

**Subject-BIOLOGY**

<b>UNIT</b>	<b>CONTENT</b>
<b>UNIT -1</b>	<ul style="list-style-type: none"> <li>Biodiversity - biological classification, animal kingdom classification and Plant kingdom classification- The living world- what is life, living and nonliving, organizational level, molecular basis of life, aging and death</li> <li>Need of classification- three domain of life, systematic and taxonomy, concept of species, taxonomical hierarchy and, bi- nomenclature, tri – nomenclature, tools for study of taxonomy –Museum, zoological parks, herbarium and botanical gardens</li> <li>Biological classification- five kingdom classification, Monera, Protista and fungi Kingdom important characters and classification up to major groups, Virus, Viroid's important features and characteristics and study of Indian Cryptogams and their ecological importance</li> <li>Plant Kingdom- classification and special characteristics features of plants major group – algae, bryophyte, pteridophytes, gymnosperm and angiosperm till class and their important features with examples</li> <li>International code of botanical and zoological nomenclature</li> </ul>
<b>UNIT -2</b>	<ul style="list-style-type: none"> <li>Classification of animal kingdom- invertebrates- acoelomates, coelomates, pseudocoelomates, Protostomes and deuterostomes, bilateral and radial animals, and different types of symmetry</li> <li>classification of invertebrates- Protozoa, porifera ,coelentrata ,Platyhelminthes ,aschehelminthes, Annelida, Arthropod,mollusca, Echinodermata, hemichordata classification up to classes and general features</li> <li>Protozoa- general features and life cycle of paramecium, monocystis ,trypanosoma and plasmodium</li> <li>Porifera- skeleton system, Canal system and reproduction</li> <li>Coelentrata- types of polymorphism, formation of coral reef, metagenesis, general features and life cycle of orelia and obelia.</li> <li>Platyhelminthes - parasitic adaptation, general features and life history of fasciola and taenia and disorder causes of symptoms</li> <li>Nemetehelminthes- general features and life history of ascaris and parasitic adaptation</li> <li>Annelida- process of metamerism, and general features and life history of earthworm and leach</li> <li>Arthropod- eye vision in Arthropod, larval stage of crustaceans animals, mouthpart in insect, Metamorphism in insects and their hormonal regulation, apps and termites social behavior</li> <li>mollusca- locomotory organ, Torison and Detorison in gastropods, general features and life history of Pila, sepia.</li> <li>Echinodermata - life history of Starfish and various larvel stage</li> <li>Hemichordata- organisation and his life history of Balanoglossus,</li> <li>Protocordata- general features and life history of hardmania.</li> </ul>
<b>UNIT -3</b>	<ul style="list-style-type: none"> <li>classification of vertebrate-Pisces, Amphibia, reptilian, aves and mammalia, general features and study up to order level</li> <li>Pisces class- respiration, locomotion and migration</li> <li>amphibia class- parental care</li> <li>reptilia -origin of reptilian, types of skull, position of sphinodon and crocodile</li> <li>aves- origin of birds, Avian adaptations of aves, and migration</li> <li>mammalians- origin of mammalians, dental formula,oviperous,marsupial, aquatic mammalians,and common features of primates</li> <li>competitive study of different system such as -circulatory system, excretory system, skeleton system, reproductive system, brain and sensory organ such as- skin,eye, Nose, ear in vertebrates animals</li> </ul>
<b>UNIT -4</b>	<ul style="list-style-type: none"> <li>Structure and function of cell- the basic unit of life, difference between prokaryotes and Eukaryotic, difference between Plant cell and Animal cell and structure, cell wall, cell membrane different model of cell membrane structure, membrane transport.</li> <li>Different cell organelles such as- structure and function of mitochondria, lisosomes, Golgi body, endoplasmic reticulum, vacuoles, ribosome, plastid, and micro bodies, structure and function of nucleus and nucleolus.</li> <li>Cyto skeleton system- structure of cilia, flagella. <span style="float:right">Cell</span></li> <li>division - mitosis and meiosis cell division, crossing over and linkage process and factors affecting it.</li> </ul>
