

Mahatma Gandhi University
Department of Botany
M.Sc (Botany) I- Semester Syllabus
Blow up
Paper- I
Phycology

Lecturer	Topic	Remarks
Unit - I		
Lecture - 1	Introduction to Phycology	
Lecture - 2	Fritsch systems of classifications	
Lecture - 3	Parker systems of classifications	
Lecture - 4	Criteria used in the primary classification of algae: a) Pigments	
Lecture - 5	b) Reserve food materials	
Lecture - 6	c) Flagella	
Lecture - 7	d) Cell wall	
Lecture - 8	e) Gross cell structure	
Lecture - 9	Algae of diverse habitats – a) Terrestrial	
Lecture - 10	b) Freshwater algae	
Lecture - 11	c) Marine algae	
Lecture - 12	Reproduction of algae – a) Vegetative	
Lecture - 13	b) Asexual – Different types of spores	
Lecture - 14	sexual - zygotic	
Lecture - 15	sporic and gametic	
Unit - II		
Lecture - 16	Introduction to cynophyceae Chlorophyceae	
Lecture - 17	Microcystis	
Lecture - 18	Lyngbya	
Lecture - 19	Aulosira	
Lecture - 20	Eudorina,	
Lecture - 21	Pediastrum,	
Lecture - 22	, Hydrodictyon,	
Lecture - 23	Pithophora	
Lecture - 24	Ulva	
Lecture - 25	Draparnaldiopsis,	
Lecture - 26	Cosmarium,	
Lecture - 27	Closterium	
Lecture - 28	Bryopsis	
Lecture - 29	Introduction to Charophyceae	
Lecture - 30	nitella	
Unit - IV		
Lecture - 31	Introduction to Bacillariophyceae	
Lecture - 32	Cyclotella	
Lecture - 33	Cymbella	
Lecture - 34	Gomphonema	
Lecture - 35	Introduction to Euglenophyceae	
Lecture - 36	Euglena	
Lecture - 37	Phacus	
Lecture - 38	Intoduction to Phaeophyceae	
Lecture - 39	Laminaria	

Lecture - 40	Padina	
Lecture - 41	Introduction to Rhodophyceae	
Lecture - 42	Importance of Rodophyceae	
Lecture - 43	Porphyra,	
Lecture - 44	Gracillaria, Corallina	
Lecture - 45	Corallina	
Unit -III		
Lecture -46	Algal blooms	
Lecture -47	fomation and effects of algalblooms	
Lecture -48	Toxic algae	
Lecture -49	Algal biofertilizers	
Lecture -50	Economical importance of Algal Biofertilizers	
Lecture -51	Cyanophyceae species role in agriculture	
Lecture -52	Algae as Food.	
Lecture -53	Economical impotence of algal food	
Lecture -54	Algae as Feed.	
Lecture -55	Role of algae in industry	
Lecture -56	Different speices of economic importance algae	
Lecture -57	Alginic acid,	
Lecture -58	Agar,	
Lecture -59	Carrageenan	
Lecture -60	Fossil Algae (A brief account only).	

Reference books

1. Fritsch, F.E. The structure and reproduction of algae volume I and II
2. Robin South,G and Alan Whittick: Introduction to Phycology
3. Morris,I: An Introduction to Algae
4. Bold, H.C. and Wynne, M.D.: Introduction to the Algae structure and reproduction
5. H.D.Kumar: Introductory Phycology

Paper-II Bryophyta and Pteridophyta

Lecturer	Topic	Remarks
UNIT 1		
Lecturer - 1	Classification system of bryophytes	
Lecturer - 2	Marchantiales; Marchantia vegetative structure	
Lecturer - 3	Marchantia Reproduction	
Lecturer - 4	Targionia vegetative structure	
Lecturer - 5	Targionia Reproduction	
Lecturer - 6	Jugarmanniales; Porella vegetative structure	
Lecturer - 7	porella reproduction	
Lecturer - 8	Anthocerotales, Anthoceros vegetative structure	
Lecturer - 9	Anthoceros Reproduction	
Lecturer - 10	Notothyllas vegetative structure	
Lecturer - 11	Notothyllas Reproduction	

Lecturer - 12	Sphagnales; sphangum vegetative structure	
Lecturer - 13	sphangum reproduction	
Lecturer - 14	polytrichales;polytrichum vegetitive structure	
Lecturer - 15	polytrichum reproduction	
UNIT- 2		
Lecturer - 16	Structure of gametophyte in bryophytes	
Lecturer - 17	Evolution of gametophyte in bryophytes	
Lecturer - 18	structure of sporophytes in bryophytes	
Lecturer - 19	evolution of sporophytes in bryophytes	
Lecturer - 20	economic importance of bryophytes	
Lecturer - 21	Fossils	
Lecturer - 22	Fossilization	
Lecturer - 23	Types of plant fossils	
Lecturer - 24	Fossil bryophytes	
UNIT- 3		
Lecturer - 25	Introduction to pteridophytes	
Lecturer - 26	Classification system of Pteridophytes	
Lecturer - 27	Psilotales; psilotum vegetitive structure	
Lecturer - 28	psilotum reproduction	
Lecturer - 29	Filicales; Ophioglossum vegetitive structure	
Lecturer - 30	Ophioglossum reproduction	
Lecturer - 31	Adiantum vegetative structure	
Lecturer - 32	Adiantum reproduction	
Lecturer - 33	Slavina vegetative structure	
Lecturer - 34	Slavina reproduction	
Lecturer - 35	Azolla vegetative structure	
Lecturer - 36	Azolla reproduction	
Lecturer - 37	Lycopodiales; lycopodium vegetative structure	
Lecturer - 38	Lycopodium reproduction	
Lecturer - 38	phylloglossum vegetative structure	
Lecturer - 39	phylloglossum reproduction	
Lecturer - 40	Selaginaellales; Selagenella vegetative structure	
Lecturer - 41	Selagenella reproduction	
Lecturer - 42	Equisetales; Equisetum vegetative stucture	
Lecturer - 43	Equisetum reproduction	
Lecturer - 44	Stelar evolution in pteridophytes	
Lecturer- 45	evloution of solenostele and dictio stele	
UNIT -4		
Lecturer - 46	Telome theory	
Lecturer - 47	Telome theory applications	
Lecturer - 48	Heterospory	
Lecturer - 49	Seed habit	
Lecturer - 50	Geological time scale	
Lecturer - 51	Techniques employed in the of fossils	
Lecturer - 52	Origin and evolution of Rhyiniales	
Lecturer - 53	Origin and evolution of zostirophyllales	
Lecturer - 54	General characters of Lepidodendrales	
Lecturer - 55	reproductive structure s of lepidodendrales	

