The syllabus is in tune with the syllabus adapted by the Board of Intermediate Education, TG, for Intermediate course with effect from the academic year 2023-2024 (1st year) (100%) and 2024-2025 (2nd year) (100%) and is designed at the level of Intermediate Course and equivalent to (10+2) scheme of Examination conducted by Board of Intermediate Education, Telangana. The syllabus is designed to indicate the scope of subjects included for TG EAPCET-2025. The topics mentioned therein are not to be regarded as exhaustive. Questions may be asked in TG EAPCET-2025 to test the student's knowledge and intelligent understanding of the subject. The syllabus is applicable to students of both the current and previous batches of Intermediate Course, who desire to appear for TG EAPCET-2025.

BOTANY

1) **DIVERSITY IN THE LIVING WORLD:**

The living world: What is living? Diversity in the living world; Taxonomic categories and taxonomical aids.

Biological Classification: Five kingdom classification - Monera, Protista, Fungi, Plantae and Animalia, Three domains of life (six kingdom classification), Viruses, Viroids, Prions & Lichens.

Science of plants – Botany: Origin, Development, Scope of Botany and Branches of Botany.

Plant Kingdom: Salient features, classification and alternation of generations of the plants of the following groups - Algae, Bryophytes, Pteridophytes, Gymnosperms and Angiosperms.

2) **STRUCTURAL ORGANISATION IN PLANTS- MORPHOLOGY:**

Morphology of flowering Plants

Vegetative: Parts of a typical Angiospermic plant; Vegetative morphology and modifications - Root, Stem and Leaf- types; Venation, Phyllotaxy.

Reproductive: Inflorescence - Racemose, Cymose and special types.

Flower: Parts of a flower and their detailed description; Aestivation, Placentation.

Fruits: Types- True, False and parthenocarpic fruits.

3) **REPRODUCTION IN PLANTS:**

Modes of Reproduction: Asexual reproduction, binary fission, Sporulation, budding, fragmentation, vegetative propagation in plants, Sexual reproduction, Overview of angiosperm life cycle.

Sexual Reproduction in Flowering Plants: Stamen, microsporangium, pollen grain. Pistil, megasporangium (ovule) and embryo sac; Development of male and female gametophytes. Pollination - Types, agents, Out breeding devices and Pollen - Pistil interaction. Double Fertilization; Post fertilisation events: Development of endosperm and embryo; development of seed, Structure of Dicotyledonous and Monocotyledonous seeds, Significance of fruit and seed. Special modes - Apomixis, parthenocarpy, polyembryony.

4) **PLANT SYSTEMATICS:**

Taxonomy of angiosperms: Introduction. Types of Systems of classification. Semi-Technical description of a typical flowering plant. Description of Families: Fabaceae, Solanaceae and Liliaceae.

5) **CELL STRUCTURE AND FUNCTION:**

Cell - The Unit of Life: Cell- Cell theory and cell as the basic unit of life- overview of the cell. Prokaryotic and Eukaryotic cells, Ultra Structure of Plant cell (structure in detail and functions in brief), Cell membrane, Cell wall, Cell organelles: Endoplasmic reticulum, Mitochondria, Plastids, Ribosomes, Golgi bodies, Vacuoles, Lysosomes, Microbodies, Centrosome and Centriole, Cilia, Flagella, Cytoskeleton and Nucleus. Chromosomes: Number, structural organization; Nucleosome.

Biomolecules: How to analyze chemical composition?, Primary and secondary metabolites. Structure and function of Proteins, Carbohydrates, Lipids and Nucleic acids.

Cell cycle and Cell Division: Cell cycle, Mitosis, Meiosis - significance.

6) **INTERNAL ORGANISATION OF PLANTS:**

Histology and Anatomy of Flowering Plants: Tissues - Types, structure and functions: Meristematic; Permanent tissues - Simple and Complex tissues. Tissue systems - Types, structure and function: Epidermal, Ground and Vascular tissue systems. Anatomy of Dicotyledonous and Monocotyledonous plants - Root, Stem and Leaf. Secondary growth in Dicot stem and Dicot root.

