

Annexure -3

EXISTING	MODIFIED
<p>I Semester Unit- I Introduction and a brief account of microbiology. Microbes of soil, air & Water</p> <p>4 Hours</p> <p>Unit II: Land marks in Virology - History and discovery, status of viruses in microbiology (Living & non-living characteristics), Structure and multiplication of TMV and Bacteriophage [T4], Virioids, Prions, Tobacco mosaic disease, Yellow mosaic of Bean, Transmission of viruses.</p> <p>6 Hours</p> <p>Unit IV: Bacteria: History, discovery and Occurrence. Classification of Bacteria based on morphology , flagellation and nutrition. Ultra structure, reproduction - Vegetative , Fission, Budding & Endospore formation. Genetic recombination - conjugation, transformation and transduction. Role of bacteria in human welfare-As</p>	<p>I Semester Unit-I Introduction and a brief account of microbiology. Microbes of soil- soil bacteria, soil algae, soil actinomycetes, soil protozoans, Microbes of air-aeroallergens, microbes of water-water blooms, Biological indicators</p> <p>4 Hours</p> <p>Unit II: Virology - History and discovery, status of viruses in microbiology (Living & non-living characteristics), Structure and multiplication of TMV and Bacteriophage [T4], Viral diseases of plants-Causal organism and symptoms, transmission and management of Tobacco mosaic disease, Yellow mosaic of Bean, Virioids-general characters, Potato spindle tuber viriod. Prions-general characters-prion diseases- Bovine spongyform encephalopathy(BSE) in Cattle, Creutzfeldt- Jacob disease in humans.</p> <p>7 Hours</p> <p>Unit IV: Bacteria: History, discovery and Occurrence. Classification of Bacteria based on morphology , flagellation and nutrition. Ultra structure, reproduction - Vegetative by Fission, Budding & Endospore formation. Sexual by genetic recombination - conjugation, transformation and transduction. Role of bacteria in human welfare-As Natures' scavengers, Bacterial Bio-</p>