Lecturer - 56	Morphology of calamitales	
Lecturer - 57	reproductive structure s ofcalamitales	
Lecturer - 58	General characters of sphenophyllum	
Lecturer - 59	Reproductive structure of sphenophyllum	
Lecturer - 60	Mayzostaches	

Reference books

1. Smith, G.M. Cryptogomic Botany. Vol.II
2. Parihar, N.S.: Bryophyta
3. Parihar, N.S.1976: Biology and Morphology of Pteridophytes
4. Sporne, K.R. Pteridophyta
5. Rashid: Introduction to Pteridophyta
6. Cavers, F. Inter-relations of Bryophytes.

Paper-III Taxonomy of Angiosperms and Medicinal Botany

Lecturer	Topic	Remarks
unit - 1		
Lecturer -1	Intorduction to taxonomy	
Lecturer -2	Artificial classification systems	
Lecturer -3	Phenetic classification system[bentham and hooker]	
Lecturer -4	Hutchinson classification system	
Lecturer -5	Cronquist classification system	
Lecturer -6	Comparision between hutchinson and cronquist systems	
Lecturer -7	Takhtajan classification system	
Lecturer -8	Taxnomic evidence andf techniques ;Morphology	
Lecturer -9	Micromorphology	
Lecturer -10	Epidermology -stomata	
Lecturer -11	Hair and trichomes	
Lecturer -12	Cytology	
Lecturer -13	Phytochemistry -upto genes level	
Lecturer -14	Species level	
Lecturer -15	Nucleic acid hybridization	
UNIT -2		
Lecture -16	Nomenclature concept of ICBN	
Lecture -17	ICBN Codes	
Lecture -18	ICBN Principles	
Lecture -19	Rules and recommdandations of ICBN	
Lecture -20	Ranks and nomenclatue of taxa	
Lecture -21	Typification	
Lecture -22	Rule of priority	
Lecture -23	Effective publication	
Lecture -24	Valid publication	
Lecture -25	Author citation	
Lecture -26	Biosystematics concept	
Lecture -27	categories	
Lecture -28	species concept	

Lecture -29	biological species concept	
Lecture -30	Ecological species concept	
UNIT -3		
Lecture -31	Magnoliaceae and Winteraceae vegetative characters	
Lecture -32	Magnoliaceae and Winteraceae floral characters	
Lecture -33	Malvaceae and Steruliaceae vegetative characters	
Lecture -34	Malvaceae and Steruliaceae Floral characters	
Lecture -35	Rutaceae and Meliaceae vegetative characters	
Lecture -36	Rutaceae and Meliaceae floral characters	
Lecture -37	Amaranthaceae and Chenopodiaceae vegetative characters	
Lecture -38	Amaranthaceae and Chenopodiaceae foral characters	
Lecture -39	Cyperaceae and Poaceae vegetative characters	
Lecture -40	Cyperaceae and Poaceae floral characters	
Lecture -41	Apocynaceae and Asclepiadaceae vegetative characters	
Lecture -42	Apocynaceae and Asclepiadaceae floral characters	
Lecture -43	Verbenaceae and Lamiaceae vegetative characters	
Lecture -44	Verbenaceae and Lamiaceae floral characters	
Lecture -45	Origin of anigospers with reference to recent findings	
UNIT- 4		
Lecture -46	Role of plants in medicine	
Lecture -47	Origin of medicinal botany	
Lecture -48	Development of medicinal botany	
Lecture -49	Andrographis Paniculata morphology	
Lecture -50	Andrographis Paniculata active principles and medcinal uses	
Lecture -51	Asparagus racemosus morphology	
Lecture -52	Asparagus racemosus active principles and medcinals uses	
Lecture -53	Clitoria ternata morphology	
Lecture -54	Clitoria ternata active principles and medcinals uses	
Lecture -55	Phyllanthus emblica morphology	
Lecture -56	Phyllanthus emblica actives principles and medicinals uses	
Lecture -57	Gymnema sylvestre morphology	
Lecture -58	Gymnema sylvestre active principles and medicinals uses	
Lecture -59	Telangana geography and forest vegetation	
Lecture -60	Open land vegetation	

References

1. Lawrence: Taxonomy of Vascular Plants
2. Sivarajan, V.V. (Ed. Robson). Introduction to Principles of Plant Taxonomy
3. Heywood, V.H. Plant Taxonomy
4. Naik, V.N. Taxonomy of Angiosperms (1988)
5. Stace, C.R. Plant Taxonomy and biosystematics (2nd Ed.)
6. Hutchinson, J. The families of flowering plants (3rd Ed.), 1973
7. Takhtajan, K. Outline of classification of flowering plants. Botanical Rev. 46:225-359), 1980
8. Flowering plants. Origin and Dispersal (Trans. By Jeffrey), 1969

Paper-IV
Pant Biochemistry

Lecturer	Topic	Remarks
Unit - I		
Lecturer - 1	Conservation of energy	
Lecturer - 2	Entropy and disorder	
Lecturer - 3	Gibbs free energy	
Lecturer - 4	Chemical	
Lecturer - 5	Redox potential	
Lecturer - 6	Energy currencies (ATP, NAD, NADP),	
Lecturer - 7	ATP structure and reactions	
Lecturer - 8	Introduction to enzymes	
Lecturer - 9	Properties of enzymes	
Lecturer - 10	Cofactors	
Lecturer - 11	Isozymes	
Lecturer - 12	Michaelis – Menten equation	
Lecturer - 13	Mechanism of enzyme action	
Lecturer - 14	Induced fit and lock and key theory	
Lecturer - 15	Regulation of enzyme action	
Unit - II		
Lecturer - 16	Classification of carbohydrates	
Lecturer - 17	Monosaccharides and oligosaccharides	
Lecturer - 18	Polysaccharides	
Lecturer - 19	Storage polysaccharides	
Lecturer - 20	Structural polysaccharides	
Lecturer - 21	Glycoproteins	
Lecturer - 22	Simple lipids	
Lecturer - 23	Compound lipids	
Lecturer - 24	Sterols and terpenoids	
Lecturer - 25	Biosynthesis of fatty acids	
Lecturer - 26	Polyunsaturated fatty acids	
Lecturer - 27	lipoproteins	
Lecturer - 28	α - oxidation, β -oxidation	
Lecturer - 29	Glyoxylate cycle	
Lecturer - 30	Gluconeogenesis	
Unit - III		
Lecturer - 31	Introduction to Amino acids	
Lecturer - 32	General properties of Amino acids	
Lecturer - 33	Classification and characteristics Of Aminoacids	
Lecturer - 34	Non protein amino acids	
Lecturer - 35	Peptide bond	
Lecturer - 36	GS and GOGAT	

