C E T 2 0 2 7

Date: 11-11-2026

BIOLOGY

SYLLABUS for CET-2027

KEA, Sampige Road, 18th Cross, Malleswaram, Bangalore – 560 012

CLASS XI

Total Periods: 160

I. Diversity in the Living World (Periods 30)

Chapter-1: The Living world: Biodiversity; Need for classification, Taxonomy & Systematics; Binomial nomenclature; Concept of species and taxonomical hierarchy.

Chapter- 2: Biological Classification: Three domain of life, five kingdom classification; Salient features and classification of Monera; Protista and Fungi into major groups; Lichens; Viruses and Viroids.

Chapter- 3: Plant Kingdom: Salient Features and Classification of plants into major groups - Algae, Bryophytes, Pteridophytes and Gymnosperms.

Chapter- 4: **Animal Kingdom:** Salient features and classification of animals - non chordate up to phyla level and chordate up to classes level **(Salient features and examples).**

II. Structural Organization in Plants and Animals (Periods 20)

Chapter-5: **Morphology of Flowering Plants:** Morphology and functions of different parts of flowering plants - Root, stem, leaf, inflorescence - cymose and racemose, flower, fruit and seed (To be dealt along with the relevant practical of the Practical Syllabus). Semi-technical description of a typical flowering plant; Family Solanaceae features and its economic importance.

Chapter-6: Anatomy of Flowering Plants: Tissue systems; Anatomy of Root, stem and leaf (Dicotyledonous and Monocotyledonous plants).

Chapter-7: Structural Organization in Animals: Morphology, anatomy and functions of different systems (digestive, circulatory, respiratory, nervous and reproductive) of frog. (Brief account only).

III. Cell Structure and Functions (Periods 35)

Chapter- 8: Cell: The Unit of Life - Cell theory and cell as the basic unit of life; Structure of prokaryotic and eukaryotic cell; Plant cell and animal cell; Cell envelope, cell membrane, cell wall; Cell organelles – structure and function; Endomembrane system - endoplasmic reticulum, Golgi bodies, lysosomes, vacuoles; mitochondria, ribosomes, plastids, microbodies; Cytoskeleton, cilia, flagella, centrioles (ultra structure & function); Nucleus – nuclear membrane, chromatin, nucleolus, chromosome structure and types**.**

Chapter - 9: Biomolecules: Biomicromolecules and biomacromolecules, Chemical constituents of living cells; structure and function of, proteins, carbohydrates, lipids, nucleic acids, primary and secondary metabolites, Enzymes – Types and nomenclature, properties, enzyme action, **factors** affecting enzyme activity**.**

Chapter-10: Cell Cycle and Cell division: Phases of Cell cycle, mitosis, meiosis and their significance.

IV. Plant Physiology (Periods 30)

Chapter-11: Photosynthesis in Higher Plants: Photosynthesis as a means of Autotrophic nutrition; Where does photosynthesis take place; Early experiments on photosynthesis**,** Pigments are involved in Photosynthesis (Elementary idea); Photochemical and biosynthetic phases of photosynthesis;

Cyclic and non-cyclic photophosphorylation; Chemiosmotic hypothesis; Photorespiration; C_3 and C_4 pathways; Factors affecting photosynthesis.

Chapter-12: Respiration in Plants: Exchange of gases; Cellular respiration – glycolysis, fermentation (anaerobic), TCA cycle and electron transport system (aerobic); Energy relations – Number of ATP molecules generated; Amphibolic pathways; Respiratory quotient.

Chapter-13: Plant Growth and Development: Seed germination; Phases of plant growth and plant growth rates; Conditions for growth; Differentiation, dedifferentiation and redifferentiation; development and sequence of developmental process in a plant cell; Growth regulators, characteristics, discovery and physiological effects of auxin, gibberellin, cytokinin, ethylene and ABA.

V. Human Physiology (Periods 45)

Chapter-14: Breathing and Exchange of Gases: Respiratory organs in animals (recall only); Respiratory system in humans; Mechanism of breathing and its regulation in humans– Exchange of gases, transport of gases and regulation of respiration, Respiratory volumes and **capacities,** Disorders related to respiration-Asthma, Emphysema, Occupational respiratory disorders.

