

ATTENDANCE SHEET -CUM- MINUTES OF BOARD OF STUDIES

Minutes of the meeting of the Board of Studies of Botany (Subject)
held on 20/2/2016 (date) at 10.30 AM (time).

PRESENT

(Name)		(Signature)
1. <u>Prof. J.N. Shrivastava</u>	(Chairperson)	<u>Mansoor</u>
2. <u>Prof. Mansoor Ahmad Siddiqui</u>	(External Expert 1)	<u>Balaji</u>
3. <u>Prof. N.K. Dubey</u>	(External Expert 2)	<u>Absent</u>
4. <u>Prof. D. Prem Kumar</u>	(Internal Member)	<u>Prem Kumar</u>
5. <u>Prof. G.P. Saksangi</u>	(Internal Member)	<u>Absent</u>
6. <u>Dr. S.K. Soni</u>	(Internal Member)	<u>Soni</u>
7. <u>Ms. Aakarsha Khutwa</u>	(Internal Member)	<u>Aakarsha</u>
8. <u>Dr. G.D. Upadhyay</u>	(Internal Member)	<u>G.D. Upadhyay</u>
9. <u>Dr. Rajiv Ranjan</u>	(Internal Member)	<u>Ranjan</u>
10. <u>Dr. Shaemita Gupta</u>	(Internal Member)	<u>Shaemita Gupta</u>

Proposed changes in the existing system

The UG syllabi were changed to comply upto 70% with CBCS guidelines of UGC. The changes ⁱⁿ various UG courses are appended.

Balaji
20.2.16

Prof. Mansoor Ahmad Siddiqui

Mansoor
20/2/16
(Signature of Chairperson)

	EXISTING STATUS	PROPOSAL FOR CHANGE/ADDITION
S.No.	BOM 101	
	COURSE NAME:ALGAE AND LICHENS	Title: Algae and Lichens
UNIT 1	Introduction, general characters, comparison between Algae and fungi, classification and pigments in algae, structure and life cycle of <i>Chlamydomonas</i>	Introduction, general characters, Range of thallus organization ,comparison between Algae and fungi, classification and pigments in algae, Reserve food (of only groups represented in syllabus) , structure and life cycle of <i>Chlamydomonas</i>
UNIT 2	Life cycle of <i>Volvox</i> , <i>Oedogonium</i> , <i>Chara</i> and <i>Vaucheria</i>	
UNIT 3	Life cycle of <i>Ectocarpus</i> , <i>Sargassum</i> , <i>Polysiphonia</i> and general account of blue green algae.	No change
UNIT 4	General character of various classes of algae, Economic importance of algae: Algae as food; In Industries; In public health, Role of Algae in nitrogen fixation.	No change
UNIT 5	General account; Nature of the relationship between Algae and Fungi in Lichens.	No change
	Suggested readings: 1. Smith GM: Cryptogamic Botany Vol. I 2. Pandey SN & PS Trivedi: Text book of Botany 3. Saxena AK and RP Sarabhai: Text book of Botany Vol.I 4. Vashistha BR: Algae 5. Lee RE: Phycology	
	BOM 102	
	COURSE NAME: FUNGI AND PLANT PATHOLOGY	Introduction to trueFungi : Morphology ,thallus organization; cell wall composition Nutrition , Reproduction and Classification Status & Interrelationships, Modern Concept of Phylogenetic classification of fungi.
UNIT 1	Fungi : Morphology , Nutrition , Reproduction and Classification Status & Interrelationships, Modern Concept of Phylogenetic classification of fungi.	
UNIT 2	Structure , Reproduction and Life Histories of following: (a) Myxomycotina : General Account of Slime moulds (b) Mastigomycotina : <i>Synchytrium</i> , <i>Pythium</i> , <i>Albugo</i> including diseases caused by them , symptoms , Etiology and control measures.	Structure , Reproduction and Life Histories of Allied Fungi : General Account of Slime moulds[Myxomycota]:types of plasmodia and fruiting bodies. Life cycle of <i>Albugo</i> ; <i>Pythium</i> [Oomycota]including diseases caused by them , symptoms , Etiology and control measures. [shifted <i>Synchytrium</i> from unit 2 to 3]
UNIT 3	Structure , reproduction and life history of following : Yeast different life pattern. <i>Eurotium</i> , <i>Penicillium</i> , Discovery and role of antibiotics , <i>Peziza</i> and <i>Morchella</i> .	Structure , Reproduction and Life Histories of True Fungi: Life cycle of <i>Synchytrium</i> [Chytridiomycota]; <i>Rhizopus</i> [Zygomycota] <i>Saccharomyces</i> ; <i>Aspergillus</i> ; <i>Penicillium</i> ; <i>Alternaria</i> ; <i>Peziza</i> ; <i>Morchella</i> [Ascomycota] including

