

## **VITEEE Biology Syllabus:**

### **Taxonomy:**

- Need for classification; three domains of life
- Linnaean, Whittaker, Bentham and Hooker systems of classification
- Salient features of non-chordates up to phyla levels and chordates up to class levels

### **Cell and Molecular Biology:**

- Cell theory
- Prokaryotic cell and its ultrastructure
- Eukaryotic cell- cell wall, cell membrane, cytoskeleton, nucleus, chloroplast, mitochondria, endoplasmic reticulum, Golgi bodies, ribosomes, lysosomes, vacuoles and centrosomes
- Cell cycle and division - amitosis, mitosis and meiosis
- Search for genetic material; the structure of DNA and RNA; replication, transcription, genetic code, translation, splicing, gene expression and regulation (lac operon) and DNA repair.

### **Reproduction:**

- Asexual reproduction – binary fission, sporulation, budding, gemmule formation and fragmentation. Vegetative propagation in plants, sexual reproduction in flowering plants and structure of flowers.
- Pollination, fertilisation, development of seeds and fruits, seed dispersal, apomixis, parthenocarpy and polyembryony
- Human reproductive system
- Gametogenesis, menstrual cycle, fertilisation, implantation, embryo development up to blastocyst formation, pregnancy, parturition and lactation
- Assisted reproductive technologies.

### **Genetics and evolution:**

- Chromosomes - structure and types, linkage and crossing over, recombination of chromosomes, mutation and chromosomal aberrations
- Mendelian inheritance, the chromosomal theory of inheritance, deviation from the Mendelian ratio (incomplete dominance, co-dominance, multiple allelism, pleiotrophy), sex-linked inheritance and sex determination in humans
- Darwinism, neo-Darwinism, Hardy and Weinberg's principle and factors affecting the equilibrium: selection, mutation, migration and random genetic drift.

### **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, antibiotics, cancer, HIV and AIDS. Adolescence, drug and alcohol abuse

### **Biochemistry:**

- Structure and function of carbohydrates, lipids, and proteins. Enzymes – types, properties and enzyme action
- Metabolism - glycolysis, Krebs's cycle and pentose phosphate pathway.

### **Plant physiology:**

- Movement of water, food, nutrients, gases, and minerals
- Passive diffusion facilitated diffusion, and active transport
- Imbibition, osmosis, apoplast and symplast transport and guttation
- Transpiration, photosynthesis (light and dark reactions) and electron transport chain
- Hormones and growth regulators, photoperiodism and vernalization. Nitrogen cycle and biological nitrogen fixation

### **Human physiology:**

- Digestion and absorption, breathing and respiration, body fluids and circulation, excretory system, endocrine system, nervous system, skeletal and muscular systems
- Locomotion and movement, growth, ageing, and death. Hormones - types of hormones, functions and disorders

### **Biotechnology and its applications:**

- Recombinant DNA technology, applications in health, agriculture and industries; genetically modified organisms; Human insulin, vaccine and antibiotic production
- Stem cell technology and gene therapy. Apiculture and animal husbandry
- Plant breeding, tissue culture, single cell protein, fortification, Bt crops and transgenic animals. Microbes in food processing, sewage treatment, wastemanagement and energy generation.
- Biocontrol agents and biofertilizers. Biosafety issues, biopiracy and patents.

### **Biodiversity, ecology and environment:**

- Ecosystems: components, types, pyramids, nutrient cycles (carbon and phosphorous), ecological succession and energy flow in an ecosystem; Biodiversity - concepts, patterns, importance, conservation, hot spots, endangered organisms, extinction, Red data book, botanical gardens, national parks, sanctuaries, museums, biosphere reserves and Ramsar sites
  - Environmental issues: pollution and its control
  - Population attributes - growth, birth, and death rate and age distribution.
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