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AcademicYear-2024-25

CLASS: F.Y. B.Sc Botany **SUBJECT: -Botany Sem I Paper I**

Sr.No	Month	Name of Topic: Plant Diversity 1	TH
1	June	ALGAE: Structure, life cycle and systematic position of *Nostoc* and *Spirogyra*, Economic importance of Algae.	15
2	July	FUNGI: Structure, life cycle and systematic position of *Rhizopus* and *Aspergillus*, Economic importance of Fungi. Modes of nutrition: Saprophytism and Parasitism.	15
3	August	BRYOPHYTA: General characters of Hepaticae, Structure, life cycle and systematic position of *Riccia*.	15

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AcademicYear-2024-25

CLASS: F.Y. B.Sc Botany **SUBJECT: -Botany Sem I Paper II**

Sr.No	Month	Name of Topic: Form and Function 1	TH
1	June	CELL BIOLOGY: General structure of plant cell: cell wall Plasma membrane (bilayer lipid structure, fluid mosaic model) , Ultra structure and functions of the following cell organelles: Endoplasmic reticulum and Chloroplast.	15
2	July	Energy pyramids, energy flow in an ecosystem, Types of ecosystems: aquatic and terrestrial	15
3	August	Genetics: Phenotype/Genotype, Mendelian Genetics- monohybrid, dihybrid; test cross; back cross ratios. Epistatic and Non epistatic interactions; multiple alleles.	15

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CLASS: F.Y. B.Sc Botany **SUBJECT: -Botany Sem II Paper I**

Sr.No	Month	Name of Topic: Plant Diversity 1	TH
1	June	Pteridophytes: Structure life cycle, systematic position and alternation of generations in *Nephrolepis*. Stellar evolution	15
2	July	Gymnosperms : Structure life cycle systematic position and alternation of generations in *Cycas*. Economic importance of Gymnosperms	15
3	August	Angiosperms: Leaf: simple leaf, types of compound leaves, Incisions of leaf, venation, phyllotaxy, types of stipules, leaf apex, leaf margin, leaf base, leaf shapes. Modifications of leaf: spine, tendril, hooks, phyllode, pitcher, *Drosera* or insectivorous plants, Inflorescence: Racemose: simple, catkin, spadix, panicle. Cymose: monochasial, dichasial, polychasial. Compound; corymb, umbel, cyathium, capitulum, verticillaster, hypanthodium. Study of the following: Malvaceae, Amaryllidaceae.	15

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CLASS: F.Y. B.Sc Botany **SUBJECT: -Botany Sem II Paper II**

Sr.No	Month	Name of Topic: Form and Function 1	TH
1	June	Anatomy: Simple tissues, complex tissues.Primary structure of dicot and monocot root, stem and leaf. Epidermal tissue system: types of hair, monocot and dicot stomata.	15
2	July	Physiology; Photosynthesis: Light reactions, photolysis of water, photophosphorylation (cyclic and non cyclic), carbon fixation phase (C_3, C_4 and CAM pathways).	15
3	August	Medicinal Botany: Concept of primary and secondary metabolites, difference between primary and secondary metabolites. Grandma's pouch: Following plants have to be studies with respect to botanical source, part of the plant used, active constituents present and medicinal uses: *Oscimum sanctum, Adathoda vasica, Zinziber officinale, Curcuma longa, Santalum album, Aloe vera.*	15