		diseases caused by <i>Synchytrium</i> and <i>Alternaria</i> . Symptoms , Etiology and control measures. [Degeneration of sex in Ascomycota] Discovery and role of antibiotics [Added <i>Rhizopus</i>]
UNIT 4	Structure , reproduction and life history of following : (a) Basidiomycotina – <i>Agaricus</i> , <i>Puccinia</i> , <i>Ustilago</i> . (b) Deuteromycotina (<i>Alternaria</i>) including diseases caused by them, Symptoms , Etiology and control measures.	Structure , Reproduction and Life Histories of True Fungi: Life cycle of <i>Puccinia</i> ; <i>Ustilago</i> ; <i>Agaricus</i> [Basidiomycota] including diseases caused by them, Symptoms , Etiology and control measures. [shifted <i>Alternaria</i> from unit 4 to 3]
UNIT 5	Special Topics – Principles of plant diseases control , Role of fungicides in modern agriculture , Diseases Resistant varieties. Heterothallism , Degeneration of sex in fungi , Economic importance of fungi, Edible fungi.	Special Topics – Principles of plant diseases control , Role of fungicides in modern agriculture , Diseases Resistant varieties. Heterothallism , , Economic importance of fungi, Edible fungi. [Deleted Degeneration of sex in fungi from unit 5 and added Degeneration of sex in Ascomycota in Unit3]
	BOM201	
UNIT 1	COURSE NAME: BACTERIA , VIRUS AND MYCOPLASMA BACTERIA Definition, salient features, classification and distribution, morphological and chemical composition of bacterial cell, Gram reaction, nutrition. Reproduction. Economic importance of bacteria.	Types:-archaebacteria; eubacteria & wall less forms; Vegetative, asexual and recombination in bacteria. Economic importance of bacteria with reference to their role in agriculture and industry [fermentation and medicine]
UNIT 2	VIRUS Definition, Nature and characteristics of viruses; Brief historical account pertaining to discovery of viruses; Symptoms caused by viruses; Transmission of viruses.	NO CHANGE NEEDED SYLLABUS IS AS PER CBCS, UGC GUIDELINES
UNIT 3	Physical properties, Morphology of viruses and chemical composition, TMV, general account of bacteriophage, disease caused by viruses with special reference to plants.	NO CHANGE NEEDED SYLLABUS IS AS PER CBCS, UGC GUIDELINES
UNIT 4	MYCOPLASMA Definition, characteristics, classification and composition. Economic importance of Mycoplasma.	Spheroplasts
UNIT 5	CYANOBACTERIA Definition, salient features, and morphological and chemical composition. Economic importance of Cyanobacteria as food.	NO CHANGE NEEDED SYLLABUS IS AS PER CBCS, UGC GUIDELINES
	BOM 202	
UNIT 1	COURSE NAME: CELL BIOLOGY Structure and evolution of prokaryotic and eukaryotic cell.	Cell as a unit of structure and function; Characteristics of prokaryotic and eukaryotic cells; Origin of cell : Endosymbiotic and other theories
UNIT 2	Organisation, and function of Cell wall; Plasma membrane; Endoplasmic reticulum; Golgi apparatus; Lysosomes ; Peroxisomes and Ribosomes	[5 pds] Membrane transport – Passive, active and facilitated transport, endocytosis and exocytosis; Endomembrane system
		[5 pds]

