

**VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT**

**SYLLABUS FOR CBCS AND SEMESTER SYSTEM**

**B.Sc. SEM – III**

**(Effective from June 2016)**

**ZOOLOGY PAPER – III (Z – 301)**

**(Non-chordates, Evolution and Economic Zoology)**

**UNIT - 1**

Introduction to classification: General study of Non-Chordate Phyla up to Subclass with examples: - Protozoa, Porifera, Coelenterata (Cnidaria), Helminthes, Annelida.

**UNIT - 2**

Study of the following animal types with reference to the structure and functions of various organs of all systems of Leech.

**UNIT - 3**

**Evolution and Adaptations:**

- i. Variation
- ii. Fossorial, Cursorial, Deep sea & Cave Dwelling Adaptations

**UNIT - 4**

**Economic Zoology:**

- (i) Sericulture: - Life-History of Indian species of Mulberry silk-worm (*Bombyx mori*); Management of Silk industry including rearing, spinning and reeling; Types and Economic importance of silk.

( ii ) Apiculture :- Life-history of Honey- bees, types, castes, structure of honeycomb, economic importance of honey, venom and wax.

### **B.Sc. SEM – III**

#### **ZOOLOGY PRACTICAL – I (Based on paper - III)**

##### **(Non-chordates, Evolution and Economic Zoology)**

1- Classification of following animals up to--sub-class.

Amoeba, Euglena, Monocystis, Paramoecium, Leucosolenia, Hyalonema, Spongilla, Hydra, Porpita, Aurelia, Gorgonia, Sea-anemone, Planaria, taenia, Liver-fluke, Ascaris, Earthworm  
Leech, Nereis

2- The following practicals of **LEECH** to be taught/studied **only** with the help of charts, models, videos, photographs, permanent slides, working models, simulators etc.

- a) Digestive system and mounting of salivary gland.
- b) Reproductive system mounting of jaws.
- c) Nervous system and mounting of testicular nephridia.

3- **Adaptations:** Fossorial adaptations-Arenicola and Talpa; Deep sea adaptations-giant squid, Octopus, flat fish, arrow fish; Cave dwelling adaptations- Troglodyte, Proteus (proteus anguinus);Cursorial adaptations- Cheetah, Horse, Wolves, Deer; Variation- Digits in man, giraffe.

4- Life history of Indian mulberry silk worm (Bombyx mori). Api culture: To study Life history, queen, drones, workers, wax, modern movable beehive.

**B.Sc. SEM – III**  
**ZOOLOGY PAPER – IV (Z – 302)**  
**(Chordates, Histology and Osteology)**

**UNIT - 1**

Introduction to classification: General study of the following protochordates and chordates up to subclass with examples: Urochordata, Cephalochordate, Cyclostomes, Pisces.

**UNIT – 2**

Study of the **Scoliodon (Dog Fish)** with reference to their structure and functions of various organs of all systems.

**UNIT - 3**

**Histology:**

Study the Ultra structure following mammalian tissues– stomach, intestine, liver, Salivary gland, pancreas, kidney and gonads.

**UNIT - 4**

**Osteology:**

Study of girdles in Frog, Scoliodon, varanus, pigeon and rabbit.

**B.Sc. SEM – III**  
**ZOOLOGY PRACTICAL - II (Based on paper -IV)**  
**(Chordates, Histology and Osteology)**

1- Classification upto sub-class (with the help of specimens, photographs, models etc.)

Ascidian, amphioxus, lamprey, myxine, Scoliodon, electricray, protopterus, clarius, seahorse, ophi  
ocephalus, labeo.

2- The following practicals of **SCOLIODON** to be taught/studied **only** with the help of  
charts, models, videos, photographs, permanent slides, working models, simulators etc.

a) Digestive system and temporary mounting of placoid scales.

b) Urino-genital system and mounting of ampulla of lorenzini.

c) Circulatory system

d) Brain-dorsal and ventral view.

3-Mammalian Histology: Study of permanent histological slides of salivary gland, liver,  
stomach, pancreas, intestine, kidney, gonads.

4-Osteology: Study of girdles in Scoliodon, frog, varanus, pigeon and rabbit.