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AcademicYear-2024-25

CLASS: F.Y. B.ScZoology **SUBJECT: -Zoology Sem 1 Paper I**

Sr.No	Month	**Name of Topic:** Wonders of Animal World	TL
1	June	Echolocation in Bats and Cetaceans - Dolphins and Whales, Mechanism of Pearl formation in Mollusca,Bioluminescence in Animals: Noctiluca, Glow worm, Firefly, Angler Fish (Mechanism and use for the animal), Regeneration in Animals - Earthworm (Annelida) and Lizard (Reptile), Mimicry in Butterflies and its significance: Great Eggfly and Common Crow, Common Palmfly and Plain Tiger.Mechanism of Coral formation and types of Coral reefs, Bird migration: Definition, types and factors inducing bird migration, Adaptive features of desert animals: Reptiles (Phrynosoma) and Mammals (Camel), Breeding and Parental care in: Pisces - Ovo-viviparous (Black Molly/Guppy), Mouth brooders. (Tilapia), Brood pouches (Sea horse), Amphibia - Mouth brooders (Darwin's Frog), Egg carriers (Midwife Toad), Aves: Brood Parasitism (Cuckoo)	15
2	July	Biodiversity and its Conservation: Introduction to Biodiversity - Definition, Concepts, Scope and Significance. Levels of Biodiversity - Introduction to Genetic, Species and Ecosystem Biodiversity, Introduction of Biodiversity Hotspots- (Western Ghats and IndoBurma Border), Values of biodiversity - Direct and Indirect use value, Threats to Biodiversity - Habitat loss and Man-Wildlife conflict, Biodiversity conservation and management.	15
3	August	Footsteps to follow: Dr. Har Gobind Khorana (Genetic code), Dr. Varghese Kurien (Amul –White revolution), Dr. Salim Ali (Ornithologist), Anna Hazare (Water Conservation-Ralegan Siddhi), Baba Amte (Anandvan), Kiran Mazumdar Shaw (Biocon), Gadre Fisheries (Surimi), Rajendra Singh.	15

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CLASS: F.Y. B.ScZoology **SUBJECT: -Zoology Sem1 Paper II**

Sr.No	Month	**Name of Topic:** INSTRUMENTATION and ANIMAL BIOTECHNOLOGY	TL
1	June	Introduction to good laboratory practices. Use of safety symbols: meaning, types of hazards and precautions, Units of measurement: Calculations and related conversions of each: Metric system- length (meter to micrometer); weight (gram to microgram), Volumetric (Cubic measures) Temperature: Celsius, Fahrenheit, Kelvin Concentrations: Percent solutions, ppt, ppm, ppb dilutions, Normality, Molarity and Molality. Biostatistics: Introduction and scope, Sampling and its types, Central Tendencies (mean, median, mode) Tabulation, Graphical representations (Histograms, bar diagrams, pie diagrams).	15
2	July	Animal Biotechnology: Biotechnology: Scope and achievements of Biotechnology (Fishery, Animal Husbandry, Medical, Industrial). Transgenesis: Retro viral method, Nuclear transplantation method, DNA microinjection method and Embryonic stem cell method, Cloning (Dolly), Ethical issues of transgenic and cloned animal. Applications of Biotechnology: DNA fingerprinting: Technique in brief and its application in forensic science (Crime Investigation), Recombinant DNA in medicines (recombinant insulin),Gene therapy: Ex-vivo and In vivo, Severe Combined Immunodeficiency (SCID), Cystic Fibrosis, Green genes: Green Fluorescent Protein (GFP) from Jelly fish valuable as reporter genes used to detect food poisoning.	15
3	August	Instrumentation: Microscopy Construction, principle and applications of dissecting and compound microscope. Colorimetry and Spectroscopy - Principle and applications. pH - Sorenson's pH scale, pH meter - principle and applications. Centrifuge - Principle and applications (clinical and ultra centrifuges). Chromatography - Principle and applications (Partition and Adsorption), Electrophoresis - Principle and applications (AGE and PAGE)	15

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CLASS: F.Y. B.ScZoology **SUBJECT: -Zoology Sem2 Paper I**