UNIT 3	Organisation and function of: Chloroplast; Mitochondrion and Nucleus	Semiautonomous nature of Chloroplast and Mitochondrion Nuclear envelope, nuclear pore complex, nuclear lamina, molecular organization of chromatin; nucleolus
UNIT 4	(a) The cell cycle (b) Mitosis and meiosis (c) Cytoskeleton	[5 pds] Regulation of cell cycle-check points Role and structure of microtubules, microfilaments and intermediary filament
UNIT 5	(a) Chromosome structure, chemistry and function (b) identification of genetic material; DNA structure and replication; Genetic code	NO CHANGE NEEDED SYLLABUS IS AS PER CBCS, UGC GUIDELINES
BOM 301		
UNIT 1	COURSE NAME: BRYOPHYTA Introduction and criteria for classification. Recent systems of classification.	No change
UNIT 2	Comparative morphological and structural organisation of gametophytes and sporophytes, reproductive mechanisms and their significance, evolutionary trends.	Adaptation to land habit
UNIT 3	Detailed life cycles of <i>Riccia</i> , <i>Marchantia</i> , <i>Pellia</i> , <i>Anthoceros</i> , <i>Sphagnum</i> and <i>Funaria</i>	<i>Porella</i>
UNIT 4	Experimental studies: Spore germination, protonema differentiation, sex organ differentiation, parthenogenesis, apogamy, apospory, regeneration	No change
UNIT 5	Ecology, Pollution indicators and monitoring; horticultural uses; economic importance; sterilization of the sporogenous tissue.	No change
BOM 302		
UNIT 1	COURSE NAME: PTERIDOPHYTES [8 pds] Classification of Pteridophytes; Life cycle with special reference to alternation of haploid and diploid phases of following: Psilotum, Lycopodium, Selaginella, Isoetes, Equisetum and Marsilea.	NO CHANGE NEEDED SYLLABUS IS AS PER CBCS, UGC GUIDELINES
UNIT 2	[8 pds] Comparative organography, systematics reproduction and phylogeny of the following: Psilotales, Lycopodiales, Selaginellales, Isoetales, Equisetales and Marsileales, Angiopteridales.	NO CHANGE NEEDED SYLLABUS IS AS PER CBCS, UGC GUIDELINES
UNIT 3	[8 pds] Special Topics; Evolution of stele in Pteridophytes; Telome Theory	NO CHANGE NEEDED SYLLABUS IS AS PER CBCS, UGC GUIDELINES
UNIT 4	[8 pds] Heterospory and seed habit; Apospory, Apogamy, Parthenogenesis	NO CHANGE NEEDED SYLLABUS IS AS PER CBCS, UGC GUIDELINES
UNIT 5	[7 pds] Ecological adaptation of Pteridophytes; Economic importance of Pteridophytes, Fossil plants of Pteridophytes.	Early land plants (<i>Cooksonia</i> and <i>Rhynia</i>)

	EXISTING STATUS	PROPOSAL FOR CHANGE/ADDITION
	BOM 303	
UNIT 1	COURSE NAME: GYMNOSPERMS AND PALAEOBOTANY Salient features, classification and distribution in India, Geological era, Formation and types of fossils	Title: Gymnosperms and Palaeobotany No change
UNIT 2	Comparative morphology, anatomy and life history of the following order: Cycadales, Ginkgoales and coniferales.	No change
UNIT 3	Comparative morphology, anatomy and life history of taxa of order Gnetales, Economic importance of Gymnosperms (Including fossils also)	No change
UNIT 4	Phytochemistry of Gymnosperms with specific reference to carbohydrates (Sago) Lignin, resins, alkaloids (Ephedrine) and other secondary metabolites and toxins (Taxol) etc.	No change
UNIT 5	Comparative morphology, anatomy and affinities of fossil order Pteridospermales, Bennettitales, Pteridiales and Cordaitales.	No change
	Suggested readings: 1. Vashistha BR: Gymnosperms 2. Taylor TN: Palaeobotany-An Introduction to fossil plant biology 3. Stewart WN: Palaeobotany and the evolution of plants 4. Sharma OP: Gymnosperms. 5. Journals, Advances in Botanical research, Botanical review, Quarterly review of Biology	
	BOM 401	
UNIT 1	COURSE NAME: ANATOMY Scope and importance of the study of plant anatomy. Tissue structure, function and distribution of simple and complex tissues; Shoot apex and vascular meristem.	Title: Anatomy of Angiosperms Scope and importance of the study of plant anatomy. Tissue structure, function and distribution of simple and complex tissues; Shoot apex Apical cell theory, histogen theory, Tunica corpus theory and vascular meristem
UNIT 2	Anatomy of primary monocot and dicot roots; secondary growth in dicot roots; root hairs; Anatomy of monocot & dicot stem, secondary growth in stem.	Anatomy of primary monocot and dicot roots; secondary growth in dicot roots; root hairs; Anatomy of monocot & dicot stem, secondary growth in stem. Sap wood and heart wood, ring and diffuse porous wood, early and late wood, tyloses.
UNIT 3	Anatomy of monocot and dicot leaves, Trichomes, stomatal types and adaptations. Structure of periderm, development of periderm, lenticels, commercial cork.	No change
UNIT 4	Unusual structure and secondary growth in dicot, monocot stems and dicot roots.	No change
UNIT 5	Leaf fall and healing of wounds. Basic anatomical differences among hydrophytes, xerophytes, parasitic and epiphytic plants	No change

