# SYLLABUS

## LECTURER (SCHOOL EDUCATION)
## PAPER – II
## BIOLOGY

### Part – I Senior Secondary Level

#### 1. Taxonomy :

- Definition of life, Biodiversity, Need for classification, concept of species and taxonomical hierarchy, Binominal nomenclature.
- Tools for study of taxonomy – Museums, Zoos, Herbaria, Botanical gardens.
- Classification of Living organism, five kingdom system.

#### 2. Structural Organization in Animals and Plants:

- Animal tissue: Types, Origin, Location, Structure and functions.
- Plant tissue: Anatomy of root, stem and leaves of monocots and dicots.
- Structure of flowers, types of Inflorescence and fruits.

#### 3. Plant Physiology:

- Water relations.
- Transpiration.
- Photosynthesis.
- Respiration.
- Mineral nutrition.
- Plant movements.
- Nitrogen and lipid metabolism.
- Growth and development.

#### 4. Animal Physiology:

- Digestion and absorption.
- Breathing and respiration.
- Body fluids and circulation.
- Excretory products and their elimination.
- Locomotion and movement.
- Neural control and coordination.
- Chemical coordination and regulation.
- Reproduction.

### 5. Genetics and Evolution :

- Mendelian Inheritance.
- Chromosomal theory of inheritance.
- Sex determination in human beings.
- Linkage and crossing over.
- Origin of life – theories and evidence.

### 6. Biology in Human Welfare :

- Economic importance of Protozoa, Helminths, Insects and Molluscs.
- Plant utilization- Cereals (Wheat, Rice), Fiber yielding plants (Cotton, Jute), Vegetable oils (Groundnut, Mustard), Spices (Coriander, Fenugreek and Cumin), Medicinal Plants (Commiphora, Withania), Beverages (Tea, Coffee).
- Basic concepts of Immunology, Vaccines, Pathogens, Parasites, Cancer, AIDS.

### 7. Environmental Biology :

- Organism and its environment.
- Biogeochemical cycles: Carbon, Nitrogen, Phosphorus.
- Environmental Pollution: Air, Water, Noise and Soil.

## Part – II Graduation Level

### 1. Cell Structure and Functions:

- Concept of Cell Theory; Structure of Prokaryotic and Eukaryotic cell; Plant and Animal cell.
- Structure, properties and functions of cell surface - cell process.
- Cell organelles-structure and function.
- Chromosomes – Structure, types, aberrations.
- Chemical constituents of living cells:
    - Biomolecules - Structure and functions of proteins, carbohydrates, lipids, nucleic acids.
    - Enzymes – Types, properties and enzyme action.
- Cell cycle; cell division - mitosis, meiosis and their significance.

### 2. Taxonomy :

- Levels of Organization, Symmetry, Coelom and Metamerism in animals.
- Salient features and classification of non chordata and chordata up to order level with examples.
- Salient features and classification of plants (major groups up to class).
- Floral variations in Ranunculaceae, Apiaceae, Asteraceae and Poaceae.

### 3. Structure (External Internal), Reproduction and Life cycle of the following :

Amoeba, Obelia, Taenia, Ascaris, Pheretima , Periplanata, Rana and Rabbit.

### 4. Structure Reproduction and Life cycle of the following :

Algae, Fungi, Bryophytes, Pteridophytes, and Gymnosperms.

### 5. Developmental Biology :

- Gametogenesis, Spermatogenesis and Oogenesis.
- Fertilization, Cleavage, Blastula, Gastrula-Morphogenetic movement, Fate maps, embryonic induction.
- Metamorphosis of frog. Regeneration, Amphibian limb regeneration.
- Extra-embryonic membranes in chick.
- Placenta in mammals.
- Endocrine control of ovulation, pregnancy, parturition and lactation.

### 6. Reproduction in Higher Plants :

- Vegetative, Asexual and Sexual Reproduction.
- Pollination and Fertilization.
- Embryogenesis.

### 7. Ethology :

**Types of Animal Behavior :** Feeding, Learning, Instinctive, Motivated, Social and Reproductive.

### 8. Biostatistics :

- Mean, Mode, Median, Standard deviation.
- Tabular and graphical representation of data- histogram, Pie diagram, bar diagram, line graph.

## Part – III Post Graduation Level

### 1. Ecology :

Ecosystems- components and types. Energy flow; Food chain, food web. Environmental factors (climatic, edaphic and biotic). Population and ecological adaptations. Plant and animal succession.

### 2. Biotechnology and its Applications :

- Definitions, scope and applications.
- Recombinant DNA technology.
- Transgenic animals and plants.
- Application in Health and Agriculture.
- Tissue culture- methods and application.

**3. Techniques in Biology :**

Electrophoresis, Centrifugation, Chromatography, Colorimetry, Spectrophotometry, ELISA.

**4. Microscopy :**

Principle of Light microscopy, Phase contrast microscopy and Electron microscopy.

**5. Biogeography and Wild Life Conservation :** Endemism, Hot spots, Plant and Animal distribution with special reference to Rajasthan. Wild life conservation. Biosphere reserves, Wild life sanctuaries and National Parks.

## Part – IV (Pedagogy, Teaching Learning Material, Use of Computers and Information Technology in Teaching Learning)

### I. Pedagogy and Teaching Learning Material (Instructional Strategies for Adolescent Learner)

- Communication skills and its use.
- Teaching models- advance organizer, concept attainment, information processing, inquiry training.
- Preparation and use of teaching-learning material during teaching.
- Cooperative learning.

### II. Use of Computers and Information Technology in Teaching Learning

- Concept of ICT, hardware and software.
- System approach.
- Computer assisted learning, computer aided instruction