Sr.No	Month	**Name of Topic:** Ecology and Wildlife Management	TL
1	June	Population dynamics: Population density, Natality ,Mortality, Fecundity ,Age structure Sex ratio, Life studies Survivorship curves, Population dispersal and distribution patterns, Niche concept. Population growth regulation: Intrinsic mechanism – Density dependent fluctuations and oscillations ,Extrinsic mechanism- Density independent, environmental and climate factors, population interactions . Population growth pattern,Sigmoid, J Shaped, Human census (India) – Concept, mechanism and significance.	15
2	July	Ecosystem: Concept of Ecosystem.Ecosystem - Definition and components Impact of temperature on biota ,Biogeochemical cycles (Water, Oxygen, Nitrogen, Sulphur),Fresh water ecosystem – Lentic and Lotic. Food chain and food web in ecosystem (Fresh water and Grass land).Ecological pyramids - energy, biomass and number. Animal interactions (commensalism, mutualism, predation, antibiosis, parasitism	15
3	August	National parks and Sanctuaries of India: Concept of Endangered and Critically Endangered species using examples of Indian Wildlife with respect to National Parks and Wildlife. Management strategies with special reference to Tiger and Rhinoceros in India, Ecotoursim, Biopiracy.	15

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CLASS: F.Y. B.ScZoology **SUBJECT: -Zoology Sem2 Paper II**

Sr.No	Month	Name of Topic:Nutrition and Health	TL
1	June	Concept of balanced diet, dietary recommendations to a normal adult,infant, pregnant woman and aged. Malnutrition disorders – Anemia (B12 and Iron deficiency), Rickets, Marasmus, Goiter, Kwashiorkar (cause, symptoms, precaution and remedy.Constipation, piles, starvation, acidity, flatulence, peptic ulcers (cause,symptoms, precaution and remedy).Obesity (Definition and consequences).Importance of fibres in food.Significance of breast feeding.Swine flu (cause, symptoms, precaution and remedy).BMI calculation and its significance	15
2	July	Health: Definition of Health, the need for health education and health goal. Physical, psychological and Social health issues. WHO and its programmes - Polio, Small pox, Malaria and Leprosy (concept, brief accounts and outcome with respect to India) effects of self-medication.Water and water supply, Sources and properties of water. Purification of water, small scale, medium scale and large scale (rapid sand filters),Water footprint (concept, brief accounts and significance). Hygiene: Hygiene and health factors at home, personal hygiene, oral hygiene and sex hygiene. Radiation risk: Mobile Cell tower and electronic gadgets (data of recommended level, effects and precaution). Blood bank – Concept and significance	15
3	August	Common Human Diseases and Disorders: Stress related disorders: Hypertension,Diabetes type II, anxiety, insomnia, migraine, depression (cause, symptoms, precaution and remedy)Communicable and non-communicable diseases ,Tuberculosis , Typhoid and Dengue, Hepatitis (A and B), AIDS, Gonorrhea and Syphilis, Diseases of respiratory system- Asthma, Bronchitis.Oral Cancer	15

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CLASS: S.Y. B.ScZoology **SUBJECT: -Zoology Sem 3 Paper I**