	Suggested readings: <ol style="list-style-type: none"> 1. KESau: Plant anatomy of seed plants 2. Fahn, A. Plant anatomy 3. EL Stover: Introduction of plant anatomy 4. BP Pandey: Plant anatomy 5. G Haberlandt: Physiological plant anatomy 6. AS Foster: Plant Anatomy 	
	BOM 402	
UNIT 1	Concepts of free energy: Laws of thermodynamics and their relevance to organism; Bioenergetics: energy transfers, redox potential, coupled reactions; ATP and high-energy compounds. Structure and properties of water, biological importance; pH and buffers	No change
UNIT 2	Organic acids: types of organic acids in plants and their significance. Fatty acids, Fats and Lipids: Saturated and unsaturated fatty acids; Saponifiable lipids: Neutral fats – structure of triglyceride; basic structure and significance of glycerophosphatide, phospholipids, Plasmalogens, Sphingolipids, Glycolipids; Nonsaponifiable lipids: Terpenes and steroids. β -oxidation of fatty acids.	No change
UNIT 3	Carbohydrates: Classification – mono-, oligo- and polysaccharides; Aldoses and ketoses; on the basis of number of carbon atoms; straight chain and ring formula, significance; stereoisomers, epimers, enantiomers, anomers (α and β); ring formula of α -D galactose, α -D gluco pyranose; α -D glucopyranose, α -D fructofuranose, D-ribose, D-deoxyribose, N-actyl D-glucoseamine; Disacchrides: structural formula of sucrose, lactose, maltose; Polysaccharaides: Types–homo/heteropolysaccharides; Structural/storage; Inulin, starch (amylose and amylopectin), glycogen, cellulose, hemicellulose, chitin.	No Change
UNIT 4	Amino acids & Proteins: Structure, characteristics and type of amino acid; protein/nonprotein amino acids, essential and nonessential amino acids; D and L form; properties of amino acids; Significance of proline in the structure of protein, peptide bond; protein structure – primary, secondary and tertiary; Types of protein; significance of proteins; isoelectric point, techniques for protein purification, electrophoresis.	No change
UNIT 5	Denaturation and renaturation of DNA; Gene expression in eukaryotes; Regulation of expression- in eukaryotes; Genetic engineering; RNAi concept and importance; Bioinformatics.	No change
	BOM 403	
	COURSE NAME: TAXONOMY	Title: Taxonomy of Angiosperms
UNIT 1	General principles of classification; Artificial, Natural and Phylogenetic type of classification	Definition of taxonomy, aims and importance of taxonomy, different phases of taxonomy, general principles of classification given by Bentham and Hooker, Charles Edwin Bessey, Engler and Prantl and John Hutchinson. Artificial, Natural and Phylogenetic systems of classification and their comparison, Alpha and Omega taxonomy.
UNIT 2	Classification of Angiosperms as given by Benthem and Hooker, Merits and Demerits of the classification	