Lecturer - 37	Introduction to Proteins	
Lecturer - 38	Importance of Proteins	
Lecturer - 39	Classification of proteins	
Lecturer - 40	Structure of proteins	
Lecturer - 41	Ramachandran plot	
Lecturer - 42	Structure of DNA and types	
Lecturer - 43	B, A and Z forms and DNA	
Lecturer - 44	Structure of RNA	
Lecturer - 45	m-RNA, t-RNA, r-RNA	
Unit - IV		
Lecturer - 46	Chemical composition	
Lecturer - 47	Membrane models	
Lecturer - 48	Functions of Membranes	
Lecturer - 49	Membrane proteins	
Lecturer - 50	Membrane lipids	
Lecturer - 51	Cellulose	
Lecturer - 52	Hemicelluloses, lignin	
Lecturer - 53	Pectin, Suberin	
Lecturer - 54	Cutin	
Lecturer - 55	Introduction to secondary metabolites	
Lecturer - 56	Occurance of secondary metabolites	
Lecturer - 57	classification of secondary metabolites	
Lecturer - 58	Alkaloids, Terpinods	
Lecturer - 59	Flavanoids, Coumarins	
Lecturer - 60	Distribution and functions	

References

1. Plant Physiology, biochemistry and molecular biology. David, T: Dennis and Davis Turnip. Longman. Scientific and technical U.K. 1990.
2. Plant Biochemistry Voet, D and Voet J.G. International
3. Outlines of biochemistry. 5th edition Con E.E. and Stump P.K. 1995. Willey
4. Principles of biochemistry, Lehninger, A.L. 1982 CBS Publication
5. Biochemistry, Strayer W.H. 1976. Foreman Company.
6. Introduction to Plant Physiology. Willium G. Hopkins and Norman P. A. Huner
7. Plant Physiology. Lincoln Taiz and Eduardo Zeiger. International Edition
8. Plant Biochemistry. P.M. Dey and J.B. Harborne
9. Plant Biochemistry. Hans-Walter Heldt
10. Physicochemical and Environmental Plant Physiology. Park S. Nobel

**II- Semester
Paper-I
Mycology**

Lecturer	Topic	Remarks
Unit-I		
Lecturer - 1	Introduction to Mycology	
Lecturer - 2	Hyphal ultrastructure	
Lecturer - 3	Fungal wall and septa	
Lecturer - 4	Main growth forms of fungi	
Lecturer - 5	Mode of nutrition in fungi	
Lecturer - 6	General characteristics of fungal spores;	
Lecturer - 7	Asexual and sexual reproduction in different groups of fungi.	
Lecturer - 8	Heterokaryosis	
Lecturer - 9	Parasexual cycle	
Lecturer - 10	Sex Pheromones	
Lecturer - 11	Mechanism of nuclear inheritance	
Lecturer - 12	Mechanism of extra-nuclear inheritance.	
Lecturer - 13	ICN	
Lecturer - 14	Phylogeny and recent taxonomic criteria	
Lecturer - 15	Classification of fungi	
Unit - II		
Lecturer - 16	Microsporidia - General account	
Lecturer - 17	Chytridiomycota – Synchytrium	
Lecturer - 18	Blastocladiomycota - Allomyces	
Lecturer - 19	Pilobolus	
Lecturer - 20	Neocallimastigomycota - General account	
Lecturer - 21	Glomeromycota – Glomus	
Lecturer - 22	Ascomycota - Taphrina	
Lecturer - 23	Emericella	
Lecturer - 24	Neurospora	
Lecturer - 25	Gibberella,	
Lecturer - 26	Glomerella	
Lecturer - 27	Morchella	
Lecturer - 28	Basidiomycota - Melampsora	
Lecturer - 29	Phallus	
Lecturer - 30	Ustilago	
Lecturer - 31	Oomycota – Peronospora	
Lecturer - 32	Fungi-like organisms - Stemonitis	

Unit - III		
Lecturer - 33	Production of alcohol and organic acids	
Lecturer - 34	Types of metabolites used in medicine and production of antibiotics	
Lecturer - 35	Wilts,	
Lecturer - 36	Leafspots,	
Lecturer - 37	Root rots	
Lecturer - 38	Smuts	
Lecturer - 39	Rusts	
Lecturer - 40	Rusts	
Lecturer - 41	Ectomycorrhizae	
Lecturer - 42	Endomycorrhizae	
Lecturer - 43	Mycofungicides, weedicides, and insecticides	
Lecturer - 44	Types of mushrooms, biology and growth of mushrooms	
Lecturer - 45	Nutritional & medicinal value of edible mushrooms; fungal protein	
Unit - IV		
Lecturer - 46	Archaeobacteria and Eubacteria	
Lecturer - 47	General characters of Plant Pathogenic Bacteria	
Lecturer - 48	Ultra structure of bacterial cell	
Lecturer - 49	Cell wall, nutritional and growth factors of bacteria.	
Lecturer - 50	Significance of plasmids	
Lecturer - 51	Molecular events in genetic transfer in Bacteria	
Lecturer - 52	Conjugation, transformation and transduction	
Lecturer - 53	Characteristics and ultrastructure of virions	
Lecturer - 54	Isolation, purification	
Lecturer - 55	Detection and characterization of viruses	
Lecturer - 56	Classification of viruses	
Lecturer - 57	Symptomatology and Transmission of plant viruses	
Lecturer - 58	Importance of the viruses	
Lecturer - 59	Mollicutes: General characters	
Lecturer - 60	Transmission & diseases caused by Spiroplasmas and	

