

SRMJEEE Biology Syllabus 2025

Unit Name	Sub-topics
Diversity of Living World	Biodiversity, classifications, Importance Taxonomy of Systematics, Concept of species and hierarchy, Binomial Tools for the study of taxonomical, nomenclature, Taxonomy.
	Five kingdom classifications: Monera, Protista, and Fungi into major groups; Lichens; Viruses, and Viroids. Salient Features of them
	Classification of plants into major groups - Algae, Bryophytes, Pteridophytes, Gymnosperm, and Angiosperm - salient and distinguishing features. Angiosperms - classification up to class, characteristic features, and examples. Alternation of generation in plant life cycles
	Classification of animals - nonchordate up to phyla level and chordate up to class's level - salient and distinguishing features with a few examples of each category.
Structural Organization in Animals and Plants	Plant tissues: Morphology and modifications, Tissues, Anatomy and functions of different parts of flowering hypothesis; Photorespiration; C3 and C4 pathways; Factors affecting photosynthesis.
	Respiration: 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 of growth, Differentiation, dedifferentiation and redifferentiation, Sequence of developmental process in a plant cell, Growth regulators: auxin, gibberellin, cytokinin, ethylene, ABA. Seed dormancy, Photoperiodism, Vernalisation.
Cell Structure and Function	Cell theory and cell as the basic unit of life, Structure of prokaryotic and eukaryotic cell, Plant cell and animal cell. Cell envelope, cell

	<p>membrane, cell wall. Cell organelles - structure and function: Endomembrane system- endoplasmic reticulum, Golgi bodies, lysosomes, vacuoles, mitochondria, ribosomes, plastids, microbodies: Cytoskeleton, cilia, flagella, centrioles. Nucleus – nuclear membrane, chromatin, nucleolus.</p>
	<p>Chemical constituents of living cells: Biomolecules – structure and function of proteins including Enzymes–types, properties, enzyme action, carbohydrates, lipid and nucleic acids.</p>
	<p>Cell division: Cell cycle, mitosis, meiosis and their significance</p>
<p>Plant Physiology</p>	<p>Transport in plants: Movement of water, gases and nutrients, Cell to cell transport – Diffusion, active transport; Plant – water relations – Imbibition, water potential, osmosis, plasmolysis; Long distance transport of water – Absorption, apoplast, symplast, transpiration pull, root pressure and guttation; Transpiration – Opening and closing of stomata; Uptake and translocation of mineral nutrients – Transport of food, phloem transport, mass flow hypothesis.</p>
	<p>Mineral nutrition: Essential minerals, macro and micronutrients and their role, Deficiency symptoms, Mineral toxicity, Elementary idea of Hydroponics, Nitrogen – metabolism, cycle and fixation</p>
	<p>Photosynthesis: Significance - site of photosynthesis, pigments - Photochemical and biosynthetic phases of photosynthesis, Cyclic and non-cyclic</p>
	<p>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 and Diabetes insipidus, Role of other organs in excretion, Disorders - Uremia, Renal failure, Renal calculi, Nephritis, Dialysis and artificial kidney, kidney transplant.</p>

	<p>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 system – Myasthenia gravis, Tetany, Muscular dystrophy, Arthritis, Osteoporosis, Gout</p>
	<p>Neural control and coordination: Neurons and nerves, Nervous system in humans– central nervous system, peripheral nervous system and visceral nervous system. Generation, conduction and transmission of nerve impulse, Reflex action, Sensory perception, Sense organs, Elementary structure and function of eye and ear.</p>
	<p>Chemical coordination and regulation: 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, Role of hormones as messengers and regulators, Hypo- and hyperactivity and related disorders: Common disorders e.g. Dwarfism, Acromegaly, Cretinism, goiter, exophthalmic goiter, diabetes, Addison’s disease.</p>
Human Physiology	<p>Digestion and absorption: Alimentary Canal and digestive glands, Role of digestive enzymes and gastrointestinal hormones, Peristalsis, digestion, absorption and assimilation of proteins, carbohydrates and fats, Egestion; Nutritional and digestive disorders – indigestion, constipation, vomiting, jaundice, diarrhea</p>
	<p>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, Respiratory volumes, Disorders related to respiration - Asthma, Emphysema, Occupational respiratory disorders.</p>
	<p>Body fluids and circulation: Composition of blood, blood groups, coagulation of blood, Composition of lymph and its function, Human</p>