7) PLANT ECOLOGY:

Ecological Adaptations, Succession and Ecological Services: Introduction. Plant communities and Ecological adaptations: Hydrophytes, Mesophytes and Xerophytes. Plant succession. Ecological services - Carbon fixation, Oxygen release and pollination (in brief).

8) **PLANT PHYSIOLOGY:**

Transport in Plants: Means of Transport- Diffusion, Facilitated Diffusion, Passive symports and antiports, Active Transport, Comparison of Different Transport Processes, Plant-Water Relations- Water Potential, Osmosis, Plasmolysis, Imbibition, Long Distance Transport of Water- Water Movement up a Plant, Root Pressure, Transpiration pull, Transpiration-Opening and Closing of Stomata, Transpiration and Photosynthesis - a compromise, Uptake and Transport of Mineral Nutrients- Uptake of Mineral Ions, Translocation of Mineral Ions, Phloem transport: Flow from Source to Sink-The Pressure Flow or Mass Flow Hypothesis.

Mineral Nutrition: Methods to Study the Mineral Requirements of Plants, Essential Mineral Elements-Criteria for Essentiality, Macronutrients, Micronutrients, Role of Macro- and Micronutrients, Deficiency Symptoms of Essential Elements, Toxicity of Micronutrients, Mechanism of Absorption of Elements, Translocation of Solutes, Soil

as Reservoir of Essential Elements, Metabolism of Nitrogen-Nitrogen Cycle, Biological Nitrogen Fixation, Symbiotic nitrogen fixation, Nodule Formation.

Enzymes: Chemical Reactions, Enzymatic Conversions, Nature of Enzyme Action, Factors Affecting Enzyme Activity, Temperature and pH, Concentration of Substrate, Classification and Nomenclature of Enzymes, Co-factors.

Photosynthesis in Higher Plants: Early Experiments, Site of Photosynthesis, Pigments involved in Photosynthesis, Light Reaction, The Electron Transport-Splitting of Water, Cyclic and Noncyclic Photo-phosphorylation, Chemiosmotic Hypothesis, Biosynthetic phase-The Primary Acceptor of CO2, The Calvin Cycle, The C4 Pathway, Photorespiration, Factors affecting Photosynthesis.

Respiration of Plants: Cellular respiration, Glycolysis, Fermentation, Aerobic Respiration - Tricarboxylic Acid Cycle, Electron Transport System (ETS) and Oxidative Phosphorylation, The Respiratory Balance Sheet, Amphibolic Pathway, Respiratory Quotient.

Plant Growth and Development: Growth- Plant Growth, Phases of Growth, Growth Rates, Conditions for Growth, Differentiation, Dedifferentiation and Redifferentiation, Development, Plant Growth Regulators- Discovery, Physiological effects of Plant Growth Regulators, Auxins, Gibberellins, Cytokinins, Ethylene, Abscisic acid, Seed Dormancy, Photoperiodism, Vernalisation.

9) **MICROBIOLOGY:**

Bacteria: Morphology of Bacteria, Bacterial cell structure - Nutrition, Reproduction-Sexual Reproduction, Conjugation, Transformation, Transduction, The importance of Bacteria to Humans.

Viruses: Discovery, Classification of Viruses, structure of Viruses, Multiplication of Bacteriophages – The lytic cycle, The Lysogenic Cycle, Viral diseases in Plants, Viral diseases in Humans.

10) **GENETICS:**

Principles of Inheritance and Variation: Mendel's Experiments, Inheritance of one gene (Monohybrid Cross)-Back cross and Test cross, Law of Dominance, Law of Segregation or Law of purity of gametes, Deviations from Mendelian concept of dominance – Incomplete Dominance, Co-dominance, Explanation of the concept of dominance, Inheritance of two genes-(Dihybrid Cross) Law of Independent Assortment, Chromosomal Theory of Inheritance, Linkage and Recombination, Mutations, Significance of mutations.

11) **MOLECULAR BIOLOGY:**

Molecular Basis of inheritance: The DNA- Structure of Polynucleotide Chain, Packaging of DNA Helix, The Search for Genetic Material, Transforming Principle, Biochemical Characterization of Transforming Principle, The Genetic Material is DNA, Properties of Genetic Material (DNA versus RNA), RNA World, Replication - The Experimental Proof, The Machinery and the Enzymes.

