

# **BITSAT Biology Syllabus 2026**

## **1. Diversity in Living World**

- 1.1 Biology – its meaning and relevance to mankind
- 1.2 What is living; Taxonomic categories and aids; Systematics and Binomial system of nomenclature.
- 1.3 Introductory classification of living organisms (Two-kingdom system, Five-kingdom system);
- 1.4 Plant kingdom – Salient features of major groups (Algae to Angiosperms);
- 1.5 Animal kingdom – Salient features of Nonchordates up to phylum, and Chordates up to class level.

## **2. Cell: The Unit of Life; Structure and Function**

- 2.1 Cell wall; Cell membrane; Endomembrane system (ER, Golgi apparatus/Dictyosome, Lysosomes, Vacuoles); Mitochondria; Plastids; Ribosomes; Cytoskeleton; Cilia and Flagella; Centrosome and Centriole; Nucleus; Microbodies.
- 2.2 Structural differences between prokaryotic and eukaryotic, and between plant and animal cells.
- 2.3 Cell cycle (various phases); Mitosis; Meiosis.
- 2.4 Biomolecules – Structure and function of Carbohydrates, Proteins, Lipids, and Nucleic acids.
- 2.5 Enzymes – Chemical nature, types, properties and mechanism of action.

## **3. Genetics and Evolution**

- 3.1 Mendelian inheritance; Chromosome theory of inheritance; Gene interaction; Incomplete dominance; Co-dominance; Complementary genes; Multiple alleles;
- 3.2 Linkage and Crossing over; Inheritance patterns of hemophilia and blood groups in humans.
- 3.3 DNA –its organization and replication; Transcription and Translation;
- 3.4 Gene expression and regulation; DNA fingerprinting.
- 3.5 Theories and evidences of evolution, including modern Darwinism.

## **4. Structure and Function – Plants**

- 4.1 Morphology of a flowering plant; Tissues and tissue systems in plants; Anatomy and function of root, stem (including modifications), leaf, inflorescence, flower (including position and arrangement of different whorls, placentation), fruit and seed; Types of fruit; Secondary growth;
- 4.2 Absorption and movement of water (including diffusion, osmosis and water relations of cell) and of nutrients; Translocation of food; Transpiration and gaseous exchange; Mechanism of stomatal movement.
- 4.3 Mineral nutrition – Macro- and micro-nutrients in plants including deficiency disorders; Biological nitrogen fixation mechanism.

**4.4** Photosynthesis – Light reaction, cyclic and non-cyclic photophosphorylation; various pathways of carbon dioxide fixation; Photorespiration; Limiting factors.

**4.5** Respiration – Anaerobic, Fermentation, Aerobic; Glycolysis, TCA cycle; Electron transport system; Energy relations.

## **5. Structure and Function - Animals**

**5.1** Human Physiology – Digestive system – organs, digestion and absorption; Respiratory system – organs, breathing and exchange and transport of gases.

**5.2** Body fluids and circulation – Blood, lymph, double circulation, regulation of cardiac activity; Hypertension, Coronary artery diseases.

**5.3** Excretion system – Urine formation, regulation of kidney function

**5.4** Locomotion and movement – Skeletal system, joints, muscles, types of movement.

**5.5** Control and co-ordination – Central and peripheral nervous systems, structure and function of neuron, reflex action and sensory reception; Role of various types of endocrine glands; Mechanism of hormone action.

## **6. Reproduction, Growth and Movement in Plants**

**6.1** Asexual methods of reproduction;

**6.2** Sexual Reproduction – Development of male and female gametophytes; Pollination (Types and agents); Fertilization; Development of embryo, endosperm, seed and fruit (including parthenocarpy and elminth).

**6.3** Growth and Movement – Growth phases; Types of growth regulators and their role in seed dormancy, germination and movement;

**6.4** Apical dominance; Senescence; Abscission; Photo- periodism; Vernalisation;

**6.5** Various types of movements.

## **7. Reproduction and Development in Humans**

**7.1** Male and female reproductive systems

**7.2** Menstrual cycle; Gamete production; Fertilisation; Implantation;

**7.3** Embryo development;

**7.4** Pregnancy and parturition

**7.5** Birth control and contraception.

## **8. Ecology and Environment**

**8.1** Meaning of ecology, environment, habitat and niche.

**8.2** Ecological levels of organization (organism to biosphere); Characteristics of Species, Population, Biotic Community and Ecosystem; Succession and Climax. Ecosystem – Biotic and abiotic components; Ecological pyramids; Food chain and Food web

**8.3** Energy flow; Major types of ecosystems including agroecosystem.

**8.4** Ecological adaptations – Structural and physiological features in plants and animals of aquatic and desert habitats.

**8.5** Biodiversity and Environmental Issues – Meaning, types and conservation strategies (Biosphere reserves, National parks and Sanctuaries), Air and Water Pollution (sources and major pollutants); Global warming and Climate change; Ozone depletion; Noise pollution; Radioactive pollution; Methods of pollution control (including an idea of bioremediation); Deforestation; Extinction of species (Hot Spots).

## **9. Biology and Human Welfare**

**9.1** Animal husbandry – Livestock, Poultry, Fisheries; Major animal diseases and their control. Pathogens of major communicable diseases of humans caused by fungi, bacteria, viruses, protozoans and helminthes, and their control.

**9.2** Cancer; AIDS.

**9.3** Adolescence and drug/alcohol abuse

**9.4** Basic concepts of immunology.

**9.5** Plant Breeding and Tissue Culture in crop improvement.

## **10. Biotechnology and its Applications**

**10.1** Microbes as ideal system for biotechnology

**10.2** Microbial technology in food processing, industrial production (alcohol, acids, enzymes, antibiotics), sewage treatment and energy generation.

**10.3** Steps in recombinant DNA technology – restriction enzymes, NA insertion by vectors and other methods, regeneration of recombinants

**10.4** Applications of R-DNA technology in human health –Production of Insulin, Vaccines and Growth hormones, Organ transplant, Gene therapy.

**10.5** Applications in Industry and Agriculture – Production of expensive enzymes, strain improvement to scale up bioprocesses, GM crops by transfer of genes for nitrogen fixation, herbicide-resistance and pest-resistance including Bt crops.