<p>Natures' scavengers, Bio-fertilizers, Industrial curing of tea, tobacco, tanning of leather, Retting of fibres, production of Alcohols and acids. A mention of bacterial diseases in Plants, Animals and Humans</p> <p style="text-align: center;">8Hours</p> <p>Unit V: Cyanobacteria: A general account of occurrence, structure, reproduction and economic importance . Type study: <i>Spirulina and Nostoc</i>. Cyanobacteria -as food, bio-fertilizers, pioneers in plant succession, biological indicators and water blooms.</p> <p>3 Hours</p> <p>Practicals: Part III-Sterilization Technique, study of microbes in water,air, soil by petri plate exposure method (2 Practicals)</p> <p>Scheme of Practical Exam: Q II-Material = 4 Marks</p> <p>Q IV - G, H & I= 2X3=6 Marks</p> <p>II SEMESTER Theory</p> <p>Unit III: <u>PLANT PATHOLOGY</u> – Symptoms, causal organisms and management of :-</p>	<p>fertilizers, Industrial curing of tea, tobacco, tanning of leather, Retting of fibres, production of Alcohols and acids. A mention of bacterial diseases in Plants, Animals and Humans Brief account of Citrus canker.</p> <p>11 Hours</p> <p>Unit V: Cyanobacteria: A general account of occurrence, structure, reproduction and economic importance Blue green algae. Cyanobacteria -as food, bio-fertilizers, pioneers in plant succession, Type study: <i>Spirulina, Nostoc, Scytonema</i>.</p> <p>4 Hours</p> <p>Practicals: Part III & IV -Sterilization Technique (Preparation of media NA / PDA) study of microbes in air by Petri plate exposure method</p> <p>Scheme of Practical Exam: Q II-Material = 3 Marks</p> <p>Q IV – G Bacterial staining = 3 Marks</p> <p>Q V -- H & I microslides 2X2=4 marks</p> <p>II SEMESTER Theory</p> <p>: <u>PLANT PATHOLOGY</u> – Introduction and classification of plant diseases, Disease cycle. Symptoms, causal organisms and management of :- 1. Downy Mildew of sorghum 2. Grain smut of sorghum</p>
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<p>1. Downy Mildew of sorghum 2. Grain smut of sorghum 3. Tikka disease of groundnut 4. Late blight of potato 5. Koleroga of arecanut 6. Coffee rust. 7. Blast of Paddy 8. Wheat rust - Puccinia graminis 9. White rust</p> <p>A brief account of Biopesticides: Neem, Trichoderma, Bacillus thuringiensis in pest and disease control.</p> <p style="text-align: right;">12Hours</p> <p>Unit IV: <u>LICHENS</u>: Distribution, types, structure, reproduction and economic importance 4 Hours</p> <p>Practicals VI. white rust</p> <p>III SEMESTER Theory</p> <p>Unit I PTERIDOPHYTA :- Introduction, general characters, classification . 2 Hours</p> <p>External and internal structure and reproduction of the following forms: (Developmental details not required) 1. Psilotum 2. Selaginella 3. Equisetum 4. Ophioglossum 5. Marsilea A brief account of Heterospory and seed habit and Stelar evolution among Pteridophytes</p>	<p>3. Tikka disease of groundnut 4. Late blight of potato 5. Koleroga of arecanut 6. Coffee rust. 7. Blast of Paddy 8. Wheat rust - Puccinia graminis 9. Red rot of Sugarcane.</p> <p>A brief account of Biopesticides: Neem, Trichoderma, Bacillus thuringiensis in pest and disease control. 13 Hours</p> <p>Unit IV: <u>LICHENS</u>: Distribution, types, structure, reproduction and economic importance 3 Hours</p> <p>Practicals VI. Remove white rust, add Blast of Paddy, Red rot of Sugarcane III SEMESTER Theory</p> <p>Unit I-- PTERIDOPHYTA :- Introduction, general characters, classification. 2 Hours</p> <p>External and internal structure and reproduction of the following forms: (Developmental details not required) 1. Psilotum 2. Selaginella 3. Equisetum 4. Ophioglossum 5. Marsilea 10 Hours A brief account of Heterospory and seed habit and Stelar evolution among Pteridophytes, Brief account of fern house. 5 Hours</p>