<b>UNIT -5</b>	<ul style="list-style-type: none"> <li>Biomolecules- structure and function of Carbohydrate, protein, lipid, enzyme and vitamin, mechanism of enzyme action, discovery of enzyme, general features of enzyme, chemical nature of enzyme and factor affecting activity of enzyme and coenzyme reaction.</li> <li>Inorganic substances- importance of minerals and water for plants and animals</li> </ul>
<b>UNIT -6</b>	<ul style="list-style-type: none"> <li>Tissue- types of animal tissue- types of epithelial tissue, connective tissue, skeleton tissue cartilage and Bone, vascular tissue- blood and lymph, muscular tissue and types of nervous tissue its structure.</li> <li>Types of plant tissue- meristemic tissue, simple tissue, Complex tissue, special types of tissue</li> <li>Simple tissue- parenchyma, collenchymas, sclerenchyma</li> <li>Complex tissue- xylem and phloem and its functions</li> <li>different types of special tissue and glandular tissue</li> </ul>
<b>UNIT -7</b>	<ul style="list-style-type: none"> <li>Earthworm, cockroach and frog- classification , habit and nature of earthworm, external and internal morphology, digestive system, circulatory system, respiratory system, excretory system, nervous system, reproductive system.</li> </ul>

UNIT	CONTENT
	<ul style="list-style-type: none"> <li>• Cockroach- habit and nature of Cockroach external and internal morphology, digestive system, circulatory system, respiratory system, excretory system, nervous system, reproductive system.</li> <li>• Frog- habit and nature of frog external and internal morphology, digestive system, circulatory system, respiratory system, excretory system, nervous system, reproductive system.</li> <li>• Important plant families- study of bracaceae, roseceae, Euphorbaicia, Fabaceae, poaceae, lileacea, malvaceace, soleneceae, cucurbitaceae.</li> </ul>
<b>UNIT -8</b>	<ul style="list-style-type: none"> <li>• Anatomy and morphology of flowering plant- structural organization and modification of stems, roots and leaves</li> <li>• function of roots, stem and leaves</li> <li>• Types of flowers and inflorescence, fruit, types of simple fruit, aggregate fruits, composite fruits, seeds types and dormancy</li> <li>• Part of flowering plant- structure of Monocotyledonous and dicotyledonous root, structure of Monocotyledonous and dicotyledonous stem, structure of Monocotyledonous and dicotyledonous leaf. And secondary growth</li> </ul>
<b>UNIT -9</b>	<ul style="list-style-type: none"> <li>• Transportation in plants and mineral nutrition- transportation of water, gas and mineral elements in plants, cell to cell diffusion, active transport, plant water relation, water potential ,osmosis, plasmolysis, pathway of water movment, absorpition, Apoplast, symplast, transpiration, opening and closing stomata, absorpition and transportation of minerals elements, food transportation, pressure flow theory</li> <li>• Essential minerals- macro elements and micro elements their functions and deficiency symptoms, mineral poisoning, hydroponics general features, nitrogen metabolism, nitrogen cycle, biological nitrogen fixation.</li> </ul>
<b>UNIT -10</b>	<ul style="list-style-type: none"> <li>• Photo synthesis in plant -photosynthesis method as a Nutrition, site of photosynthesis, importance of photosynthesis, chloroplast( chlorophyll) structure, photosynthesis pigment,</li> <li>• light reaction of photosynthesis, dark reaction of photosynthesis, electron transfer system, cyclic and noncyclic photo-phosphorylation</li> <li>• C3 plant and C4 plant, C3 cycle and C4 cycle, CAM cycle,</li> <li>• Chemo osmosis, photo respiration, factor affecting of photosynthesis.</li> </ul>
<b>UNIT -11</b>	<ul style="list-style-type: none"> <li>• Respiration, plant growth and development in plant- exchange of respiratory gases in plant, cellular respiration- glycolysis process, krebs cycle, electron transport system, ATP synthesis, Ambhibolic pathway, anaerobic respiration, respiration quotients and fermentation process</li> <li>• Plant growth and development, seed germination, phases of plant growth, and plant growth rate, stage of development differentiation de- differentiation and re- differentiation, development stage in plant, plant growth regulators- auxins, gibberellins cytokinins, ethylene, abscisic acid, photoperiodism, vernalisation, senescence, plant movement, nitrogen metabolism</li> </ul>