Chapter-15: Body Fluids and Circulation: Composition of blood, blood groups, coagulation of blood; Composition of lymph and its function; Human circulatory system– Structure of human heart and blood vessels; **circulatory pathways,** cardiac cycle, cardiac output, ECG; Double circulation; Regulation of cardiac activity; Disorders of circulatory system-Hypertension, Coronary artery disease, Angina pectoris, Heart failure.

Chapter-16: Excretory Products and their Elimination: Modes of excretion –Ammonotelism, ureotelism, uricotelism; Human excretory system–structure and function; Urine formation, mechanism of concentration of the filtrate, and **micturition,** Osmoregulation; Regulation of kidney function– Renin-angiotensin, Atrial Natriuretic Factor, ADH and Diabetes insipidus, Role of other organs in excretion; Disorders-Uremia, Renal failure, Renal calculi, Nephritis; Dialysis and artificial kidney.

Chapter- 17: Locomotion and Movement: Types of movement – ciliary, flagellar, muscular; Skeletal muscle – contractile proteins and muscle contraction; Skeletal system and its functions (To be dealt with the relevant practical of Practical syllabus); Joints; Disorders of muscular and skeletal system- Myasthenia gravis, Tetany, Muscular dystrophy, Arthritis, Osteoporosis and Gout.

Chapter- 18: Neural Control and Coordination: Neuron and nerves; Nervous system in humans– central nervous system, peripheral nervous system and visceral nervous system; Generation and conduction of nerve impulse.

Chapter –19: **Chemical Coordination and Integration:** Endocrine glands and hormones; Human endocrine system - Hypothalamus, Pituitary, Pineal, Thyroid, Parathyroid, **Thymus,** Adrenal, Pancreas, Gonads; Heart, **kidney and Gastrointestinal tracts,** Mechanism of hormone action (Elementary Idea); Role of hormones as messengers and regulators, Hypo-and hyperactivity and related disorders (Common disorders e.g. Dwarfism, Acromegaly, Cretinism, goiter, exophthalmic goiter, diabetes, Addison's disease).

Important: Diseases related to all the human physiology systems to be taught in brief.

VI: PRINCIPLES RELATED TO PRACTICAL BIOLOGY

1. Study and describe locally available common flowering plants of family Solanaceae, floral formula and floral diagram.
2. To study anatomy of monocot and dicot roots and stems (primary).
3. To study the distribution of stomata in the upper and lower surfaces of leaves.
4. To study and identify different types of inflorescences.
5. Study of external morphology of frog.
6. Study of mitosis.
7. To detect the presence of carbohydrates (glucose, sucrose and starch), proteins and lipids.
8. To detect the presence of urea, sugar, albumin and bile salts in urine.

References:

- **Biology Textbook for Class XI, NCERT, Revised Edition, 2024-25**
- **NCERT laboratory Manual (Latest)**

CLASS XII

Total Periods: 160

I. Reproduction (Periods 35)

Chapter- 1: Sexual Reproduction in Flowering Plants: Flower structure; Development of male and female gametophytes; Pollination–types, agencies and examples; Outbreeding devices; Pollen-Pistil interaction; Double fertilization; Post fertilization events– Development of endosperm and embryo, Development of seed and formation of fruit **(Types of fruits and seeds)** Special modes– apomixis, parthenocarpy, polyembryony; Significance of seed and fruit formation.

Chapter- 2: Human Reproduction: Male and female reproductive systems; Microscopic anatomy of testis and ovary; Gametogenesis- spermatogenesis & oogenesis; Menstrual cycle; Fertilization, embryo development up to blastocyst formation, implantation; Pregnancy and placenta formation (Elementary idea); Parturition (Elementary idea); Lactation (Elementary idea).

Chapter- 3: Reproductive Health: Problems and strategies, Need for reproductive health and prevention of sexually transmitted diseases (STD); **Population stabilization** and Birth control- Need and Methods, Contraception and Medical Termination of Pregnancy (MTP); Amniocentesis; Infertility and assisted reproductive technologies – IVF-ET, ZIFT, GIFT, **ICSI, AI, IUI & IUT** (Elementary idea for general awareness).