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<p>15 Hours</p> <p>Unit III--<u>ANATOMY of Angiosperms</u> Tissues - Classification. Theories of apical meristem. A brief account of Simple and complex tissues 4 Hours</p> <p>Anatomy- Study of anatomy of Dicot and Monocot -Roots, Stems and Leaves Secondary growth in Dicot stem. Anomalous secondary growth in Monocot stem (Ex.: Dracaena)</p> <p>A brief account of Trichomes, Stomata and Laticifers 6 Hours</p> <p>IV SEMESTER</p> <p>Unit I - Morphology of Angiosperms 14 hours</p> <p>Unit II - REPRODUCTIVE BIOLOGY (Embryology)</p> <p>I. Structure of Anther, T.S. of anther, Microsporogenesis, Development of male gametophyte, Role of tapetum. A brief account of Palynology</p> <p>2. Structure of Ovule, types of Ovule, Megasporogenesis, Development of female gametophyte (Polygonum type)</p> <p>3. Pollination Biology : Types, Contrivances and significance of cross pollination</p> <p>4. Fertilization : A general</p>	<p>Practicals- Add Osmunda</p> <p>Unit III-<u>ANATOMY of Angiosperms</u> Tissues - Classification. Theories of apical meristem. A brief account of Simple and complex tissues 4 Hours</p> <p>Anatomy- Study of anatomy of Dicot and Monocot -Roots, Stems and Leaves Secondary growth in Dicot stem. Anomalous secondary growth in Monocot stem Ex.: Dracaena) Types of wood A brief account of Trichomes, Stomata and Laticifers 6 Hours</p> <p>IV SEMESTER</p> <p>Unit-I Morphology of Angiosperms 10 hours</p> <p>Unit II - REPRODUCTIV BIOLOGY (Embryology)</p> <p>I. Structure of Anther, T.S. of anther, Microsporogenesis, Development of male gametophyte, Role of tapetum. Palynology- Sculpturing, Apertures, NPC-System. Applied aspects- Geo and Melitto palynology</p> <p>2. Structure of Ovule, types of Ovule, Megasporogenesis, Development of female gametophyte (Polygonum type)</p> <p>3. Pollination Biology : Types, Contrivances and significance of cross</p>
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<p>account.</p> <p>5. Endosperm : Types and development- a brief account</p> <p>6. Embryo : Dicot type with development-Crucifer type</p> <p>7. Experimental embryology, Apomixis, Polyembryony</p> <p>8. Scope of Reproductive biology 12 hours</p> <p><u>Unit III-ECOLOGY</u></p> <p>1. Ecosystem :Classification, Concepts and components of ecosystem</p> <p>2. Ecological factors : a brief account</p> <p>3. Study of Forest (dry deciduous), Fresh (Pond) and Marine water ecosystems</p> <p>4. Energy flow and Ecological pyramids</p> <p>5. Biogeochemical cycles : Nitrogen Cycle and Hydrological cycle</p> <p>6. Ecological adaptations :Hydrophytes, Xerophytes, Halophytes, Parasites, Epiphytes</p> <p>7. Plant succession : Definition, Steps of succession and types(xerosere,Hydrosere)</p> <p>8. Phytogeography : Definition, Vegetational types of Karnataka 18 Hours</p> <p>VSEMESTER</p> <p>UNIT I--TAXONOMY Principles of Taxonomy, A brief account of Classical and modern Taxonomy</p>	<p>pollination, pollen pistil interaction.</p> <p>4. Fertilization : A general account.</p> <p>5. Endosperm : Types and development- a brief account</p> <p>6. Embryo : Dicot type with development-Crucifer type</p> <p>7. Experimental embryology, Apomixis, Polyembryony</p> <p>8. Scope of Reproductive biology 13 hours</p> <p><u>Unit III-ECOLOGY</u></p> <p>1. Ecosystem :Classification, Concepts and components of ecosystem</p> <p>2. Ecological factors : a brief account</p> <p>3. Study of Forest (dry deciduous), Fresh (Pond) and Marine water ecosystems</p> <p>4. Endangered plants,Endemism and Red data Books</p> <p>5. Biogeochemical cycles : Carbon cycle, Nitrogen Cycle and Phosphorous cycle</p> <p>6. Ecological adaptations :Hydrophytes, Xerophytes, Halophytes, Parasites, Epiphytes</p> <p>7. Plant succession : Definition,Steps of succession andtypes(Xerosere,Hydrosere) 16 hours</p> <p>8. Phytogeography : Definition, Vegetational types of Karnataka 3Hours</p> <p>VSEMESTER</p> <p>UNIT I—TAXONOMY Principles of Taxonomy, A brief account</p>