Sr.No	Month	**Name of Topic:** Fundamentals of Genetics, Chromosomes and Heredity, Nucleic acids	TL
1	June	Introduction to Genetics • Definition, Scope and Importance of Genetics. • Classical and Modern concept of Gene (Cistron, Muton, Recon). • Brief explanation of the following terms: Allele, Wild type and Mutant alleles, Locus, Dominant and Recessive traits, Homozygous and Heterozygous, Genotype and Phenotype, Genome.Mendelian Genetics • Mendelian Genetics: Monohybrid & Dihybrid Cross, Test Cross, Back Cross, Mendel's Laws of Inheritance, Mendelian Traits in Man. • Exceptions to Mendelian inheritance: Incomplete dominance, Codominance, Lethal Genes, Epistasis - Recessive, Double recessive, Dominant and Double dominant. • Chromosome theory of inheritance. • Pedigree Analysis-Autosomal dominant and recessive, X- linked dominant, and recessive.	8
2	July	Multiple Alleles and Multiple Genes • Concept of Multiple Alleles, Coat colour in rabbit, ABO and Rh blood group system • Polygenic inheritance with reference to skin colour and eye colour in humans. • Concept of Pleiotropy.Linkage and Crossing Over • Linkage and crossing over, Types of crossing over, Cytological basis of crossing over.Chromosomes • Types of Chromosomes–Autosomes and Sex chromosomes • Chromosome structure - Heterochromatin, Euchromatin • Classification based on the position of centromere • Endomitosis, Giant chromosomes- Polytene and Lampbrush chromosomes and Significance of Balbiani rings.	7
3	August	Sex- determination • Chromosomal Mechanisms: XX-XO, XX-XY, ZZ-ZW • Sex determination in Honey bees: Haplo-diploidy • Sex determination in Drosophila- Genic balance theory, Intersex, Gynandromorphs • Parthenogenesis • Hormonal influence on sex determination- Freemartin and Sex reversal. • Role of environmental factors- Bonelia and Crocodile • Barr bodies and Lyon hypothesis. Sex linked, sex influenced and sex-limited inheritance. • X-linked: Colour-blindness, Haemophilia • Y-linked: Hypertrichosis • Sex-influenced genes • Sex-limited genes. Genetic material •Griffith's transformation experiment, Avery-Macleod &McCarty, experiment and Hershey Chase experiment of Bacteriophage infection • Chemical composition and structure of nucleic acids • Double helix nature of DNA, Solenoid model of DNA • Types of DNA – A, B, Z & H forms • DNA in Prokaryotes - Chromosomal and Plasmid • Extra nuclear DNA - Mitochondria and Chloroplast • RNA as a genetic material in virus • Types of RNA: Structure and function.	15
4	September	Flow of genetic information in a eukaryotic cell • DNA Replication • Transcription of mRNA • Translation • Genetic code, Gene expression and regulation • One gene-one enzyme hypothesis /one polypeptide hypothesis • Concept of Operon • Lac Operon	15

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CLASS: S.Y. B.ScZoology **SUBJECT: -Zoology Sem3 Paper II**

Sr.No	Month	Name of Topic: PLANT DIVERSITY	TL
1	June	Thallophyta (Algae) & Bryophyta General Characters of Division Phaeophyta: Distribution, Cell structure, range of thallus, Economic Importance. Structure, life cycle and systematic position of *Sargassum* General Account of Class Anthocerotae and Musci Structure, life cycle and systematic position of *Anthoceros Funaria*	15
2	July	Angiosperms Systematics: Objectives and Goals of Plant systematic Plant Nomenclature, Taxonomy in relation to Anatomy, Palynology, Chemical constituent, Embryology, Cytology, Ecology With the help of Bentham and Hooker's system of Classification for flowering plants study the vegetative, floral characters and economic importance of the following families :Leguminosae , Asterace, Amaranthaceae, Palmae	15
3	August	Modern Techniques to Study Plant Diversity Preservation methods :Dry and Wet method. Microscopy – Principle and working of Light, and electron microscope. Chromatography- Principles and techniques in paper and thin layer chromatography. Principles and techniques of Horizontal and Vertical electrophoresis.	15

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CLASS: S.Y. B.ScZoology **SUBJECT: -Zoology Sem 3 Paper III**