UNIT 3	Polypetalae, Papaveraceae, Brassicaceae, Capparidaceae, Malvaceae, Rutaceae, Fabaceae, Myrtaceae and Cucurbitaceae	Classification of Angiosperms as given by Bentham and Hooker Merits and Demerits of the classification and its comparison with Englers & Prantl and John Hutchinson's classification, Evolutionary trends in Angiospermic flower.
UNIT 4	Gamopetalae, Rubiaceae, Asteraceae, Apocynaceae, Asclepiadaceae, Convolvulaceae, Solanaceae, Acanthaceae and Lamiaceae	Polypetalae-Detailed description of the families with examples and range in vegetative and reproductive structure; Papaveraceae, Brassicaceae, Capparidaceae, Malvaceae, Rutaceae, Leguminosae, Myrtaceae and Cucurbitaceae.
UNIT 5	Monochlamydeae and Monocots: Euphorbiaceae, Arecaceae, Liliaceae, Musaceae and Poaceae	Gamopetalae -Detailed description of the families with examples and range in vegetative and reproductive structure; Rubiaceae, Asteraceae, Apocynaceae, Asclepiadaceae, Convolvulaceae, Solanaceae, Acanthaceae and Lamiaceae. Monochlamydae and monocots-Detailed description of the families with examples and range in vegetative and reproductive structure; Euphorbiaceae, Arecaceae, Liliaceae, Musaceae and Poaceae.
	Suggested readings: <ol style="list-style-type: none"> 1. Introduction to principles of Taxonomy V V Sivarajan Oxford & IBH Publishing Co. N. D. 2. Taxonomy of Agiosperms V. Singh & D K Jain, Rastogi Publication. Meerut 3. Taxonomy of Angiosperms Prof T. Pullaiah 4. Plant Systematics Michael G. Simpson (2006) 5. Plant Taxonomy by B.P. Pandey, S. Chand & Co. 6. Angiosperms, G.L.Chopra 7. Plant Taxonomy, N.S. Subrahmanyam 	
	BOM 501 (1)	
	COURSE NAME: PLANT TAXONOMY	Title: Taxonomy of Angiosperms
UNIT 1	Principle of systematic & criteria employed with emphasis on the comparative study of the systems proposed by Benthem and Hooker, Engler, Prantl and Hutchinson.	No change
UNIT 2	Preparation of herbarium, Important herbaria of India; Important Botanical gardens-India & abroad, their role	No change

UNIT 3	Polypetalae: Brassicaceae, Papaveraceae, Capparidaceae, Malvaceae, Tiliaceae, Sterculiaceae, Rutaceae, Rosaceae, Lytheraceae, Cucurbitaceae, Cactaceae.	Botanical nomenclature; Principles and rules (ICN); ranks and names; binominal system, typification, author citation, valid publication, rejection of names, principle of priority and its limitations.
UNIT 4	Gamopetalae: Rubiaceae, Asteraceae, Apocynaceae, Asclepiadaceae, Acanthaceae, Lamiaceae, Verbenaceae, Bignoniaceae, Scrophulariaceae.	Taxonomic evidences from palynology, cytology, phytochemistry and molecular data. Taxonomic hierarchy (2 Lectures) Ranks, categories and taxonomic groups
UNIT 5	Amarantaceae, Chenopodiaceae, Nyctaginaceae, Euphorbiaceae, Amaryllidaceae, Liliaceae, Palmeae and Poaceae.	Biometrics, numerical taxonomy and cladistics Characters; variations; OTUs, character weighting and coding; cluster analysis; phenograms, cladograms (definitions and differences).
	Suggested readings: <ol style="list-style-type: none"> 1. The families of flowering plants , John Hutchinson 2. Monocotyledons, Arber A. 3. Introduction to principles of Taxonomy V V Sivarajan Oxford & IBH Publishing Co. N. D. 4. Taxonomy of Agiosperms V. Singh & D K Jain, Rastogi Publication. Meerut 5. Taxonomy of Angiosperms Prof T. Pullaiah 6. Plant Systematics Michael G. Simpson (2006) 7. Plant Taxonomy by B.P. Pandey, S. Chand & Co. 8. Angiosperms, G.L.Chopra 9. Plant Taxonomy, N.S. Subrahmanyam 	
	BOM 502	
	COURSE NAME: CYTOGENETIC AND PLANT BREEDING	
UNIT 1	Concept of gene-fine structure analysis; gene structure and organisation; gene function and regulation; genetics polymorphism (RFLP) and their role in genetics, evolution and breeding.	No Change
UNIT 2	Cytogenetics of polyploids-inheritance pattern in autopolyploids, chromosome & chromatid segregation. Induction & characterization of trisomics, monosomics, nullisomics; alien addition and substitution and their role in gene transfer; genetics of metric characters and quantitative characters; polygenic traits and response to selection; cytoplasmic inheritance, male sterility, origin, induction and application.	No Change (Addition) Linkage and Crossing over
UNIT 3	Mobile genetic elements-insertion elements, transposes in bacteria, Ty elements in yeast; Ac-Ds,Spm (En) & Mu elements in maize, their significance in development and evolution; mutagenesis & fate; physical and chemical mutagens.	(Addition) Quantitative inheritance (4 lectures) 26 Concept, mechanism, examples. Monogenic vs polygenic Inheritance.
UNIT 4	Introduction to plant breeding, objectives of plant breeding centres of origins of crop plant, methods of reproduction,	No Change