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<p>Systems of classification: Broad outline of Bentham and Hooker's and Engler and Prantl's-Classifications with merits and demerits.A brief account of APG system of classification Plant Nomenclature- Binomial system, ICBN Principles and aims. Numerical taxonomy and Chemotaxonomy ‘</p> <p style="text-align: center;">05 Hours</p> <p>UNIT II --Field and Herbarium Techniques, Herbaria, Botanical gardens, Floras and their importance</p> <p>Botanical Survey of India and its functions. 04 Hours</p> <p>UNITIII.- Study of following Families according to Bentham and Hooker's system of Classification</p> <p>DICOTS: 1Magnoliaceae2. Brassicaceae 3Rutaceae,4.Myrtaceae 5Fabaceae6.Euphorbiaceae7Malvaceae 8Apocynaceae,9.Acanthaceae. 10.Lamiaceae, 11 Apiaceae 12.Asclepiadaceae13Verbenaceae 14.Solanaceae 15.Rubiaceae16. Cucurbitaceae 17.Asteraceae 18.Amaranthaceae MONOCOTS:1Poaceae.2. Arecaceae 3.Liliaceae4.Musaceae.5.Orchidaceae</p> <p style="text-align: center;">25 Hours</p>	<p>of Classical and modern Taxonomy Systems of classification: Broad outline of Bentham and Hooker's andEngler and Prantl's-Classifications with merits and demerits.A brief account of APG system of classification Plant Nomenclature- Binomial system, ICBN Principles and aims. Numerical taxonomy and Chemotaxonomy</p> <p style="text-align: center;">05 Hours</p> <p>UNITII--Field and Herbarium Techniques, Herbaria, Botanical gardens, Floras and their importance(Hassan, Mandya and Mysore Dist. floras), Botanical Survey of India and its functions. 04 Hours</p> <p>UNITIII.- Study of following Families according to Bentham and Hooker's system of Classification</p> <p>DICOTS:1Magnoliaceae2Ranunculaceae 3. Brassicaceae 4. Rosaceae 5..Fabaceae 6.Euphorbiaceae 7. Malvaceae 8.Dipterocarpaceae 9.Apiaceae 10.Asclepiadaceae 11.Verbenaceae 12.Solanaceae 13. Rubiaceae 14. Cucurbitaceae 15. Asteraceae 16.Amaranthaceae MONOCOTS:1.Poaceae.2.Arecaceae 3.Liliaceae 4.Musaceae.5.Orchidaceae</p> <p style="text-align: center;">25 Hours</p>
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<p>UNIT IV-ECONOMIC BOTANY (Cultivation aspects not required) Food plants: Rice, Wheat, Maize, potato Pulses-Pegion pea, Bengal gram, Black gram, Green gram Fibre plants: Cotton, Jute, Coir Spices: Cardamom, Clove, Cinnamon, Pepper Beverages: Coffee and Tea Narcotic Plants: 1. Opium, 2. Cannabis, 3. Tobacco Oil yielding plants: Ground nut, Coconut, Safflower, Sunflower Fire wood, Timber and bamboos : Rose wood, Teak, Honne, Acacia Bamboo Medicinal plants: A general account - Plants of medicinal importance studied in Monocot and Dicot families under Taxonomy</p> <p>05Hours</p> <p>UNIT V –ETHNOBOTANY Introduction and significance of Ethnobotany :- 1. <i>Phyllanthus</i> 2. <i>Hemidesmus indicus</i> 3. <i>Terminalia chebula</i>. 4. <i>Strychnos nux-vomica</i> 5. <i>Aloe vera</i> 6. <i>Boerhaavia diffusa</i>. 7. <i>Withania somnifera</i></p> <p>Importance of sacred groves and their conservation: 03 Hours</p>	<p>UNIT IV-ECONOMIC BOTANY (Cultivation aspects not required) Food plants: Rice, Wheat, Maize, Ragi Fodder plants: Sorghum, Cow pea, Subabul Fibre plants: Cotton, Jute, Coir Spices: Cardamom, Clove, Cinnamon, Pepper Beverages: Coffee and Tea Perfumes : Jasmine, Pachouli, Sandal Dyes : Indigo, Bixa, Lawsonia Narcotic Plants: 1. Opium, 2. Cannabis, 3. Tobacco Insecticides: Neem, Pyrethrin, Nicotine Oil yielding plants: Ground nut, Coconut, Safflower, Sunflower Timber : Rose wood, Teak, Honne Medicinal plants: A general account - Plants of medicinal importance studied in Monocot and Dicot families under Taxonomy</p> <p>05Hours</p> <p>UNIT V –ETHNOBOTANY Introduction and significance of Ethnobotany :- 1. <i>Phyllanthus emblica</i> and <i>Phyllanthus amarus</i> 2. <i>Hemidesmus indicus</i> 3. <i>Terminalia chebula</i>. 4. <i>Strychnos nux-vomica</i> 5. <i>Aloe vera</i> 6. <i>Boerhaavia diffusa</i>. 7. <i>Withania somnifera</i></p> <p>Importance of sacred groves and their conservation: 03 Hours</p>
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VSEMESTER
Theory Paper-VI