II. Genetics and Evolution (Periods 45)

Chapter- 4: Principles of Inheritance and Variation: Mendelian Inheritance; Deviations from Mendelism– Incomplete dominance, Co-dominance, Multiple alleles and Inheritance of blood groups, Pleiotropy; Elementary idea of polygenic inheritance; Chromosome theory of inheritance; Chromosomes and genes; Sex determination– In humans, birds, honey bee; **Drosophila and grasshopper**; Linkage and crossing over; **Mutation,** Genetic disorders; **Pedigree analysis,** Mendelian disorders in humans – Sex linked inheritance (Haemophilia and Colour blindness) and Autosome linked inheritance (Sickle cell anemia, Phenylketonuria and Thalassemia); Chromosomal disorders in humans (Down's syndrome, Turner's and Klinefelter's syndromes).

Chapter-5: Molecular Basis of Inheritance: Search for genetic material and DNA as genetic material; Structure of DNA and RNA; DNA packaging; **Properties of genetic material (DNA vs RNA),** DNA replication; Central dogma; Transcription, genetic code, **mutation and genetic code,** translation; Gene expression and regulation– Lac Operon; Genome and human genome project; DNA fingerprinting.

Chapter-6: Evolution: Origin of life; Evolution of life forms a theory, Biological evolution and evidences for biological evolution (Paleontological, comparative anatomy, embryology and molecular evidence); Darwin's contribution, Modern Synthetic theory of Evolution; Mechanism of evolution– Variation (Mutation and Recombination) and Natural Selection with examples, types of natural selection; Gene flow and genetic drift; **Founder effect A brief account of evolution,** Hardy- Weinberg's principle; Adaptive radiation; Human evolution.

III. Biology in Human Welfare (Periods 25)

Chapter- 7: Human Health and Disease: Pathogens; parasites causing human diseases (Malaria, Filariasis, Ascariasis, Typhoid, Pneumonia, common cold, amoebiasis, ring worm); Basic concepts of

immunology- **Immunity and its types, autoimmunity, immune system in the body,** vaccines; Allergy, Cancer, HIV and AIDs; Adolescence, drug and alcohol abuse.

Chapter- 8: Microbes in Human Welfare: In household food processing, industrial production, sewage treatment, energy generation and as biocontrol agents and biofertilizers.

IV. Biotechnology and its Applications (Periods 30)

Chapter-9: Biotechnology: Principles and Processes: Genetic engineering (Recombinant DNA technology); **Tools, techniques and processes.**

Chapter-10: Biotechnology and its Applications: Application of Biotechnology in health and agriculture; Human insulin and vaccine production, gene therapy; Genetically modified organisms-Bt crops; Tissue culture, Transgenic Animals; Biosafety issues– Biopiracy and patents.

V. Ecology and Environment (Periods 25)

Chapter-11: Organisms and Populations: Population- Population attributes– **Population** Growth, models, birth rate, death rate, immigration and emigration, age distribution; **Life history variations,** Population interactions–mutualism, competition, predation, parasitism, **amensalism** and commensalism.

Chapter- 12: Ecosystem: Patterns, components; productivity and decomposition; Energy flow; **Ecological pyramids;** Pyramids of number, biomass and energy.

Chapter-13: **Biodiversity and Conservation:** Concept, of Biodiversity; Patterns of Biodiversity; Importance of Biodiversity; Loss of Biodiversity; Biodiversity conservation and approaches; Hotspots, endangered organisms, extinction, Red Data Book, National parks and sanctuaries, Biosphere reserves and sacred grooves**, Botanical gardens, zoological parks, wildlife safari parks, seed banks, tissue culture and cryopreservation, and Biodiversity convention**

VI: PRINCIPLES RELATED TO PRACTICAL BIOLOGY

1. To study reproductive parts of commonly available flowers.
2. To calculate the percentage of pollen germination.
3. To study pollen tube growth on stigma.
4. To study discrete stages of gametogenesis in mammalian testes and ovary.
5. To study and identify various stages of female gametophyte development in the ovary of a flower.
6. To perform emasculation, bagging and tagging for controlled pollination.
7. To study the blastula stage of embryonic development in mammals.
8. Preparation and analysis of pedigree charts.
9. To verify Mendel's law of segregation.
10. To verify Mendel's law of independent assortment.
11. Staining of nucleic acids by acetocarmine.
12. Study of homologous and analogous organs in plants and animals.
13. To study disease causing organisms and symptoms of the diseases.

Reference:

- **Biology Textbook for Class XII, NCERT, Revised Edition, 2024-25**.
- **NCERT laboratory Manual (Latest)**