

**National Education Society for  
Tribal Students  
New Delhi**

Detailed syllabus for the posts of Post Graduate  
Teachers (PGTs)

## Syllabus -PGTs

- **General awareness**

General knowledge and Current affairs with special emphasis in the field of education.

- **Reasoning Ability**

Puzzles & Seating arrangement, Data sufficiency, Statement based questions (Verbal reasoning), Inequality, Blood relations, Sequences and Series, Direction Test, Assertion and Reason, Venn Diagrams.

- **Knowledge of ICT**

Fundamentals of Computer System, Basics of Operating System, MS Office, Keyboard Shortcuts and their uses, Important Computer Terms and Abbreviations, Computer Networks, Cyber Security, and Internet.

- **Teaching aptitude**

Teaching-Nature, Characteristics, Objectives and Basic requirements, Learner's characteristics, Factors affecting teaching, Methods of Teaching, Teaching Aids and Evaluation Systems.

- **Experiential activity-based pedagogy and case study based**

- **National Education Policy (NEP)- 2020**

- **General English**

Verb, Tenses, Voice, Subject-Verb Agreement, Articles, Comprehension, Fill in the Blanks, Adverb, Error Correction, Sentence Rearrangement, Unseen Passages, Vocabulary, Antonyms/Synonyms, Grammar, Idioms & Phrases

- **General Hindi**

संधि, समास, विलोम शब्द, पर्यायवाची शब्द, सामान्य असुद्धियाँ, वाक्यांशों के लिए एक शब्द, मुहावरे- लोकोक्तियाँ, अपठित गद्यांश पर आधारित प्रश्न |

## **PGT -Biology**

### **The Living World**

Biodiversity; Need for classification; three domains of life; taxonomy and systematics; concept of species and taxonomical hierarchy; binomial nomenclature

### **Biological Classification**

Five kingdom classification; Salient features and classification of Monera, Protista and Fungi into major groups; Lichens, Viruses and Viroids.

### **Plant Kingdom**

Classification of plants into major groups; Salient and distinguishing features and a few examples of Algae, Bryophyta, Pteridophyta, Gymnospermae (Topics excluded - Angiosperms, Plant Life Cycle and Alternation of Generations)

### **Animal Kingdom**

Salient features and classification of animals, non-chordates up to phyla level and chordates up to class level (salient features and at a few examples of each category).

### **Morphology of Flowering Plants**

Morphology of different parts of flowering plants: root, stem, leaf, inflorescence, flower, fruit and seed. Description of families: Solanaceae

### **Anatomy of Flowering Plants**

Anatomy and functions of tissue systems in dicots and monocots.

### **Structural Organisation in Animals**

Morphology, Anatomy and functions of different systems (digestive, circulatory, respiratory, nervous and reproductive) of frog.

### **Cell-The Unit of Life**

Cell theory and cell as the basic unit of life, structure of prokaryotic and eukaryotic cells; Plant cell and animal cell; cell envelope; cell membrane, cell wall; cell organelles - structure and function; endomembrane system- endoplasmic reticulum, ribosomes, golgi bodies, lysosomes, vacuoles; mitochondria, plastids, microbodies; cytoskeleton, cilia, flagella, centrioles (ultrastructure and function); nucleus.

### **Biomolecules**

Chemical constituents of living cells: biomolecules, structure and function of proteins, carbohydrates, lipids, nucleic acids; Enzymes - properties, enzyme action.

### **Cell Cycle and Cell Division**

Cell cycle, mitosis, meiosis and their significance

### **Photosynthesis in Higher Plants**

Photosynthesis as a means of autotrophic nutrition; site of photosynthesis, pigments involved in photosynthesis (elementary idea); photochemical and biosynthetic phases of photosynthesis; cyclic and non-cyclic photophosphorylation; chemiosmotic hypothesis; photorespiration; C<sub>3</sub> and C<sub>4</sub> pathways; factors affecting photosynthesis.

### **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.

### **Plant - Growth and Development**

Seed germination; phases of plant growth and plant growth rate; conditions for growth; differentiation, dedifferentiation and redifferentiation; sequence of developmental processes in a plant cell; growth regulators - auxin, gibberellin, cytokinin, ethylene, ABA.