Reference books

1. John Webster and Roland W.S. Weber - Introduction to Fungi
2. Alexopoulos C.J., C.W. Mims and M. Blackwell - Introductory Mycology
3. Mehrotra R.S. and K.R. Aneja - An Introduction to Mycology
4. Smith, J.E. - The Filamentous Fungi
5. Change. S.T. and P.G. Miles - Edible mushrooms and their cultivation
6. Mosses, B.V.A. - Mycorrhizae
7. Powel, C and D. J. Bagyaraj - V.A. Mycorrhizae
8. Berry, R. - Industrial mycology (Vol. I)
9. Dubey, S.C. - Biotechnology.
10. Jeffrey C. Pommerville - Alcamo's Fundamentals of Microbiology
11. Arora D.R. and B. Arora - Text book of Microbiology.

Gymnosperms and Embryology

Lecturer	Topic	Remarks
Unit - I		
Lecturer - 1	Distribution of Gymnosperms - Past	
Lecturer - 2	Distribution of Gymnosperms - present.	
Lecturer - 3	Distribution of Gymnosperms in India	
Lecturer - 4	Classification of Gymnosperms – Proposed by Sporne and Pant.	
Lecturer - 5	Economic importance of Gymnosperms	
Lecturer - 6	Wood anatomy of Conifers	
Unit-II		
Lecturer - 7	Cycus morphology	
Lecturer - 8	Cycus Anatomy	
Lecturer - 9	Cycus Ovule L.S	
Lecturer - 10	Zamia morphology	
Lecturer - 11	Zamia Anatomy	
Lecturer - 12	Male and Female cones of Cycadales	
Lecturer - 13	Ginkgo Morphology	
Lecturer - 14	Ginkgo Anatomy	
Lecturer - 15	Male and Female cones of Ginkgoales	
Lecturer - 16	Araucaria Morphology	
Lecturer - 17	Araucaria Anatomy	
Lecturer - 18	Podocarpus Morphology	
Lecturer - 19	Podocarpus Anatomy	
Lecturer - 20	Cupressus Morphology	
Lecturer - 21	Cupressus Anatomy	
Lecturer - 22	Cedrus Morphology	
Lecturer - 23	Cedrus Anatomy	
Lecturer - 24	Male and Female cones of Araucaria,Podocarpus	
Lecturer - 25	Male and Female cones of Cupressus,Cedrus	
Lecturer - 26	Taxus Morphology	
Lecturer - 27	Taxus Anatomy	
Lecturer - 28	Male and Female cones of Taxus	
Lecturer - 29	Ephedra Morphology	
Lecturer - 30	Ephedra Anatomy	
Lecturer - 31	Welwitschia Morphology	
Lecturer - 32	Welwitschia Anatomy	
Lecturer - 32	Male and Female cones of Gnetales	
Lecturer - 33	General Account of Pteridospermales- Paliozoic pteridospermales	
Lecturer - 34	Mesozoic Pteridospermales	
Lecturer - 35	Pantoxylales Morphology	
Lecturer - 36	Reproductive structures of pantoxylales	
Lecturer - 37	Cordaitales Morphology	
Lecturer - 38	Reproductive structures of Cordaitales	
Unit-III		
Lecturer - 39	Microsporangium: Anther	
Lecturer - 40	sporogenous tissue	
Lecturer - 41	Formation of pollen wall	
Lecturer - 42	Vegetative and generative nucleus.	

Lecturer - 43	Megasporangium: Ovule	
Lecturer - 44	Types of ovules	
Lecturer - 45	Nucellus	
Lecturer - 46	Megasporogenesis	
Lecturer - 47	Embryosac types	
Lecturer - 48	Special account of mature embryosac	
Unit-IV		
Lecturer - 49	Fertilization: Double fertilization	
Lecturer - 50	Self-incompatibility	
Lecturer - 51	Barriers of fertilization	
Lecturer - 52	Endosperm: Development	
Lecturer - 53	Types of endosperms	
Lecturer - 54	Embryogeny of dicots.	
Lecturer - 55	General account of Apomixis	
Lecturer - 56	Diplospory	
Lecturer - 57	Parthenocarpy	
Lecturer - 58	Applications of Parthenocarpy	
Lecturer - 59	Embryology in relation to Taxonomy above genus level	
Lecturer - 60	Embryology in relation to Taxonomy upto species level	

References

1. Chamberlain, C.J. Gymnosperms: Structure and evolution
2. Sporne K. R: The Morphology of Gymnosperms.
3. Vashistha, P.C. 1978: Gymnosperms.
4. Foster & Gifford. Comparative Morphology of Vascular Plants
5. Delevoryas, T.1963. Morphology and evolution of Fossil Plants
6. Arnold C.W. introduction to Paleobotany
7. Shukla & Mishra: Essentials of Paleobotany
8. Steward, W.N. 1988: Paleobotany & Evolution of plants
9. Sergeiv, Moyen: Fundamentlis of Paleobotany – 1098
10. Taylor, T.N. 1981. Introduction to Fossils

Paper-III Plant Anatomy and Palynology

Lecturer	Topic	Remarks
Unit - I		
Lecturer - 1	Introduction to Plant Anatomy	
Lecturer - 2	Importance and relationships of Plant Anatomy	
Lecturer - 3	Shoot Development	
Lecturer - 4	Apical Meristem and types of vegetative shoot apex in Gymnosperm	