	breeding methods of self and cross pollinated plants.	
UNIT 5	Breeding and improvement of some selected cereal, pulse, oil seed and vegetable crops; heterosis and inbreeding depression; exploitation of hybrid vigour	
	BOM 503	
UNIT 1	COURSE NAME: PLANT PHYSIOLOGY Plant – Water relations: Diffusion and osmosis, chemical potential and its gradient, water potential, components of water potential. Symplast and apoplast. Ascent of sap, mechanisms. Transpiration, factors controlling transpiration, role of stomata, mechanism of stomatal movements. Significance of transpiration. Antitranspirants, guttation.	Water absorption by roots, aquaporins, pathway of water movement, transmembrane pathways, root pressure
UNIT 2	Mineral Nutrition: Mineral requirements, essential and non-essential elements, criteria of essentiality, macro and micro nutrients, role of essential elements, mineral deficiency symptoms. Ion antagonism and toxicity, solution culture; transport of nutrients within the plant body; Absorption of minerals, Transport of ions across membrane, Passive absorption, Electrochemical gradient, Donnan equilibrium, Facilitated diffusion, Accumulation against concentration gradient, Active absorption, Role of ATP, Carrier systems, Role of cell membrane, Proton pumps and ion flux.	chelating agents, soil as a nutrient reservoir
UNIT 3	Enzymes: Enzyme as catalysts – their chemical and biological properties; cofactors, coenzymes; effect of temperature, pH and inhibitors; classification and nomenclature of enzymes; isoenzymes; allosteric enzymes. Carbon Assimilation: Assimilation of energy; Role of light; Absorption spectrum and action spectrum; compensation point; photosynthetic yield and quantum yield. Photosynthesis- photochemical reaction, absorption and transfer of solar energy, mechanism, role of chlorophylls and accessory pigments, antennae molecules and active center molecules; ionization of chlorophyll and flow of electrons, carriers and terminal acceptors; energy (quantal) requirement electron flow; photolysis of water and evolution of oxygen, model of photoelectron flow; evidence for two photosystems; reduction of NADP; photophosphorylation; Reduction of carbon-di-oxide into glucose: Benson and Calvin cycle; Hatch, Slack and Kortschak Pathway; Crassulacean Acid Metabolism (CAM); Energetics of CO ₂ reduction; Photorespiration.	No Change
UNIT 4	Carbon oxidation: retrieval of energy; oxidative metabolism; glycolysis – anaerobic conversion of pyruvate into ethanol and lactate, energy balance. Oxidative decarboxylation of pyruvate into acetyl CoA; TCA cycle; reduction of NAD, oxidation of reduced NAD, oxidative phosphorylation; Chemosmotic theory of ATP synthesis. Energy balance of	No Change