<b>UNIT -12</b>	<ul style="list-style-type: none"> <li>• Sexual reproduction in flowering plant- Various method of reproduction, asexual reproduction and sexual reproduction, modes of asexual reproduction-Binary fission, sporulation, budding, gemmules formation, segmentation, vegetative propagation in plants.</li> <li>• Structure of flower, development of male and female gametophyte, pollination and pollen grain, types of pollination, pollinating agents with and example, external reproductive organs, pollen-pistil interaction, double fertilization, post development after fertilization, development of embryo and endosperm, development of seeds and fruit, special method of reproduction- apomixes parthenocarpy, polyembryony, seed dispersal, morphogenesis and Organogenesis in plant</li> </ul>
<b>UNIT -13</b>	<ul style="list-style-type: none"> <li>• Genetics- mendelian inheritance, deviation from mendelian inheritance -incomplete dominance, co-dominance, multiple allelis, inheritance of human blood group, pleiotrotropy, polygenic inheritance, Basic concept of inheritance, chromosome and gene</li> <li>• Different types of chromosome -polythene chromosome, B-chromosome, cytoplasmic-inheritance</li> <li>• sex determination process in human birds and Honey Bee,</li> <li>• crossing over and linkage</li> <li>• Sex linked inheritance- hemophilia, color blindness, mendelian disorder in human, thalasemia, chromosomal Disorder in human such as- down syndrome, Turner syndrome klenfleter syndrome</li> <li>• DNA as a genetic material, structure of DNA and RNA, DNA packaging model, DNA replication, genetic code, Central dogma theory of genetic code, process of protein formation- transcription, translation, regulation of gene expression, Lac Operon model, genome and structure of Human Genome, Human Genome Project, DNA fingerprinting</li> </ul>
<b>UNIT -14</b>	<ul style="list-style-type: none"> <li>• Evolution- origin of life on earth and organic evolution, evidence of organic evolution, fossils evidence of organic evolution, comparative Anatomical study of organic evolution, embryological evidence for Organic evolution, molecular evidence of organic evolution .</li> <li>• Darwinism, Lamarekism, modern synthetic theory of evolution.</li> <li>• Mutation and recombination, natural selection and its types.</li> <li>• Gene family, gene displacement, genetic drift, Hardy Weinberg principal, adaptive radiation, human evolution.</li> </ul>
<b>UNIT -15</b>	<ul style="list-style-type: none"> <li>• Human reproduction- types of asexual reproduction in animals, Male reproductive system, female reproductive system, structure of testis and ovary, gameteogenesis- spermatogenesis, ogenesis, menstruation cycle ,fertilization, embryo development process from blastocyst ,implantation, pregnancy, placenta types and formation, parturition and lactation, morphogenesis and Organogenesis in animal</li> </ul>

UNIT	CONTENT
	<ul style="list-style-type: none"> <li>Reproductive health, significance and need of studying reproductive health ,sexual transmitted disease STD, birth control and medical termination of pregnancy ,MTP, amniocentesis, infertility, and assisted reproductive methods – IVF, ZIFT, GIFT</li> </ul>
<b>UNIT -16</b>	<ul style="list-style-type: none"> <li>Human Physiology-1- digestion and absorption, alimentary canal and digestive gland, role of digestive enzyme and hormone, whole process of digestion, absorption, digestive disorder- constipation, vomiting ,jaundice, diarrhea ,indigestion</li> <li>Human respiration- respiratory organ in different animal, structure of respiratory system in human, process of breathing gaseous exchange in human, respiratory volumes, respiratory disorder –asthma, emphysema.</li> <li>Human circulatory system- blood and blood groups, process of blood coagulation, Lymph and its functions, Rh- factor, human circulatory system, structure of blood vessels and human heart, cardiac cycle, heart sound production, ECG, double circulatory system, regulation of cardiac activities, disorder of circulatory system- high blood pressure, low blood pressure, coronary artery, angina pectoris and heart attack</li> </ul>