Lecturer - 5	Apical Meristem and types of vegetative shoot apex in Angiosperms.	
Lecturer - 6	Cytological zonation – Anneau initial	
Lecturer - 7	Meristem d'attente	
Lecturer - 8	Sub-apical differentiation of tissues	
Lecturer - 9	Root Development	
Lecturer - 10	Organization of root apex	
Lecturer - 11	Significance of Quiescent center	
Lecturer - 12	Recent experimental studies on differentiation of tissues	
Lecturer - 13	Carpus-cuppe Theory	
Lecturer - 14	Leaf: Structure with reference to C3 and C4 plants	
Lecturer - 15	Kranz and CAM Syndrome	
Unit - II		
Lecturer - 16	Introduction to Epidermology	
Lecturer - 17	Structural composition of Epidermal cells	
Lecturer - 18	stomata	
Lecturer - 19	Trichomes	
Lecturer - 20	Epidermal cell complex – Structure	
Lecturer - 21	Orientation and arrangement	
Lecturer - 22	Stomatal complex–Basic structure	
Lecturer - 23	Ultrastructure of guard cells	
Lecturer - 24	Ontogeny of Paracytic, diacytic	
Lecturer - 25	Anisocytic stomata	
Lecturer - 26	Classification of trichomes.	
Lecturer - 27	Glandular trichomes	
Lecturer - 28	Transfer cells: Structure	
Lecturer - 29	Ontogeny	
Lecturer - 30	Distribution and function.	
Unit - III		
Lecturer - 31	Secondary growth	
Lecturer - 32	Dicot stem Anatomy	
Lecturer - 33	Significance of Dicots wood anatomy	
Lecturer - 34	Morphology and arrangement of Vessels	
Lecturer - 35	Axial Parenchyma - paratrachial	
Lecturer - 36	Apotrachial	
Lecturer - 37	Ray Parenchyma	
Lecturer - 38	Fibres	
Lecturer - 39	Value of wood elements in wood identification.	
Lecturer - 40	Significance of T.S, T.L.S,R.L.S	
Lecturer - 41	Salient features of Tectona grandis	
Lecturer - 42	Salient features of Terminalia tomentosa	
Lecturer - 43	Salient features of Shorea robusta	
Lecturer - 44	Salient features of Pongamia pinnata	
Lecturer - 45	Ripple marks and Storied fibers in Fabaceae	
Unit - IV		
Lecturer - 46	Introduction to Palynology	
Lecturer - 47	Scope of Palynology	
Lecturer - 48	Morphology of pollen – Polarity	
Lecturer - 49	Symmetry	

Lecturer - 50	Size and shape	
Lecturer - 51	Apertural pattern	
Lecturer - 52	Exine stratification	
Lecturer - 53	Ornamentation of pollen wall.	
Lecturer - 54	Aeropalynology – principles, dissemination	
Lecturer - 55	Distribution of aerospor and meteorological factors	
Lecturer - 56	Pollen and spore allergy and clinical treatment	
Lecturer - 57	Melittopalynology	
Lecturer - 58	Importance of melittopalynology	
Lecturer - 59	Role of Palynology in Taxonomy	
Lecturer - 60	Euripalynous taxa and Stenopalynous taxa	

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1. Fahn, A. *Plant Anatomy* (4th Ed.), 1990.
 2. Easu, K. *Anatomy of Seed Plants*.
 3. Easu, K. *Plant Anatomy*, 2nd Ed. Wiley N.Y. 1965.
 4. Cutter, E.G. *Plant Anatomy*, Part I and II Edward Arnold; London, 1971 and 1978
 5. Metcalf and Chalk. *Anatomy of dicots* (2nd Edition) (1983). Clarendon Press, Oxford.
 6. Metcalf (1982-87) *Anatomy of Dicots* Vol. I to III
 7. P.K.K. Nair. *Pollen Morphology of angiosperms*.
 8. P.K.K. Nair: *Essentials of Palynology*
 9. Moor & Moor: *Pollen analysis*
 10. R.B. Knox, *Pollen allergy*

Paper-IV
PLANT PHYSIOLOGY

Lecturer	Topic	Remarks
Unit - I		
Lecturer - 1	Introduction to Plantphysiology	
Lecturer - 2	Water potential	
Lecturer - 3	SPAC concept	
Lecturer - 4	Mechanism of ion uptake	
Lecturer - 5	Electrochemical potential	
Lecturer - 6	Uptake of solutes and macromolecules from soil	
Lecturer - 7	Ion channels	
Lecturer - 8	ATPase carrier	
Lecturer - 9	Aquaporins	
Lecturer - 10	Physiology and biochemistry of nitrogen fixation	
Lecturer - 11	Physical Fixation	
Lecturer - 12	Biological Fixation	
Lecturer - 13	Industrial Fixation	
Lecturer - 14	Sulphate reduction	
Lecturer - 15	Sulphate assimilation	
Unit - II		
Lecturer - 16	Introduction to Photosynthesis	
Lecturer - 17	Properties of light & absorption of light by photosynthetic pigments	
Lecturer - 18	Composition and characterization of photo systems I and II	
Lecturer - 19	Light Phase	

Lecturer - 20	Photophosphorylation	
Lecturer - 21	C3 cycle & C4 cycle	
Lecturer - 22	Differences between C3 Cycle	
Lecturer - 23	C4 cycle	
Lecturer - 24	Cam pathway and its Regulation	
Lecturer - 25	Cam pathway	
Lecturer - 26	Regulation of CAM	
Lecturer - 27	Introduction to Photorespiration	
Lecturer - 28	Photorespiration,	
Lecturer - 29	biosynthesis of glycolate	
Lecturer - 30	Regulation of photorespiration	
Unit - III		
Lecturer - 31	Introduction to Respiration	
Lecturer - 32	Glycolysis,	
Lecturer - 33	Fermentation,	
Lecturer - 34	Economic importance of Fermentaion	
Lecturer - 35	Importance of Tca Cycle	
Lecturer - 36	Tricarboxylic acid cycle	
Lecturer - 37	Regulation of TCA cycle	
Lecturer - 38	Introduction to ETS	
Lecturer - 39	ETS	
Lecturer - 40	Oxidative phosphorylation,	
Lecturer - 41	Coupling oxidative phosphorylation	
Lecturer - 42	Chemiosmotic hypothesis.	
Lecturer - 43	Hexose monophosphate shunt	
Lecturer - 44	HMP pathway significance	
Lecturer - 45	Cyanide – resistant respiration.	
Unit - iV		
Lecturer - 46	Auxins	
Lecturer - 47	Gibberellins	
Lecturer - 48	Cytokinins,	
Lecturer - 49	Ethylene	
Lecturer - 50	Abscisic acid	
Lecturer - 51	Hormonal regulation-hormone receptors	
Lecturer - 52	Secondary messengers	
Lecturer - 53	Amplification of kinases.	
Lecturer - 54	Structure and functions of Calmodulin	
Lecturer - 55	Introduction to Photoperiodism	
Lecturer - 56	Photoperiodism	
Lecturer - 57	Phytochrome – structure and function	
Lecturer - 58	Causes of dormancy	
Lecturer - 59	Methods of breaking dormancy	
Lecturer - 60	Biochemical changes accompanying seed germination.	