UNIT – II.

Cell cycle Mitosis, Meiosis and their significance Numerical variation in chromosomes, Euploidy and Aneuploidy (Detailed account) Structural changes in Chromosomes: Deletion, duplication, Inversion and Translocation

UNIT III. Nucleic acids as genetic material Avery et.al's experiment, Fraenke Conrat's experiment
DNA- Chemistry, structure, types and function
RNA- Chemistry, structure, types and function
DNA-replication- mechanism of replication in Prokaryotes and Eukaryotes
Gene Concept- Gene structure, action, and One gene-one polypeptide concept

UNIT IV. Central dogma of Molecular Biology, Genetic code, Protein Synthesis- Transcription, RNA splicing and Translation, Gene regulation in prokaryotes (Operon concept) and Eukaryotes. Molecular basis of genetic disorders- Sickle cell Anemia and Thalassemia

V SEMESTER
Theory Paper-VI

UNIT – II.

Cell cycle: Its regulation, Mitosis, Meiosis and their significance Numerical variation in chromosomes, Euploidy, induction of polyploidy in plants and Aneuploidy (Detailed account) Structural changes in Chromosomes: Deletion, duplication, Inversion and Translocation

UNIT III. Nucleic acids as genetic material- Avery et.al's experiment, Fraenkel Conrat's experiment
DNA- Chemistry, structure, types and function
RNA- Chemistry, structure, types and function
DNA-replication- mechanism of replication in Prokaryotes and Eukaryotes
Gene Concept- Gene structure, action, One gene-one enzyme concept and One gene-one polypeptide concept

10 Hours

UNIT IV. Central dogma of Molecular Biology, Genetic code, Protein Synthesis- Transcription, RNA splicing and Translation, Gene regulation in prokaryotes (Operon concept) and Eukaryotes(Gene battery).
Molecular basis of genetic disorders- Sickle cell Anemia and

<p style="text-align: center;">8 Hours</p> <p>VI SEMESTER PAPER- VII</p> <p>UNIT III – Enzymes- classification, properties, and mode of action. Photosynthesis- Introduction, significance, photosynthetic apparatus and Pigments, mechanism- light and dark reactions- C3, C4, and C2 path ways</p> <p>PAPER VIII</p> <p>UNIT-I Supplementary interaction-Coat colour in Mice</p> <p>GENETIC ENGINEERING</p> <p>UNIT IV- A concise account of methods used in recombinant DNA Technology, Restriction enzymes, Ligases, Cloning vectors, Construction of recombinant DNA and C-DNA libraries. A brief account of Genomics and its applications. A brief account of hazards and safe guards in Recombinant DNA Technology.</p> <p style="text-align: right;">7 hrs</p> <p>PLANT BIOTECHNOLOGY</p> <p>UNIT V – Introduction – Scope of</p>	<p style="text-align: center;">Thalassemia 8 Hours</p> <p>VI SEMESTER PAPER-VII Unit-I: Add Hydroponics and Aeroponics Unit-II Add Phytochrome</p> <p>UNIT III – Enzymes- classification, properties, and mode of action. Photosynthesis- Introduction, significance, photosynthetic apparatus and Pigments, mechanism- light and dark reactions- C3, C4, and Photorespiration</p> <p>IV.Add Nodulation</p> <p>PAPER VIII</p> <p>Unit I: Supplementary interaction- Anthocyanin pigmentation in Snapdragon</p> <p>GENETIC ENGINEERING</p> <p>UNIT IV- A concise account of recombinant DNA Technology, Restriction enzymes, Ligases, Cloning vectors, Construction of genomic DNA and C-DNA libraries. A brief account of Genomics and its applications. A brief account of hazards and safe guards in Recombinant DNA Technology.</p> <p style="text-align: right;">7 hrs</p> <p>PLANT BIOTECHNOLOGY</p> <p>UNIT V – Introduction – Scope of</p>
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<p>Biotechnology</p> <p>Tissue culture- Techniques, differentiation, toipotency, Organogenesis, Somatic hybridization, Somatic embryos and synthetic seeds. Anther culture - haploid production and its significance. Gene transfer methods- Agro bacterium mediated gene transfer, Electrophoration and shot gun method.</p>	<p>Biotechnology</p> <p>Tissue culture- Techniques, differentiation, toipotency, Organogenesis, Somatic hybridization, Somatic embryos and synthetic seeds. Anther culture - haploid production and its significance. Gene transfer methods- Agro bacterium mediated gene transfer, Electroporation and shot gun method.</p>
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