<b>UNIT -17</b>	<ul style="list-style-type: none"> <li>Human Physiology-2- Excretion and types of excretory animal- aminotelic, uricotelic, ureotelic, human excretory system and its structure, urine, osmoregulation, regulation of Kidneys functions, renin-angiotenin activity,ADH and diabetes insipidus, disorder of excretory system- uremia, renal failure, renal calculi, nephritis, dialysis, artificial kidney.</li> <li>Locomotion and movement- types of movement, ciliary, flagellar, muscular movement, skeletal muscles contraction, and its functions, contractive proteins and muscular contraction, skeleton system and its function, joints, disorder of skeleton system- Maesthemia, gravis, tetany, Muscular dystrophy, Arthritis, osteoporosis, gout.</li> <li>Neural control and coordination- nerve cell and nerves, origin and conduction of nerve impulse, reflex action, structure of brain and spinal cord and different part of it and functions, various sensory organ- skin, eye, ear structure and its functions.</li> <li>Chemical coordination and regulation- endocrine glands and hormone release from endocrine glands, human endocrine system- hypothalamus, pituitary gland, penal gland, thyroid gland, parathyroid gland, adrenal gland, pancreas and reproductive gland, chemical action of hormone, role of hormone as a messenger and regulator, hormonal disorder- dwarfism, agromegaly ,critinism, goiter, diabetes mellitus, addisons disease.</li> </ul>
<b>UNIT -18</b>	<ul style="list-style-type: none"> <li>Biotechnology and its applications- principles of biotechnology, recombinant DNA biotechnology, process of biotechnology genetic engineering ,application of biotechnology in health and Agriculture, human insulin and vaccine production, gene therapy, molecular diagnosis, analysis of serum and urine, PCR, Elisa technique, genetically modified organism, BT crops</li> <li>Transgenic animal, transgenic crop,</li> <li>Ethical issues, bio piracy, biopatent ,development and use of molecular marker in plant reproduction, southern blotting technique spectrometer, phase contrast fluorescence microscopy, radioactive tracer, Gel electrophoresis, radio labeling technique</li> </ul>
<b>UNIT -19</b>	<ul style="list-style-type: none"> <li>Biology in human welfare- human health and pathogens, parasites causing human diseases- Malaria, dengue, Chikengunya, elephantiasis, ascariasis, typhoid, pneumonia, cold, Amoebiasis, ringworm and preventive measure, Basic concept of immunology, vaccine, cancer, HIV, AIDS,</li> <li>Problem of adolescence, drug and alcohol addiction</li> <li>importance and need of reproductive health and prevention of sexually transmitted diseases.</li> <li>strategy for enhancement in food production enhancement in crop production, plant reproduction, tissue culture, single cell protein, bio fortification, animal husbandry and beekeeping, Pearl culture and lac culture microbes in human welfare- microbes in household products, industrial product, sewage treatment production of energy, bio control agents biofertilizers, antibody production and other uses.</li> </ul>
<b>UNIT -20</b>	<ul style="list-style-type: none"> <li>Ecology and environment- modern concept of ecology and environment ,environmental factor- physical factor, soil factor, composition of soil topographical factor, ecological adaptation, ecades and Ecotypes</li> <li>Adaptive features in plant, adaptive features in animal</li> <li>population and its interactions, positive interaction- mutualism, commensalism</li> <li>negative interaction- parasitism, competition, predation and parasites population- attributes, size and density, birth rate, mortality rate, population dispersion and distribution, Biotic potential, J and S shaped of population growth, population control.</li> <li>Ecosystem- biotic and abiotic factor of ecosystem, productivity and decomposition, energy flow, Biomass and energy flow ecological pyramid, nutrients cycle, ecological succession and its types, ecological services- carbon stratify, oxygen vintage.</li> <li>Biodiversity and conservation- concept of biodiversity, method of biodiversity, importance of biodiversity, losses of biodiversity, conservation of biodiversity, endangered and extinct species, red data book, conservation of biosphere, National Park, century, ramsar sites, and other natural places and different place of biodiversity</li> <li>Environmental issue- pollution and its type, water pollution, air pollution, sound pollution and its causes and control, agriculture Chemicals and impact on environment, garbage management, solid wastage management, radioactive garbage management, greenhouse effect, climate change, global warming, Ozone depletion and other environmental issue</li> <li>Measures of Central tendency, theory of probability, T-test, co-bonding Coefficient, geographical distribution .</li> </ul>