References

1. Mineral nutrition of crop plants. H. Marshener academic Press 1986.
2. Plant Physiology by F.B. Salisbury and C.W. Ross. Wordsworth biology series.

3. Growth and differentiation in plants by Wareing and Phillips, Pergamon press.
4. Plants Cell structure and metabolism. J.L. Hall, Flower and Roberts, ELBS, Longman.
5. Advanced Plant Physiology by M.B. Wilkinson, ELBS, Longman
6. Introduction to Plant Physiology by G.R. Noggle and G.J. Fritz, Printice Hall Press
7. Cell Biology by C.B. Powar, Himalaya Publishing
8. Plant Physiology by R.N. Devlin and F.H. Witham, CBS 1986
9. Introduction to plant physiology W.G. Hopkins and Norman P.A. Huner
10. Plant Physiology. Lincoln Taiz and Eduardo Zeiger

III- Semester Paper-I

Lecturer	Topic	Remarks
Unit - I		
Lecturer - 1	Brief account of DNA replication	
Lecturer - 2	Transcription	
Lecturer - 3	Introns and exons	
Lecturer - 4	Regulation of gene expression in prokaryotes	
Lecturer - 5	Lac-operon	
Lecturer - 6	Regulation of gene expression in eukaryotes	
Lecturer - 7	Promoters,	
Lecturer - 8	Transcription factors and enhancers	
Lecturer - 9	Overview of cell cycle.	
Lecturer - 10	Phases in cell cycle	
Lecturer - 11	Control mechanisms	
Lecturer - 12	Role of cyclins	
Lecturer - 13	Cyclin-dependent kinases.	
Lecturer - 14	Apoptosis	
Lecturer - 15	Programmed cell death	
Unit - II		
Lecturer - 16	Gene mutations	
Lecturer - 17	Substitutions mutations	
Lecturer - 18	Frame-shift mutations	
Lecturer - 19	Chromosomal aberrations (structural)	
Lecturer - 20	Transposon-induced mutations;	

Lecturer - 21	Site-directed mutagenesis	
Lecturer - 22	Brief study of DNA damage	
Lecturer - 23	DNA repair mechanisms	
Lecturer - 24	Haemophilia , Sickle cell Anaemia.	
Lecturer - 25	Gene therapy	
Lecturer - 26	Brief account of Proto-oncogenes,	
Lecturer - 27	Oncogenes and tumor suppressor genes	
Lecturer - 28	Gene interaction (12:3:1; 9:3:4; 9:7 ratio)	
Lecturer - 29	Linkage	
Lecturer - 30	Chromosome mapping in eukaryotes	
Unit III		
Lecturer - 31	Cytoplasmic male sterility	
Lecturer - 32	Hardy-Weinberg Law	
Lecturer - 33	Gene pool	
Lecturer - 34	Gene frequency	
Lecturer - 35	Genotype frequency	
Lecturer - 36	Plant tissue culture,	
Lecturer - 37	Micro propagation and transgenic plants	
Lecturer - 38	R - DNA technology. Gene cloning	
Lecturer - 39	C - DNA libraries restriction mapping	
Lecturer - 40	Blotting methods	
Lecturer - 41	Polymerase chain reaction	
Lecturer - 42	DNA fingerprinting.	
Lecturer - 43	Conventional, mutation breeding	
Lecturer - 44	Transgenic plants importance	
Lecturer - 45	QTLs and MAS.	
Lecturer - 46	Gene sequencing	
Lecturer - 47	Genomics,	
Lecturer - 48	Proteomics	
Lecturer - 49	Bioinformatics	
Lecturer - 50	Mean	
Lecturer - 51	Variance	
Lecturer - 52	Standard deviation and Standard error	
Lecturer - 53	Chi-square test.	
Lecturer - 54	Student's "t" test.	
Lecturer - 55	Probability distribution (Binomial, Poisson and Normal)	
Lecturer - 56	Introduction to computers.	
Lecturer - 57	Use of Word	
Lecturer - 58	Uses of PowerPoint	
Lecturer - 59	Use of Internet	
Lecturer - 60	World Wide Web in research	

Reference books

1. A. K. Sharma and A. Sharma. 1990. Chromosome techniques. Butterworths. 1990 Ed.
2. G. M. Cooper. 1997. The Cell and Molecular approach. ASM Press. Ed.

3. Strickberger. Genetics. 3rd Ed. 1990. Ed.
4. Snustad and Simmons. 1997. Principles of Genetics. Ed.
5. Benjamin Lewis. 1999. Genes VII.
6. Daniel Hartl. 1994. Basic Genetics. Ed.
7. Griffiths, Miller, Suzuki, Lewontin & Gelbert 1999 An introduction to Genetic analysis
8. A.V.S.S. Sambamurthy. 1999. Genetics.
9. P.K. Gupta. 1990. Genetics.
10. K. K. De. 1992. Plant tissue culture.
11. Narayanaswamy. 1994. Plant cell & tissue culture.
12. Prathibha Devi. Principles & Methods in Plant Molecular Biology, Genetics & Biochemistry, Agrobios.
13. Stansfield. 1996. Theory & Problems in Genetics. Schaum's Series. McGraw & Hill.
14. Khan, I. A. and A. Khanum. 1994 Fundamentals of Biostatistics
15. B. N. Mishra and K. K. Mishra. Naya Prakash. 1983. Introductory practical Biostatistics
16. Cynthia Gibas. O'Reilly & Assoc. 2000. Developing Bioinformatics Computer skills.
17. Balasubramanian. Ed. Concepts in Biotechnology. Universities Press. 1996.