Transcription-Transcription Unit, Transcription Unit and the Gene, Types of RNA and the process of Transcription. Genetic Code-Mutations and Genetic Code, tRNA- the Adapter Molecule, Translation, Regulation of Gene Expression-The Lac operon.

12) **BIOTECHNOLOGY:**

Principles and processes of Biotechnology: Principles of Biotechnology-Construction of the first artificial recombinant DNA molecule, Tools of Recombinant DNA Technology-Restriction Enzymes, Cloning Vectors, Competent Host (For Transformation with Recombinant DNA), Processes of Recombinant DNA Technology- Isolation of the Genetic Material (DNA), Cutting of DNA at Specific Locations, Separation and isolation of DNA fragments, Insertion of isolated gene into a suitable vector, Amplification of Gene of Interest using PCR, Insertion of Recombinant DNA into the Host, Cell/Organism, Selection of Transformed host cells, Obtaining the Foreign Gene Product, Downstream Processing.

Biotechnology and its applications: Biotechnological Applications in Agriculture-Bt Cotton, Pest Resistant Plants, Other applications of Biotechnology - Insulin, Gene therapy, Molecular Diagnosis, ELISA, DNA fingerprinting, Transgenic plants, Bio-safety and Ethical issues- Biopiracy.

13) **PLANTS, MICROBES AND HUMAN WELFARE:**

Strategies for enhancement in food production: Plant Breeding- What is Plant Breeding? Wheat and Rice, Sugarcane, Millets, Plant Breeding for Disease Resistance, Methods of breeding for disease resistance, Mutation, Plant Breeding for Developing Resistance to Insect Pests, Plant Breeding for Improved Food Quality, Single Cell Protein (SCP), Tissue Culture.

Microbes in Human Welfare: Microbes in Household Products, Microbes in Industrial Products-Fermented Beverages, Antibiotics, Chemicals, Enzymes and other Bioactive Molecules, Microbes in Sewage Treatment, Primary treatment, Secondary treatment or biological treatment, Microbes in Production of Biogas, Microbes as Biocontrol Agents, Biological control of pests and diseases, Microbes as Biofertilisers, Challenges posed by Microbes.

*****

ZOOLOGY

1) **ZOOLOGY - Diversity of Living World:**
What is life?; Nature, Scope & meaning of zoology; Branches of Zoology; Need for classification- Zoos as tools for classification; Basic principles of Classification: Biological system of classification- (Phylogenetic classification only); Levels or Hierarchy of classification; Nomenclature - Bi &Trinominal; Species concept; Kingdom Animalia; Biodiversity - Meaning and distribution, Genetic diversity, Species diversity, Ecosystem diversity (alpha, beta and gama), other attributes of biodiversity, role of biodiversity, threats to biodiversity, methods of conservation, IUCN Red data books, Conservation of wild life in India-Legislation, Preservation, Organizations, Threatened species.

2) **STRUCTURAL ORGANIZATION IN ANIMALS:**
Levels of organization, Multicellularity: Diploblastic & Triploblastic conditions; Asymmetry, Symmetry: Radial symmetry, and Bilateral symmetry (Brief account giving one example for each type from the representative phyla); Acoelomates, Pseudocoelomates and Eucoelomates: Schizo & Entero coelomates (Brief account of formation of coelom)
Tissues: Epithelial, Connective, Muscular and Nervous tissues. (make it a little more elaborative)

3) **ANIMAL DIVERSITY-I: INVERTEBRATE PHYLA:**
General Characters - (Strictly restrict to 8 salient features only Classification up to Classes with two or three examples - Brief account only). Porifera; Cnidaria; Ctenophora; Platyhelminthes; Nematoda
Annelida (Include Earthworm as a type study strictly adhering to NCERT text book); Arthropoda; Mollusca; Echinodermata; Hemichordata.

4) **ANIMAL DIVERSITY-II: PHYLUM : CHORDATA**
General Characters – (Strictly restrict to 8 points only Classification up to Classes – Brief account only with two or three examples). Phylum : Chordata; Sub phylum: Urochordata; Sub phylum: Cephalochordata; Sub phylum : Vertebrata; Super class: Agnatha, Class Cyclostomata; Super class: Gnathostomata - Super class pisces, Class: Chondricthyes, Class: Osteichthyes;
Tetrapoda: Class: Amphibia (Include Frog as a type study strictly adhering to NCERT text book), Class: Reptilia, Class: Aves, Class: Mammalia.