UNIT 5	<p>oxidation of glucose molecule. Pentose phosphate pathway, significance, energy balance.</p> <p>(i) Nitrogen metabolism: Assimilation of molecular nitrogen. Diazotrophs – free living and associative; symbiotic association: mechanism and process of symbiosis; reduction of nitrogen into ammonia, dinitrogenase enzyme; regulation and control, nif genes. Uptake of nitrogen by plants; reduction of nitrate and nitrite into ammonia; Nitrate reductase and nitrite reductase; formation of different amino acids and amides; Transamination and reductive amination.</p> <p>(ii) Phenomenon of growth and development: Definitions, phases of growth and development, morphogenesis as an expression of growth and development; mechanism – role of cell division, cell elongation and cell differentiation. Seed germination: dormancy – causes and removal; factors affecting seed germination. Physiology of flowering: Photoperiodism – discovery, variation in photoperiodic response, long day, short day and day-neutral plants, inductive and non inductive cycles, role of dark period, role of quality and intensity of light; bolting. Effect of temperature, specific cold temperature requirement, vernalization of Petkus rye; Biological clock.</p> <p>Plant Growth regulators: Auxins, cytokinins, gibberellins, abscissins, ethylene: discovery, chemistry, biosynthesis, physiological role, bioassay and mechanism of action; application. Phytochromes a general account.</p>	Discovery, chemical nature, role in photomorphogenesis, low energy responses (LER) and high irradiance responses (HIR), mode of action
BOM 504		
UNIT 1	COURSE NAME: ECOLOGY Definiton ,scope and relationship with other sciences, Plant community , Community structure and dynamics (plant succession) ,Climatic climax.	Analytical and synthetic characters of plant community; Eco tone and edge effect. Climax concepts
UNIT 2	Response of plant to stress conditions : Hydrophytes , Xerophytes and Halophytes. Their morphological , anatomical and physiological adaptations.	Ecosystems and biotic inter actions :Trophic organization ; autotrophy; heterotrophy; symbiosis ; food chains; webs; ecological pyramids; biomass; standing crop
UNIT 3	Conservation of soil : Types of soil conservation ,Global pollution : Air , water , Soil , Noise and Radio activity ,Climate change	Importance of soil: its origin; formation ;and composition; Physical, chemical and biological components of soil; soil profile
UNIT 4	Afforestation , Social forestry and Agro forestry , Renewable and non renewable resources : Sun , Wind ,Geo thermal ,Coal ,bio –energy ,fisheries.	Bio geo chemical cycles :water, carbon, nitrogen, and phosphorus. Land and Water resources.
UNIT 5	Brief account of following : International Biological	NO CHANGE NEEDED

	programme(IBP) , Man and Biosphere (MAB), International Union for Conservation of nature and natural resources (IUCN) . National park and Sanctuaries , Red Data Book , Biosphere Reserve.	SYLLABUS IS AS PER CBCS,UGC GUIDELINES
	BOM 601	
UNIT 1	COURSE NAME: MICROBIOLOGY UNIT 1: BACTERIOLOGY History of microbiology, Ultrastructure of Bacterial cell, Reproduction of Bacteria, Plasmids	Eubacteria;wall less forms [Mycoplasma and spheroplast];Nutritional types
UNIT 2	VIROLOGY Nature and structure of viruses, classification ; Viruses as disease incitants; Virus as contagious agent; Virus of bacteria, fungi, Algae and baculoviruses; virioids, prions & virusoids; physicochemical properties; with special reference to TMV; Assaying of plant viruses-general account & economic importance of viruses.	Economic importance of viruses with reference to vaccine production; role in research; medicine and diagnostics; as causal agents of plant diseases
UNIT 3	ENVIRONMENTAL MICROBIOLOGY Microbiology of air, (Flora of air, sources of air and contamination) microbiology of water (microbial flora of potable water, testing the purity of water) and soil microbiology with special reference to nitrogen fixation.	NO CHANGE NEEDED SYLLABUS IS AS PER CBCS,UGC GUIDELINES
UNIT 4	Structure , reproduction and life history of following : (a) Basidiomycotina – <i>Agaricus</i> , <i>Puccinia</i> , <i>Ustilago</i> .(b) Deuteromycotina (<i>Alternaria</i>) including diseases caused by them, Symptoms , Etiology and control measures.	Structure , Reproduction and Life Histories of True Fungi: Life cycle of <i>Puccinia</i> ; <i>Ustilago</i> ; <i>Agaricus</i> [Basidiomycota] including diseases caused by them, Symptoms , Etiology and control measures. [shifted <i>Alternaria</i> from unit 4 to 3]
UNIT 5	Special Topics – Principles of plant diseases control ,Role of fungicides in modern agriculture , Diseases Resistant varieties. Heterothallism ,Degeneration of sex in fungi , Economic importance of fungi, Edible fungi.	Special Topics – Principles of plant diseases control ,Role of fungicides in modern agriculture , Diseases Resistant varieties. Heterothallism , , Economic importance of fungi, Edible fungi. [Deleted Degeneration of sex in fungi from unit 5 and added Degeneration of sex in Ascomycota in Unit3]
	BOM 602	
UNIT 1	COURSE NAME: EMBRYOLO Historical perspective; Microsporangium; wall layers, tapetum, their function, ultrastructure, development; Microsporogenesis; pollen mother cells, callose; Pollen wall; pollen structure, sperm cells; pollen germination, pollen types.	No change
UNIT 2	Ovule-ontogeny, types; Megasporogenesis- archesporium, megaspore mother cell; tetrads polarity, development; Embryo-sac types; ultrastructure of components – synergids, egg, central cell, antipodals.	No change
UNIT 3	Pollination and Fertilization: Pollination types and agencies. Style, stigma-structure; pollen germination and pollen tube	

