- 9.4 Receptors
- 9.5 Anatomy and function of the Mauthner neurons
- 9.6 Structure and functions of the sense organs: eye, visual pigments and vision
- 9.7 Chemoreceptors: Olfactory, gustatory and electroreceptors
- 9.8 Biological significance of chemoreception

- 9.9 Acoustico-lateralis system
- 9.9.1 Labyrinth
- 9.9.2 Lateral line organs
- 9.10 Summary
- 9.11 Terminal Questions and Answers

Unit 10: Endocrine System

- 10.1 Objectives
- 10.2 Introduction
- 10.3 Hypothalamo-hypophyseal system
- 10.4 Neurosecretory system and neuro-hypophyseal hormones
- 10.5 Functional morphology of pituitary
- 10.6 Hypothalamic control of pituitary
- 10.7 Corpuscles of Stannius
- 10.8 Urophysis
- 10.9 Pineal
- 10.10 Summary
- 10.11 Terminal Questions and Answers

Unit 11: Immune System

- 11.1 Objectives
- 11.2 Introduction
- 11.3 Development of Immune System
- 11.4 Cell and tissues of Immune System
- 11.5 Fish Immune Response Modulation
- 11.6 Humoral and Cell mediated immune defence
- 11.7 Fish Antibody Molecule and their effector function
- 11.8 Host-parasite interaction
- 11.9 Summary
- 11.10 Terminal Questions and Answers

Unit 12: Reproductive System

- 12.1 Objectives
- 12.2 Introduction
- 12.3 Types and mode of reproduction
- 12.4 Organs of reproduction
- 12.5 Gametogenesis modes of reproduction viviparity
- 12.6 Role of environmental factors (photoperiod, temperature, rainfall, salinity) on gonad
- 12.7 Gonadal steroidogenesis and its control
- 12.8 Reproductive strategies, environmental and endocrine factors regulating reproductive system
- 12.9 Sexuality: intersex, bisexuality, hermaphroditism
- 12.10 Nest building and parental care
- 12.11 Behavior and cognition patterns of migration
- 12.12 Summary
- 12.13 Terminal Questions and Answers

Unit 13: Adaptations in fishes

- 13.1 Objectives
- 13.2 Introduction
- 13.3 Coloration
- 13.4 Sound production, electric organs, and luminescent organs
(Species, location, structure, physiology and biological significance)
- 13.5 Adaptations in deep sea
- 13.6 Hill-stream and cave-dwelling fishes
- 13.7 Summary
- 13.8 Terminal Questions and Answers