5) **LOCOMOTION & REPRODUCTION IN PROTOZOA:**
Locomotion: Definition, types of locomotor structures pseudopodia (basic idea of pseudopodia without going into different types), flagella & cilia (Brief account giving two examples each); Flagellar & Ciliary movement - Effective & Recovery strokes in Euglena, Synchronal & Metachronal movements in Paramecium

Reproduction: Definition, types. Asexual Reproduction: Transeverse binary fission in Paramecium & Longitudinal binary fission in Euglena. Multiple fission, Sexual Reproduction.

6) **BIOLOGY & HUMAN WELFARE:**
Parasitism and parasitic adaptation; Health and disease: introduction (follow NCERT); Life cycle, Pathogenecity, Treatment & Prevention (Brief account only) 1. Entamoeba histolytica, 2. Plasmodium vivax, 3. Ascaris lumbricoides, 4. Wuchereria bancrofti; Brief account of pathogenecity, treatment & prevention of Typhoid, Pneumonia, Common cold, & Ring worm, Tobacco, Drugs and Alcohol absuse (TDA).

7) **TYPE STUDY OF PERIPLANETA AMERICANA:**
Habitat and habits; External features; Locomotion, Digestive system; Respiratory system; Circulatory system Excretory system; Nervous system - sense organs, structure of ommatidium; Reproductive system.

8) **ECOLOGY & ENVIRONMENT:**
What is Ecology, and importance of Ecology.
Organisms and Environment: Ecology, population, communities, habitat, niche, biome and ecosphere (definitions only); Ecosystem: Elementary aspects only, Abiotic factors- Light, Temperature & Water (Biological effects only) Ecological adaptations; Population interactions; Ecosystems: Types, Components, Lake ecosystem; Food chains, Food web, Productivity and Energy flow in Ecosystem, Ecological pyramids - Pyramids of numbers, biomass and energy; Nutritient cycling - Carbon, Nitrogen & Phosphorous cycles (Brief account); Population attributes: Growth, Natality and Mortality, Age distribution, Population regulation, Environmental issues.

9) **HUMAN ANATOMY AND PHYSIOLOGY-I:**
Digestion and absorption: Alimentary canal and digestive glands; Physiology of digestion and gastrointestinal hormones; Peristalsis, digestion, absorption and assimilation of proteins, carbohydrates and fats, egestion, Calorific value of proteins, carbohydrates and fats (for box item- not to be evaluated); Disorders of digestive system, indigestion, constipation, vomiting, jaundice, diarrhea.
Breathing and Respiration: Respiratory organs in animals; Respiratory system in humans; Mechanism of breathing and its regulation in humans - Exchange of gases, transport of gases and regulation of respiration movements, Respiratory volumes; Respiratory disorders: Asthma, Emphysema, Bronchitis, Pneunomia, Occupational respiratory disorders - Asbestosis, Silicosis, Siderosis, Black Lung Disease in coal mine workers.

10) **HUMAN ANATOMY AND PHYSIOLOGY-II:**
Body Fluids and Circulation: Covered in I year composition of lymph and functions; Clotting of blood; Human circulatory system - structure of human heart and blood vessels; Cardiac cycle, cardiac output, double circulation, circulatory pathways, Portal

circulation and coronary circulation; regulation of cardiac activity; Disorders of circulatory system: Hypertension, coronary artery disease, angina pectoris, heart failure.

Excretory products and their elimination: Modes of excretion - Ammonotelism, Ureotelism, Uricotelism, Excretory organs; Human excretory system - structure of kidney and nephron; Urine formation, osmoregulation; Regulation of kidney function - Renin-Angiotensin - Aldosterone system, Atrial Natriuretic Factor, ADH and diabetes insipidus; Role of other organs in excretion; Disorders: Uraemia, renal failure, renal calculi, glomerular nephritis, dialysis using artificial kidney, and kidney transplantation.