Sr.No	Month	**Name of Topic:** Ethology, Parasitology, Economic Zoology (ELECTIVE 1)	TL
1	June	Introduction to Ethology: • Definition, History and Scope of Ethology • Animal behaviour : Innate and Learned behaviour • Types of learning: Habituation, Imprinting and Types of imprinting - Filial and sexual, Classical conditioning • Instrumental learning and insight learning.Aspects of animal behaviour: • Communication in bees and ants • Mimicry and colourations • Displacement activities, Ritualization • Migration in fish, schooling behaviour • Habitat selection, territorial behaviour.Social behaviour: • Social behaviour in primates-Hanuman langur • Elements of socio-biology: Altruism and Kinship.	15
2	July	Parasitology: Introduction to Parasitology and Types of Parasites • Definitions: Parasitism, Host, Parasite, Vector-biological and mechanical • Types of parasite-Ectoparasite, Endoparasite and their subtypes • Parasitic adaptations in Ectoparasites and Endoparasites • Types of host: Intermediate and definitive, reservoir, Host-parasite relationship and host specificity • Different types of host- parasite relationship, structural specificity, physiological specificity and ecological specificity, Life cycle, pathogenicity, control measures and treatment • Entamoeba histolytica, Fasciola hepatica, Taenia solium, Wuchereria bancrofti, Morphology, life cycle, pathogenicity, control measures and treatment • Head louse (Pediculus humanus capittis), Mite (Sarcoptes scabei), Bed bug (Cimex lectularis), Parasitological significance • Zoonosis- Bird flu, Anthrax, Rabies and Toxoplasmosis	15
3	August	Economic Zoology: Methods of bee keeping and management • Introduction to different species of honey bees used in apiculture. • Selection of flora and bees for apiculture. • Advantages and disadvantages of traditional and modern methods of apiculture. • Pests and Bee enemies- Wax moth, wasp, black ants, bee-eaters, king crow and disease control, Economic importance • Honey- Production, chemical composition and economic importance • Bee wax- Composition and economic importance. • Role of honey bee in pollination.Rearing methods, management and economic importance • Introduction to different species of earthworms used in vermiculture. • Methods of vermiculture. • Maintenance and harvesting, Economic importance: Advantages of vermiculture, demand for earthworms; market for vermicompost and scope for entrepreneurship.	11
4	September	Dairy development in India • Role of dairy development in rural economy, employment opportunities. Dairy Processing • Filtration, cooling, chilling, clarification, pasteurization, freezing. Milk and milk products • Composition of milk • Types of milk: a) Buffalo milk b) Cow milk (A1 &A2) • Whole milk and toned milk • Milk products.	4

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CLASS: S.Y. B.ScZoology **SUBJECT: -Zoology Sem 3 Paper III**

Sr.No	Month	**Name of Topic:** Maintenance of Aquarium, Agricultural and Household pests and their control , Amazing animals(ELECTIVE 2)	TL
1	June	Introduction and scope.Exotic and Endemic species.Biology of aquarium fishes: • Guppy • Molly • Gold fish. Common characters and sexual dimorphism of marine fishes: • Anemone fish • Butterfly fish. Food and feeding: • Live fish feed • Formulated fish feed. Fish transportation: i) Handling ii) Packing iii)Transport. General maintenance of aquarium and budget for setting up an ornamental fish farm.	15
2	July	Agricultural pests and their control: Introduction and concept of pest, Types of pests: • Agricultural: Locust • Household: Bed bug • Stored grains: Flour beetle • Structural: Termites • Veterinary: Tick • Forestry: Grasshopper, Major insect pests of agricultural importance (Life cycle, nature of damage and control measures). a) Jowar stem borer b) Brinjal fruit borer c) Aphids d) Rice weevil e) Pink bollworm, Other pests: Rats, bandicoots, crabs, snails, slugs, birds and squirrels, Pest control measures: i) Cultural control ii) Physical control iii) Mechanical control iv) Chemical control v) Biological control, vi) Concept of IPM, Plant protection appliances: Rotary duster, knapsack sprayer and cynogas pump, hazards of pesticides and antidotes.	15
3	August	Amazing animals: Natural History a) Introduction and life timeline b) Butterflies the flying jewels- Blue Mormon, Striped tiger c) Herpetofauna of India- Flying frog, Fan Throated. lizard and Gharial d) Feathered Bipeds: Kingfisher, Drongo e) Mammals of India: Malabar giant squirrel. The world's most amazing animals (emphasis should be given only on amazing aspects) a) Octopus b) Spider c) Mudskipper d) Flying fish e) Pebble toad f) Strawberry poison frog g) Komodo dragon h) Lesser flamingo i) Great white pelican j) Spatule-tailed hummingbird k) Cheetah. Five most incredible animals discovered within the last decade a) The Purple (joker) crab, b) The African dwarf saw-shark (stabbing shark), c) The Psychedelic (crime fighting) gecko, d) The Matilda viper e) The Myanmar snub-nosed monkey. Marvels of Animals a) Mantis shrimp: Fastest punch b) Homing in Pacific salmon c) Sperm whale: Mechanism of deep sea diving.	11