UNIT 4	growth, double-fertilization; Sexual incompatibility: significance; pollen pistil interaction, role of pollen wall, barriers to fertilization, methods to overcome sexual incompatibility.	No change
	Endosperm and Embryo: Endosperm types, ultrastructure, haustoria, function; Embryo-zygote polarity; Dicot and Monocot embryos; development of suspensor; Nutrition of embryo; Polyembryony: types, gametic and somatic embryogenesis.	No change
UNIT 5	Apomixis – types and importance; Seed development; structure, physiology, viability, germination. Embryology and Taxonomy – diagnostic embryological features, primitive and advanced; comparative embryology. Experimental embryology: Intra ovarian pollination, In vitro pollination and fertilization, In vitro culture of ovules, ovaries, seeds, embryos, endosperm, pollen/anther (androgenesis).	No change
BOM 603		
UNIT 1	COURSE NAME: APPLIED BOTANY AND ETHNOBOTANY UNIT 1 The importance of plants and plant product, the scope of economic botany. Fruits: Types with special reference to history, origin, production, varieties, distribution, cultivation and food value of Citrus, Mango and Banana.	Origin of cultivated plants: concept of centres of origin, their importance with reference to Vavilov's work
UNIT 2	FATS AND OILS Soyabean, Coconut, groundnut, Sesamum, Mustard. Beverages: Tea Coffee, Oils and Beverages.	General description, classification, extraction and uses of oils. Comparison of essential oil and fatty oils
UNIT 3	FIBRES Cotton, Flax, Jute and paper making fibres/plants raw material. Wood and cork : A general account (With special reference to teak, cork, deodar, pine, shisham).	NO CHANGE NEEDED SYLLABUS IS AS PER CBCS,UGC GUIDELINES
UNIT 4	CONDIMENTS AND SPICES A general account. Drugs: in various systems of medicine.	Listing of important spices; their family and part used; Economic importance with special reference to fennel ; saffron ; clove ; black pepper. Description of <i>Cinchona</i> ; <i>Digitalis</i> ; <i>Papaver</i> ; <i>Cannabis</i>
UNIT 5	ETHNOBOTANY, ETHNOBOTANY AND ITS SIGNIFICANCE Indian work, study of selected plants used by tribes in their daily life, for food, clothing, shelter, medicines, agriculture, plants in folk religion and mythology.	NO CHANGE NEEDED SYLLABUS IS AS PER CBCS,UGC GUIDELINES
BOM 604		
UNIT 1	COURSE NAME: BIOMETRICS & COMPUTER APPLICATIONS Aim and scope of Biometrics, Collection and presentation	NO CHANGE NEEDED

	of data, Mean, mode, variance, standard deviation, coefficient of variation.	
UNIT 2	Application of probability distribution, Binomial, Poisson, chi square test, test of significance	NO CHANGE NEEDED
UNIT 3	Application of one way, two way analysis of variance (ANOVA). Correlation and Regression, Significance of correlation and regression.	NO CHANGE NEEDED
UNIT 4	Principles of design of experiments. RBD and CRD. Study of quantitative characters with specific examples.	NO CHANGE NEEDED
UNIT 5	Computers- definition, history and organisation of computers. Essentials of programming with any one language, commercial software packages with reference to biological application. Statistical analysis. Uses of computers for MS, drawing graphs, charts and histograms.	NO CHANGE NEEDED