Paper-II

Environmental Pollution and Protection (Common Paper)

Lecturer	Topic	Remarks
Unit - I		
Lecturer - 1	Introduction to pollution	
Lecturer - 2	Kinds of pollution, Air pollution	
Lecturer - 3	Sources of air pollution	
Lecturer - 4	Major air pollutants,	
Lecturer - 5	Primary and Secondary Pollutants	
Lecturer - 6	Stationary and mobile sources.	
Lecturer - 7	Effects of air pollutants on plants,	
Lecturer - 8	Human beings and materials	
Lecturer - 9	Control of air pollution	
Lecturer - 10	Noise pollution- sources	
Lecturer - 11	Noise pollution effects and control measures	
Lecturer - 12	Harmfull effects of air and noise pollution	
Lecturer - 13	Acid rain- causes and effects, .	
Lecturer - 14	Acid rain effects on terrestrial	
Lecturer - 15	Acid rain effects on aquatic systems	
Unit - I		
Lecturer - 16	Introduction to water pollution	
Lecturer - 17	Water pollution- Sources	
Lecturer - 18	Effects Of water pollution.	

Lecturer - 19	Control of water pollution.	
Lecturer - 20	BOD, COD	
Lecturer - 21	Hardness of water	
Lecturer - 22	Criteria of water quality.	
Lecturer - 23	Segregation, equalization, neutralization	
Lecturer - 24	Sedimentation,	
Lecturer - 25	Flotation and oil separation.	
Lecturer - 26	Secondary treatment (Biological treatment)	
Lecturer - 27	Principles of biological treatment	
Lecturer - 28	Waste stabilization ponds,	
Lecturer - 29	Aerated lagoons-Activated sludge process	
Lecturer - 30	Trickling filters.	
Unit - III		
Lecturer - 31	Introduction to soil	
Lecturer - 32	Different types of soils	
Lecturer - 33	Soil pollution	
Lecturer - 34	Soil pollution – Sources	
Lecturer - 35	Soil pollution effects	
Lecturer - 36	Control measures of soil pollution	
Lecturer - 37	Introduction to bioremediation	
Lecturer - 38	In-situ bioremediation	
Lecturer - 39	Ex-situ bioremediation	
Lecturer - 40	Sources of Toxic metals causes to soil pollution	
Lecturer - 41	Effects of toxic metals	
Lecturer - 42	Biomagnification and Bioaccumulation	
Lecturer - 43	Bioremediation of toxic metals	
Lecturer - 44	Concept of Phytoremediation	
Lecturer - 45	Importance of Phytoremediation	
Unit - IV		
Lecturer - 46	Solid Wastes	
Lecturer - 47	Classification of solid wastes	
Lecturer - 48	Types of solid wastes	
Lecturer - 49	Sources of solid wastes	
Lecturer - 50	Disposal methods of solid wastes	
Lecturer - 51	Management of Municipal waste	
Lecturer - 52	Management types of Municipal waste	
Lecturer - 53	Hazardous waste	
Lecturer - 54	Sources of Hazardous waste	
Lecturer - 55	Management of Hazardous waste	
Lecturer - 56	Biomedical waste	
Lecturer - 57	Sources of Biomedical waste	
Lecturer - 58	Management types of Biomedical waste	
Lecturer - 59	Harmful effects of Biomedical waste	
Lecturer - 60	Environmental (protection) Act-1986.	

Reference books

1. MN Rao, McGrace Hill 1993 – Air pollution
2. C.S.Rao- Environmental Engineering and technology
3. S.P. Misra and Pandey- Essential Environmental Studies
4. Y.Anjaneyulu- Introduction to Environmental Science.
5. P.D.Sharma- Ecology and Environment
6. P.C.Santra- Environmental Science

Paper-III
Biodiversity of Angiosperms

Lecturer	Topic	Remarks
Unit - I		
Lecturer - 1	Concept of Biodiversity	
Lecturer - 2	Origin and development of biodiversity	
Lecturer - 3	Definition	
Lecturer - 4	Past history	
Lecturer - 5	Ranks recognized in Biodiversity studies	
Lecturer - 6	Taxonomy and others	
Lecturer - 7	Keystone taxa	
Lecturer - 8	Aims of Biodiversity	
Lecturer - 9	Objectives of Biodiversity	
Lecturer - 10	Levels of Biodiversity - genetic diversity	
Lecturer - 11	species diversity	
Lecturer - 12	Community diversity	
Lecturer - 13	Measurement of Genetic diversity	
Lecturer - 14	Species diversity	
Lecturer - 15	Community diversity	
Unit - II		
Lecturer - 16	Current magnitude of Global Biodiversity	
Lecturer - 17	Current magnitude of National diversity	
Lecturer - 18	Botanical regions	
Lecturer - 19	Hot spots	
Lecturer - 20	Distribution of Biodiversity-Marine diversity	

Lecturer - 21	Terrestrial diversity	
Lecturer - 22	Endemism and Biodiversity	
Lecturer - 23	Types of Endemism	
Lecturer - 24	Loss of Biodiversity	
Lecturer - 25	Diversification of species-Anagenesis	
Lecturer - 26	Cladogenesis	
Lecturer - 27	Ecological extinctions	
Lecturer - 28	Proximate causes-Natural causes	
Lecturer - 29	Artificial causes	
Lecturer - 30	Degeneration & Maintenance of Biodiversity	
Unit - III		
Lecturer - 31	Inventorying	
Lecturer - 32	Definition purpose, orientation completeness and intensity	
Lecturer - 33	Indicator selection	
Lecturer - 34	Monitoring of Biodiversity at Genetic level	
Lecturer - 35	Population level	
Lecturer - 36	Species level	
Lecturer - 37	Species turnover in Ecosystems	
Lecturer - 38	Landscape levels.	
Lecturer - 39	Monitoring	
Lecturer - 40	Definition, purpose, orientation, completeness and intensity	
Lecturer - 41	Monitoring in marine environment	
Lecturer - 42	Freshwater ecosystems. Long-term monitoring of ecosystem	
Lecturer - 43	RAMSAR convention, sites, Red data	
Lecturer - 44	Assessment and use of molecular DNA data on Biodiversity	
Lecturer - 45	Application of Biotechnology for the utilization of Biodiversity	
Unit - IV		
Lecturer - 46	Economic value and utilization of Biodiversity - Food and Fodder	
Lecturer - 47	Fibre	
Lecturer - 48	Oils , Drugs	
Lecturer - 49	Timber , Rubber	
Lecturer - 50	Spices	
Lecturer - 51	Essential oils	
Lecturer - 52	Gums and Resins	
Lecturer - 53	Insecticides and Pesticides	
Lecturer - 54	Ornamentation	
Lecturer - 55	A brief account of origin of cultivated plants	
Lecturer - 56	Biodiversity convention a) Initiative from UN	
Lecturer - 57	Rio Conference	
Lecturer - 58	Recent efforts	
Lecturer - 59	Conservation of Biodiversity - In-situ conservation	
Lecturer - 60	Ex-situ conservation	