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CLASS: S.Y. B.Sc Zoology **SUBJECT: -Zoology Sem4 Paper I**

Sr.No	Month	Name of Topic: Origin and Evolution of Life, Population Genetics and Evolution, Scientific Attitude, Methodology, Scientific, Writing and Ethics in Scientific Research	TL
1	June	Introduction :Origin of the Universe , Chemical evolution - Miller-Urey experiment,Haldane and Oparin theory ,Origin of life ,Origin of eukaryotic cell, Evidences in favour of organic evolution, Evidences from geographical distribution, palaeontology, anatomy, embryology, physiology and genetics, Theories of organic evolution :Theory of Lamarck ,Theory of Darwin and Neo- Darwinism ,Mutation Theory ,Modernsynthetic theory ,Weismann's Germplasm theory,	15
2	July	Population Genetics and Evolution: Introduction to Population genetics Definition, Brief explanation of the following terms: Population, Gene pool, Allele frequency, Genotype frequency, Phenotype frequency, Microevolution, Population genetics ,Hardy- Weinberg Law ,Factors that disrupt Hardy Weinberg equilibrium: Mutation, Migration (gene flow), Non-random mating (inbreeding, inbreeding depression, assortative mating(positive and negative), disassortative mating, Genetic drift (sampling error, fixation, bottleneck effect and founder effect), Evolutionary genetics, Genetic variation: Genetic basis of variation-mutations and recombination (crossing over during meiosis, independent assortment of chromosomes during meiosis and random union of gametes during fertilization) ,Nature of genetic variations: Genetic polymorphism, Balanced polymorphism, Mechanisms that preserve balanced polymorphism- Heterozygote advantage and frequency dependent selection, Neutral variations ,Geographic variation (Cline) ,Species concept: Biological species concept and evolutionary species concept ,Speciation and Isolating mechanisms: Definition and modes of speciation (allopatric, sympatric, parapatric and peripatric) ,Geographical isolation Reproductive isolation and its isolating mechanisms , (prezygotic and postzygotic). Macroevolution and megaevolution: Concept and Patterns of macroevolution (stasis, preadaptation /exaptation, mass extinctions, adaptive radiation and coevolution), Megaevolution.	15
3	August	Scientific Attitude Methodology, Scientific Writing and Ethics in Scientific Research: Process of science: A dynamic approach to investigation: The Scientific method, Deductive reasoning and inductive reasoning, Critical thinking, Role of chance in scientific discovery (serendipity) ,Scientific research: Definition, difference between method and methodology, characteristics, types Steps in the Scientific method: Identification of research problem, formulation of research hypothesis, testing the hypothesis using experiments or surveys, preparing research/study design including, methodology and execution (appropriate controls, sample size, technically sound, free from bias, repeat experiments for consistency), documentation of data, data analysis and interpretation, results and conclusions Dissemination of data: Reporting results to scientific community (publication in peer-reviewed journals, thesis, dissertation, reports, oral presentation, poster presentation) Application of knowledge: Basic research, Applied research and Translational research, **Scientific writing:**Structure and components of a research paper: preparation of manuscript for publication of research paper- title, authors and	15

		their affiliations, abstract, keywords and abbreviations, introduction, material and methods, results, discussion, conclusions, acknowledgement, bibliography; figures, tables and their legends, Writing a review paper ,Structure and components of review Report writing and types of report ,Computer application: Plotting of graphs, Statistical analysis of data. Internet and its application in research-Literature survey, online submission of manuscript for publication ,Ethics , Ethics in animal research: The ethical and sensitive care and use of animals in research, teaching and testing, approval from Dissection Monitoring Committee (DMC), Ethics in clinical research: Approval from clinical research ethics committee or/and informed consent, Plagiarism.

