

ANUPGCET–2020 :: 101-LIFE SCIENCES (SYLLABUS)

Max. Marks: 100

- 1. Cell Biology:** Ultrastructure of prokaryotic and eukaryotic cell, Structure and function of cell organelles. Cell division - Mitosis and Meiosis. Chromosomes structure, Karyotyping.
- 2. Genetics:** Mendelian principles, Gene Interaction, Linkage and Crossing over, Sex determination, Sex linkage, Mutations - Genic and chromosomal (Structural and numerical); Chromosomal aberrations in humans. Recombination in prokaryotes transformation, conjugation, transduction, sexduction. Extra genomic inheritance.
- 3. Molecular Biology and Genetic Engineering:** Structure of eukaryotic gene, DNA and RNA structure, DNA replication in pro and eukaryotes, Transcription and translation in pro and eukaryotes, genetic code. Regulation of gene expression in prokaryotes, Principles of recombinant DNA technology. DNA vectors, Transgenesis. Applications of genetic engineering.
- 4. Biotechnology:** Plant and animal cell culture, cloning, Fermentors types and process, Biopesticides, Biofertilizers, Bioremediation, Renewable and non - renewable energy resources, Non-conventional fuels.
- 5. Biomolecules:** Carbohydrates, proteins, amino acids, lipids, vitamins and porphyrins. Enzymes - classification and mode of action, enzyme assay, enzyme units, enzyme inhibition, enzyme kinetics, Factors regulating enzyme action.
- 6. Immunology:** Types of immunity, cells and organelles of immune system, Antigen – antibody reaction. Immunotechniques, Hypersensitivity, Vaccines.
- 7. Techniques:** Microscopy - Light and Electron, Centrifugation, Chromatography, Electrophoresis, Colorimetric and Spectrophotometric techniques, Blotting techniques, PCR, DNA finger printing.
- 8. Ecology, Environment and Evolution:** Theories and evidences of organic evolution, Hardy – Weinberg law. Components of an ecosystem, Ecological pyramids, Biogeochemical cycles, Ecological adaptations. Climatic and edaphic and biotic factors. Ecological succession - Hydrosere and xerosere, Natural resources, Biodiversity, current environmental issues, Environmental pollution, Global warming and climate change.
- 9. Physiology:** Structure and function of liver, kidney and heart, composition of blood, blood types, blood coagulation, Digestion and absorption, Endocrinology, Muscle and Nervous system.
- 10. Metabolism:** Metabolism of carbohydrates, lipids, proteins, aminoacids and nucleic acids. Biological oxidation and bioenergetics.

11. Animal Science: Biology of invertebrates and chordates, Embryology of chordates, Classification of marine environment - Physical and chemical parameters, Marine, estuarine, reservoir and riverine fisheries, Cultivation of fin and shell fish. Culture practices.

12. Plant Science: Classification of cryptogams and phanerogams. General characteristics of taxonomic groups at class and family level Water relations and mineral nutrition of plants, Plant growth regulators, Ethnobotany and medicinal plants, Biology of plant seed, Photosynthesis.

13. Microbiology: Microbes - Types, distribution and biology. Isolation and cultivation of bacteria and virus. Staining techniques. Bacterial growth curve, Microbial diseases - food and water borne, insect borne, contact diseases in humans. Microbial diseases in plants - by bacteria, fungi and virus, Plant microbe - interactions.

14. Nutrition: Biological value of proteins, protein malnutrition, disorders, Chemistry and physiological role of vitamins and minerals in living systems.