	<p>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.</p>
	<p>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.</p>
	<p>Human Reproduction: Male and female anatomy of reproductive systems, microscopic tests and ovary, gametogenesis - spermatogenesis and oogenesis, menstrual cycle, fertilization, embryo development up to blastocyst formation, implantation, pregnancy and placenta formation, parturition, lactation</p>
	<p>Reproductive Health: Need for reproductive health and prevention of Sexually Transmitted Diseases (STDs), birth control - need and methods, contraception, and medical termination of infertility and assisted pregnancy (MTP), amniocentesis, reproductive technologies - IVF, ZIFT, GIFT, AI.</p>
<p>Genetics and Evolution</p>	<p>Principles of Inheritance and Variation: Heredity and variation, Mendelian inheritance, deviations from Mendelism – incomplete dominance, codominance, multiple alleles and inheritance of blood groups, pleiotropy, polygenic inheritance, chromosome theory of inheritance, chromosomes and genes, Sex determination in humans, birds, grasshopper and honey bee, linkage and crossing over. Mutation, Pedigree analysis, sex-linked inheritance -hemophilia, colour blindness, Mendelian disorders in humans – sickle cell anemia, Phenylketonuria, thalassemia, chromosomal disorders in humans, Down's syndrome, Turner's and Klinefelter's syndromes -</p>

	Bt crops; RNA interference. Human insulin, and vaccine production, stem cell technology, gene therapy, molecular diagnosis, transgenic animals, biosafety issues, biopiracy and patents.
Biology and Human Welfare Human Health and Diseases	Pathogens, parasites causing human diseases (malaria, dengue, chikungunya, filariasis, ascariasis, typhoid, pneumonia, common cold, amoebiasis, ringworm) and their control, Basic concepts of immunology – vaccines, cancer, HIV and AIDS, Adolescence - drug and alcohol abuse.
	Strategies for Enhancement in Food Production: Improvement in food production, Plant breeding, tissue culture, single cell protein, Biofortification, Apiculture and Animal husbandry
	Microbes in Human Welfare: Microbes in food processing - In household food processing, industrial production, sewage treatment, energy generation and microbes as biocontrol agents and biofertilizers. Antibiotics - production and judicious use.
Biotechnology and Its Applications Biotechnology	Principles and processes: Genetic Engineering (Recombinant DNA Technology).
	Biotechnology and its Application: Application of biotechnology in health and agriculture: genetically modified organisms
Ecology and Environment	Organisms and Populations: Organisms and environment: Habitat and niche, major abiotic factors, response to abiotic factors, ecological adaptations, population interactions - mutualism, competition, predation, Parasitism, commensalism, population attributes -growth, birth rate and death rate, age distribution.
	Ecosystem: Structure and function, productivity and decomposition, energy flow, pyramids of number, biomass, energy, nutrient cycles (carbon and phosphorus), ecological succession, ecological services - carbon fixation, pollination, release.
	Biodiversity and its Conservation: Biodiversity - Concept, patterns, importance, loss of biodiversity, biodiversity conservation, hotspots,

	endangered organisms, extinction, RedData Book, Sacred Groves, biosphere reserves, national parks, wildlife, sanctuaries and Ramsar sites.
	Environmental Issues: Air pollution and its control, water pollution and its control, agrochemicals and their effects, solid waste management, radioactive waste management, greenhouse effect and climate change impact and mitigation, ozone layer depletion, deforestation, anyone case study as success story addressing environmental issue(s).