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CLASS: S.Y. B.Sc Zoology **SUBJECT: -Zoology Sem4 Paper II**

Sr.No	Month	Name of Topic:CellBiology	TL
1	June	Introduction to cell biology :Definition and scope , Cell theory, Generalized prokaryotic, eukaryotic cell: size, shape and structure, NucleusSize, shape, number and position , Structure and functions of interphase nucleus, Ultrastructure of nuclear membrane and pore complex, Nucleolus: general organization, chemical composition & functions, Nuclear sap/ nuclear matrix, Nucleocytoplasmic interactions, Plasma membrane, Fluid Mosaic Model, Junctional complexes, Membrane receptors Modifications: Microvilli and Desmosomes, Transport across membrane, Diffusion and Osmosis, Transport: Passive and Active, Endocytosis and Exocytosis, Cytoskeletal structures, Microtubules: Composition and functions, Microfilaments: Composition and functions	15
2	July	Endomembrane System: Endoplasmic reticulum (ER): General morphology of endomembrane system, ultrastructure, types of ER and biogenesis of ER, Functions of Rough Endoplasmic Reticulum (RER) and Smooth, Endoplasmic Reticulum (SER), Golgi complex: Ultrastructure of Golgi complex, functions of Golgi complex (protein glycosylation, lipid and polysaccharide metabolism, protein sorting and secretion, Golgi Anti-Apoptotic Protein -GAAP), Lysosomes: Origin, occurrence, polymorphism and functions;Peroxisomes: Origin, morphology & functions, Mitochondria: Ultrastructure, chemical composition, functions of mitochondria and bioenergetics (Chemical energy & ATP, Kreb's cycle, respiratory chain and oxidative phosphorylation).	15
3	August	Biomolecules: Biomolecules: Concept of micromolecules and macromolecules, Carbohydrates:Definition classification, properties and isomerism, glycosidic bond Structureof Monosaccharides (glucose and fructose); Oligosaccharides (lactose and sucrose); Polysaccharides (cellulose, starch, glycogen and chitin), Biological role and clinical significance, Amino Acids and Proteins: Basic structure, classification of amino acids, Essential and Non-essential amino acids, Peptide bond, Protein conformation: Primary, Secondary, Tertiary, Quaternary Types of proteins – Structural (collagen) and functional proteins (haemoglobin) Biological role and clinical significance, Lipids:Definition, classification of lipids with examples, ester linkage ,Physical and chemical properties of lipids ,Saturated and unsaturated fatty acids ,Essential fatty acids; Triacylglycerols; Phospholipids (lecithin and cephalin); Steroids (cholesterol) ,Biological role and clinical significance, Vitamins: Water soluble vitamins (e.g. Vit C, Vit B12), Lipid soluble vitamins (e.g. Vit A, Vit D), Biological role and clinical significance.	15

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CLASS: S.Y. B.Sc Zoology **SUBJECT: -Zoology Sem4 Paper III**