### **Breathing and Exchange of Gases**

Introduction to 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, respiratory volumes; disorders related to respiration - asthma, emphysema, occupational respiratory disorders.

### **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; cardiac cycle, cardiac output, ECG; double 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; human excretory system - structure and function; urine formation, osmoregulation; regulation of kidney function - renin - angiotensin, atrial natriuretic factor, ADH, diabetes insipidus; micturition; role of other organs in excretion; disorders - uremia, renal failure, renal calculi, nephritis; dialysis and artificial kidney, kidney transplant.

### **Locomotion and Movement**

Types of movement - amoeboid, ciliary, flagellar, muscular; skeletal muscle, contractile proteins and muscle contraction; skeletal system and its functions; joints; disorders of muscular and skeletal systems - myasthenia gravis, tetany, muscular dystrophy, arthritis, osteoporosis, gout.

### **Neural Control and Coordination**

Neuron and nerves; Nervous system in humans - central nervous system and peripheral nervous system; generation and conduction of nerve impulse; visceral nervous system.

### **Chemical Coordination and Integration**

Endocrine glands and hormones; human endocrine system - hypothalamus, pituitary, pineal, thyroid, parathyroid, thymus, adrenal, pancreas, gonads; hormones of heart, kidney and gastrointestinal tract; mechanism of hormone action (elementary idea); role of hormones as messengers and regulators, hypo - and hyperactivity and related disorders; dwarfism, acromegaly, cretinism, goiter, exophthalmic goiter, diabetes, Addison's disease.

### **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; special modes - apomixis, parthenocarpy, polyembryony; Significance of seed dispersal and fruit formation.

### **Human Reproduction**

Male and female reproductive systems; microscopic anatomy of testis and ovary; gametogenesis - spermatogenesis and oogenesis; menstrual cycle; fertilisation, embryo

development up to blastocyst formation, implantation; pregnancy and placenta formation ; parturition ; lactation .Reproductive Health

Need for reproductive health and prevention of Sexually Transmitted Diseases (STDs); birth control - need and methods; medical termination of pregnancy (MTP); amniocentesis; infertility and assisted reproductive technologies - IVF, ZIFT, GIFT

### **Principles of Inheritance and Variation**

Heredity 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; linkage and crossing over; Sex determination - in human being, birds and honey bee; sex linked inheritance - haemophilia, colour blindness; Mendelian disorders in humans – thalassemia; chromosomal disorders in humans; Down's syndrome, Turner's and Klinefelter's syndromes.

### **Molecular Basis of Inheritance**

Structure of DNA and RNA; DNA packaging; Search for genetic material and DNA as genetic material; DNA replication; Central Dogma; transcription, genetic code, translation; gene expression and regulation - lac operon; Human genome project; DNA fingerprinting.

### **Evolution**

Origin of life; biological evolution and evidences for biological evolution (paleontology, comparative anatomy, embryology and molecular evidences); adaptive radiation; Darwin's theory of evolution; mechanism of evolution - variation (mutation and recombination) and natural selection with examples, types of natural selection; Gene flow and genetic drift; Hardy - Weinberg's principle; human evolution

### **Human Health and Diseases**

Pathogens; parasites causing human diseases (malaria, dengue, chikungunya, filariasis, ascariasis, typhoid, pneumonia, common cold, amoebiasis, ring worm) and their control; Basic concepts of immunology - vaccines; cancer, HIV and AIDS; Adolescence - drug and alcohol abuse.

### **Biotechnology - Principles and Processes**

Genetic Engineering (Recombinant DNA Technology).

### **Biotechnology and its Application**

Application of biotechnology in health and agriculture: genetically modified organisms - Bt crops; Human insulin, gene therapy; molecular diagnosis; transgenic animals; biosafety issues, biopiracy and patents.

### **Organisms and Populations**

Population interactions - mutualism, competition, predation, parasitism, commensalism; population attributes - growth, birth rate and death rate, age distribution.

### **Ecosystem**

Ecosystem, productivity and decomposition; energy flow; pyramids of number, biomass, energy.

### **Biodiversity and Conservation**

Biodiversity - Concept, levels, patterns, importance; loss of biodiversity; biodiversity conservation; hotspots, endangered organisms, extinction, Red Data Book, Sacred Groves, biosphere reserves, national parks, wildlife, sanctuaries and Ramsar sites.