11) **HUMAN ANATOMY AND PHYSIOLOGY-III:**

Muscular and Skeletal system: Skeletal muscle - ultra structure; Contractile proteins & Mechanism of muscle contraction, muscle fatigue, types of muscle fibres, Skeletal system and its functions; Joints. (to be dealt with relevance to practical syllabus); Disorders of the muscular and skeletal system: myasthenia gravis, tetany, muscular dystrophy, arthritis, osteoporosis, gout, Rigor Mortis.

Neural control and co-ordination: Nervous system in human beings - Central nervous system, Peripheral nervous system and Somatic and autonomic neural system; Generation and conduction of nerve impulse; Reflex action; Sensory perception; Sense organs; Brief description of other receptors; Elementary structure and functioning of eye and ear, disorders of human neural system.

12) **HUMAN ANATOMY AND PHYSIOLOGY-IV:**

Endocrine system and chemical co-ordination Endocrine glands and hormones; Human endocrine system - Hypothalamus, Pituitary, Pineal, Thyroid, Parathyroid, Thymus gland, Adrenal, Pancreas, Gonads; Mechanism of hormone action (Elementary idea only), hormones of kidney, heart and gastrointestinal tract, Role of hormones as messengers and regulators

Hypo and Hyper activity and related disorders: Common disorders -Dwarfism, acromegaly, cretinism, goiter, exophthalmic goiter, diabetes, Addison's disease, Cushing's syndrome. (Diseases & disorders to be dealt in brief).

Immune system: Basic concepts of Immunology - Types of Immunity - Innate Immunity, Acquired Immunity, Active and Passive Immunity, Cell mediated Immunity and Humoral Immunity, Cells of immune system, organs of immune system, soluble mediators of immunity and immunological disorders.

13) **HUMAN REPRODUCTION:**

Human Reproductive System: Male and female reproductive systems; Microscopic anatomy of testis & ovary; Gametogenesis, Spermatogenesis & Oogenesis; Menstrual cycle; Fertilization, Embryo development up to blastocyst formation, Implantation; Pregnancy, placenta formation, Parturition, Lactation (elementary idea).

Reproductive Health: Need for reproductive health and prevention of sexually transmitted diseases (STD); Birth control - Need and methods, contraception and

medical termination of pregnancy (MTP); Amniocentesis; infertility and assisted reproductive technologies - IVFET, ZIFT, GIFT (elementary idea for general awareness).

14) GENETICS:

Heredity and variation: Mendel's laws of inheritance with reference to Drosophila. (Drosophila melanogaster Grey, Black body colour; Long, Vestigial wings), Pleiotropy; Multiple alleles: Inheritance of blood groups and Rh-factor; Codominance (Blood groups as example) Elementary idea of polygenic inheritance; Skin colour in humans. Sex determination - in humans, birds, Fumea moth, Genic balance theory of sex determination in Drosophila melanogaster and honey bees, Sex linked inheritance - Haemophilia, Colour blindness; Mendelian disorders in humans: Thalassemia, Haemophilia, Sickle celled anaemia, cystiefibrosis PKU, Alkaptonuria; Chromosomal disorders – Down's syndrome, Turner's syndrome and Klinefelter syndrome; Human Genome Project and DNA Finger Printing.

15) ORGANIC EVOLUTION:

Origin of Life, Biological evolution and Evidences for biological evolution (palaeontological, comparative anatomical, embryological and molecular evidences) Theories of evolution: Lamarckism (in brief), Darwin's theory of Evolution-Natural Selection with example (Kettlewell's experiments on Bistonbitularia), Mutation Theory of Hugo De Vries; Modern synthetic theory of Evolution.

Hardy Weinberg law, Evolutionary forces, Types of Natural Selection; Gene flow and genetic drift; Human evolution; Speciation - Allopatric, sympatric; Reproductive isolation.

16) APPLIED BIOLOGY:

Beekeeping, Animal Husbandry: Fishery management, Poultry management, Dairy management; Animal breeding, Bio-medical Technology: Diagnostic Imaging (X-ray, CTscan, MRI), ECG, EEG, Application of Biotechnology in health: Human insulin and vaccine production; Gene Therapy; Transgenic animals; ELISA; Vaccines, MABs, Cancer biology, stem cells.

*****