Sr.No	Month	Name of Topic: Comparative Embryology, Aspects of Human Reproduction, Pollution and its effect on organisms (ELECTIVE 1).	TL
1	June	Types of Eggs- Based on amount and distribution of yolk , Structure and Types of Sperm, Types of Cleavages, Types of Blastulae, Types of Gastrulae, Coelom -Formation and types , Human reproductive system and hormonal regulation, Anatomy of human male and female reproductive system, Hormonal regulation of reproduction and impact of age on reproduction - menopause and andropause, Contraception & birth control, Difference between contraception and birth control Natural Methods: Abstinence, rhythm method, temperature method, cervical mucus or Billings method, coitus interruptus, lactation amenorrhea Artificial methods :Barrier methods, hormonal methods, intrauterine contraceptives, sterilization, termination, abortion, Infertility: Female infertility: Causes - Failure to ovulate; production of infertile eggs; damage to oviducts (oviduct scarring and Pelvic inflammatory disease -PID, TB of oviduct), Uterus (TB of uterus and cervix) , Infertility associated disorders - Endometriosis, Polycystic Ovarian Syndrome (PCOS), Primary ovarian failure (POF),Sexually Transmitted Infections (STIs) - gonorrhoea, chlamydia, syphilis and genital herpes; Antibodies to sperm; Genetic causes- recurrent abortions ,	15
2	July	Role of endocrine disruptors: Treatment of infertility Removal or reduction of causative environmental factors Surgical treatment ,Hormonal treatment- fertility drugs Assisted Reproductive Technology (ART) - *In vitro* fertilization (IVF); Embryo transfer (ET); IntraFallopian transfer (IFT), Gamete Intra-Fallopian Transfer (GIFT) &Intra-Zygote Transfer (ZIFT); Intra-cytoplasmic Sperm Injection (ICSI) with ejaculated sperm and sperm retrieved from testicular biopsies; Testicular sperm extraction (TESE). Sperm bank, cryopreservation of gametes and embryos Surrogacy.	15
3	August	Pollution and its effect on organisms: Air Pollution :Types and sources of air pollutant ,Effects of air pollution on organisms, its control and abatement measures , Water Pollution :Types and sources of water pollutant ,Effects of water pollution on organisms, its control and abatement measures, Soil Pollution ,Types and sources of soil pollutant ,Effects of soil pollution on organisms, its control and abatement measures, Sound pollution ,Different sources of sound pollution Effects of sound pollution on organisms, its control and abatement measures, Pollution by radioactive substances, Pollution by solid wastes Types and sources, Effects of solid waste pollution, its control and abatement measures, Pollution – Climate Change and Global Warming	15

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G.R.PATILCOLLEGEOFARTS,COMMERCE&SCIENCE
AffiliatedtotheUniversityofMumbai Teaching Plan
AcademicYear-2024-25
CLASS: S.Y. B.Sc Zoology SUBJECT: -Zoology Sem4 Paper III

Sr.No	Month	Name of Topic: Dairy Industry, Sericulture and Aquaculture (ELECTIVE 2).	TL
1	June	Indian Cattle breeds – Origin, distribution, distinguishing characters and economic uses: Malvi ,Hariyana , Deoni ,Red sindhi , Khillari, Exotic breeds - Origin, distribution, distinguishing characters and economic uses: Jersy ,Holstein, Indian buffalo breeds - Origin, distribution, distinguishing, characters and economic uses: Nagpuri Bhadawari, Murrah ,Jafrabadi, Systems of inbreeding and crossbreeding, Maintenance of dairy farm, Weaning of calf, castration and dehorning, Diseases and control,	15
2	July	Introduction and scope of sericulture ,Varieties of silk worm, host plants, Life history and rearing of *Bombyx mori*, Harvesting and processing of cocoon , Reeling and extraction of silk , Diseases and control measures	15
3	August	Pisciculture:Definition and scope of fishery resources in India ,Finfish culture – monoculture and polyculture Role of exotic fishes in polyculture ,Cage culture Fish seed transport ,Fish diseases -- symptoms and control , Prawn/shrimp culture: Sources, seed, culture methods – Giant fresh water prawn (*Macrobrachium rosenbergii*) ,White shrimp (*Penaeus vannamei*), Pearl culture: Pearl producing species and their distribution ,Pearl culture methods ,Composition of pearl	15

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