**B.Sc. SEM – III**  
**ZOOLOGY PAPER – V (Z – 303)**  
**(Animal Physiology)**

**UNIT – 1**

**Muscle coordination:** Types and structure of muscle fibers; Physiology of muscle contraction and energetic.

**UNIT – 2**

**Nervous coordination:** Synapse and mechanism of nerve impulse conduction. Structure and function of sense organs (human) eye & ear.

**UNIT – 3**

**Excretion and osmoregulation:** Structure of uriniferous tubule physiological process of excretion (including counter current mechanism) and urine formation; hormonal control (rennin angiotensin system and ADH); Osmoregulation in fresh and marine waters; osmosis; diffusion and Donnan's equilibrium.

**UNIT – 4**

**Hematology:** Composition of blood, Haemopoiesis and blood groups.

**B.Sc. SEM – III**  
**ZOOLOGY PRACTICAL – III (Based on paper V)**  
**(Animal Physiology)**

1. To study Haemin crystals from human blood.
2. Total count of WBC from human blood.
3. Estimation of Hemoglobin from human blood.
4. To determine normal and abnormal constituents of urine.
5. To study different types of muscle fibres- striated, nonstriated, medulated, non medulated and cardiac. Sensory organs –human eye and ear. Different types of nerve cells.

**B.Sc. SEM – III**  
**MARINE SCIENCE (EG)**

**UNIT - 1**

**Scope of marine science:**

- 1) Introduction to marine science and career.
- 2) Evolution and biological classification
- 3) Prokaryotes, eukaryotes-fungi, Protista, plant, animalia-five kingdoms

**UNIT - 2**

**Geology of the ocean:**

- 1) Zonations of ocean
- 2) List of Indian oceans-Andaman sea, Arabian Sea, bay of Bengal, gulf of Eden, gulf of Oman, Mozambique channel, Persian gulf, Red sea, Timor sea.

**UNIT - 3**

**Types of seashores and their fauna:**

- 1) Sandy shore 2) Rocky shore 3) Estuaries

**UNIT - 4**

**Marine organisms:**

- 1) Microorganisms: - phytoplanktons, zooplanktons, red algae, brown algae, green algae, multicellular algae. Economic importance of algae.
- 2) Macro organisms: - Invertebrates-commercial importance of marine sponges, Mollusca, arthropods (crab and prawns).  
Vertebrate: economic importance of Scoliodon (sharks) and marine mammals.

**B.Sc. SEM – IV**

**(Effective from Oct-Nov 2016)**

**ZOOLOGY PAPER – III (Z – 401)**

**(Non-chordates, Evolution and Economic Zoology)**

**UNIT – 1**

Introduction to classification: General study of Non-Chordate Phylas up to Subclass with examples: Arthropoda, Mollusca, Echinodermata and Hemichordata.

**UNIT - 2**

Study of the following animal types with reference to the structure and functions of various organs of all systems of Cockroach.

**UNIT – 3**

**Evolution and adaptations:**

- i. Isolation & Speciation
- ii. Protective coloration and mimicry

**UNIT – 4**

**Economic Zoology:**

- i. Lac culture
- ii. Vermi culture



**B.Sc. SEM – IV**

**ZOOLOGY PRACTICAL – I (Based on paper - III)**  
**(Non-chordates, Evolution and Economic Zoology)**

1- Classification of following animals up to--sub-class.

Peripetus, Crab, Palaemon, Lobster, Grasshopper, Termite, Silverfish, Centipede, millipede, Spider, Scorpion, , Butterfly, Chiton, Unio, Aplysia, Sepia, Starfish, Brittle star, Sea cucumber, Feather star, Balanoglossus.

2- The following practicals of **COCROACH** to be taught/studied **only** with the help of charts, models, videos, photographs, permanent slides, working models, simulators etc.

a) Digestive system and mountings of Ist and IInd thoracic spiracles.

b) Reproductive system and mounting of gizzard.

c) Nervous system and mounting of abdominal spiracle.

3- Protective coloration and mimicry (with the help of charts/models/museum specimens/photographs etc.): Leaf insect, Stick insect, Lantern fly, Eyespot butterfly, Australian seahorse, rattle snake.

4- Study of Life History of Lac insect (with the help of charts, photographs etc.)

Vermiculture (with the help of charts/ photographs/ models etc.)- types of earthworms, vermicompost practices.

**B.Sc. SEM – IV**  
**ZOOLOGY PAPER – IV (Z – 402)**  
**(Chordates, Embryology and Osteology)**

**UNIT – 1**

Introduction to **classification**: General study of the following protochordates and chordates up to subclass with examples: Amphibians, Reptilians, Aves and Mammals

**UNIT - 2**

Study of the following animal type with reference to their structure and functions of various organs of all systems of **Pigeon**.

**UNIT - 3**

**Embryology**: Different types of eggs and cleavage patterns, development in amphioxus (up to tabulation).

**UNIT - 4**

**Osteology**: Comparative Study of Fore limbs and hind limbs in frog, varanus, pigeon and rabbit.

**B.Sc. SEM – IV**

**ZOOLOGY PRACTICAL - II (Based on paper -IV)**

**(Chordates, Embryology and Osteology)**

1- **Classification** up to sub-class (with the help of specimens/ photographs/ models etc.)

Frog, hyla, bufo, salamander, amblystoma, caecilian, calotes, varanus, turtle, dhaman, russel viper, cobra, krait, pigeon, koel, sparrow, platypus, bat, rat.

2- The following practicals of **PIGEON** to be taught/studied **only** with the help of charts, models, videos, photographs, permanent slides, working models, simulators etc.

a) Digestive system and mounting of Hyoid apparatus.

b) Circulatory system

c) Urino-genital system and mounting of pecten.

d) Brain and air sacs.

3-**Embryology**: Study of amphioxus embryology (with the help of

models/charts/photographs/specimens/permanent slides etc ).: Uncleaved egg, 2, 4, 8, 16 & 32 cell stage, blastula, gastrula, t.s. passing through pharynx, intestine, testis, ovary &caudal region.

4-**Osteology**: Study of fore limbs and hind limbs in Frog, varanus, pigeon & rabbit

**B.Sc. SEM – IV**  
**ZOOLOGY PAPER – V (Z – 403)**  
**(Cytogenetics and Biochemistry)**

**UNIT - 1**

**General Cytology:**

Tool and techniques used in cytology

Cell cycle and cell division - mitosis and meiosis.

**UNIT - 2**

**Genetics:**

Structure and function of genetic material,

Control of gene expression: Control in prokaryotes and eukaryotes.

Chromosome mapping. Linkage, crossing over, Types of RNA.

**UNIT – 3**

Sex determination and dosage compensation (Heteropycnosis), Sex-linked inheritance, Cytoplasmic inheritance: Sigma substance, milk factor in mice, kappa particles, coiling of shell in *Lymnaea*, Modified Mendalian ratio 9:7, 9:3:4, 9:6:1, 12:3:1, 13:3, 15:1, 9:3:3:1 (in cock comb) Simple examples based on above types.

**UNIT - 4 Biochemistry:** Introduction and structure of carbohydrates, proteins and lipids.

**B.Sc. SEM – IV**  
**ZOOLOGY PRACTICAL – III (Based on paper V)**  
**(Cytogenetics and Biochemistry)**

- 1- Demonstration of microtome and microtechnique.
- 2-Preparation and study of different stages of mitosis from onion root tip.
- 3- Preparation and study of different stages of meiosis from cockroach testis.
- 4- Permanent slides of cell division.
- 5- Cytoplasmic inheritance: Coiling of Shell in lymnaea.
- 6- Structure of carbohydrates- Triose, Pentose, Hexose sugar, Lipid & glycerol.

**B.Sc. SEM – IV**  
**MARINE SCIENCE (EG)**

**UNIT-1**

**Marine Biology:**

- 1) Adaptations- bony fish surviving in near freezing water, sea birds, whales and their relations.
- 2) Voyage of green sea turtle.
- 3) General characters of bony and cartilaginous fishes.
- 4) Coral and coral reefs: types, economic importance and threats.

**UNIT-2**

Marine Pollution -Causative factors and impacts

**UNIT- 3**

Introduction to aqua culture-History, scope and present status.

**UNIT-4**

General idea of different aquaculture practices-mono culture, poly-culture, extensive culture and intensive culture.