Reference books

1. Global Biodiversity assessment Heywood, V.H. and Watson, RT Ed. 1995.

2. Biodiversity measurement and estimation. Ed. Hawksworth. Chapman & Hall, 1995.
3. Biodiversity and ecosystem function. Ed. B. Schulze, E. Mooney, H. A. Springer Verlag. NY. 1996.
4. Functional roles of Biodiversity: A Global Perspective. Mooney, HA, Cushman, JH, Miduo, E, Sale, OE and Schulze, ED. 1995.
5. Biodiversity prospecting: Using Genetic resources for suitable development. Reid et al. WRI, USA, 1993.
6. Conserving Biodiversity for suitable development, Ramakrishnan, AK. Das and Saxena INSA, N. Delhi. 1995.
7. Biodiversity and Forest Genetic Resources. D.N. Tewari. International Book Distrib. Dehradun
8. Biodiversity and its conservation in India S.S. Negri. 1996.
9. Biodiversity in Managed landscapes. Theory and practice. R.C. Szatro and D.W. Johnston. Oxford University Press. 1996.
10. General Ecology. HD. Kumar. Vikass Publ. House Pvt. Ltd. 1995.
11. Global Biodiversity. Trivedi.
12. Biodiversity. Agarwal - K.C.
13. Kumar, U - Biodiversity
14. Navadanya - The Biodiversity convention to its impact on III World.

Paper-IV

Cultivation and Phytochemistry of Medicinal Plants

Lecturer	Topic	Remarks
Unit - I		
Lecturer - 1	Introduction to traditional systems of medicine	
Lecturer - 2	Ayurvedha	
Lecturer - 3	Unani & siddha	
Lecturer - 4	Allopathy	
Lecturer - 5	Andrographis paniculata	
Lecturer - 6	Asparagus racemosus	
Lecturer - 7	Bacopa monnieri	
Lecturer - 8	Coleus forskohlii	
Lecturer - 9	Rauwolfia serpentine	
Lecturer - 10	Withania somnifera	
Lecturer - 11	Lemon grass	
Lecturer - 12	Citronella	
Lecturer - 13	Palmarosa	
Lecturer - 14	Eucalyptus citriodora	
Lecturer - 15	Economic importance of medicinal and aromatic plants	
Unit - I		
Lecturer - 16	Introduction to distillation	
Lecturer - 17	Description of distillation Units (hydro distillation)	
Lecturer - 18	Methods of distillation (Steam distillation)	
Lecturer - 19	Hydro steam distillation	

Lecturer - 20	Maintenance of distillation Units	
Lecturer - 21	Precautions for distillation Units	
Lecturer - 22	Yields and recoveries of different aromatic plants	
Lecturer - 23	Preparation of Crude drugs in different systems of medicine	
Lecturer - 24	i) Ayurvedha	
Lecturer - 25	ii) Siddha	
Lecturer - 26	iii) Unani	
Lecturer - 27	Value addition of Plant drugs	
Lecturer - 28	Grading	
Lecturer - 29	Processing of plant drugs (medicinal)	
Lecturer - 30	Processing of plant drugs (Aromatic)	
Unit - III		
Lecturer - 31	Introduction to the secondary metabolites	
Lecturer - 32	Occurance Alkaloids	
Lecturer - 33	Classification of Alkaloids	
Lecturer - 34	Importance of Alkaloids	
Lecturer - 35	Terpenoids	
Lecturer - 36	Coumarins	
Lecturer - 37	Steroids e) Flavonoids	
Lecturer - 38	Solvent extraction,	
Lecturer - 39	Chemical separation	
Lecturer - 40	Steam distillation	
Lecturer - 41	Soxhlet extraction	
Lecturer - 42	Chromatography:	
Lecturer - 43	HPLC,	
Lecturer - 44	TLC	
Lecturer - 45	UV - visible spectroscopy	
Unit - IV		
Lecturer - 46	Shikimic acid pathway	
Lecturer - 47	Importance of Shikimic acid pathway	
Lecturer - 48	Mevalonic acid pathway	
Lecturer - 49	Importance of Mevalonic acid pathway	
Lecturer - 50	Occurance of forskolin	
Lecturer - 51	Forskolin	
Lecturer - 52	Taxol	
Lecturer - 53	Vincristin, Vinblastin	
Lecturer - 54	Anti cancer properties of vinka alkaloids	
Lecturer - 55	Threatened Medicinal Plants	
Lecturer - 56	Endangered Medicinal Plants	
Lecturer - 57	In - situ & Ex - situ conservation	
Lecturer - 58	Loans	
Lecturer - 59	Subsidies	
Lecturer - 60	IPR – Patents	

Reference books

1. Cultivation of medicinal and aromatic crops by Farooqui and Sreeramulu. Univ. Press
2. Textbook of Pharmacognosy by Young Ken - Heber W and Young Ken
3. Pharmacognosy of indigenous drugs by K. Raghunathan and Roma Mitra
4. Pharmacognosy- Kokate et al

5. Pharmacognosy- Mohammed Ali
6. Pharmacognosy- Wallis
7. Pharmacognosy- Trease & Evans-1996
8. Pharmacognosy- Shaw and Quadri
9. Pharmacognosy- Tyler, Brady and Robbins

IV - SEMESTER

Paper-I

Ecology and Phytogeography (Common Paper)

Lecturer	Topic	Remarks
Unit - I		
Lecturer - 1	Physical environment	
Lecturer - 2	Biotic and abiotic interactions.	
Lecturer - 3	Concept of habitat	
Lecturer - 4	Concept of niche	
Lecturer - 5	Niche width and overlap	
Lecturer - 6	Fundamental and realized niche	
Lecturer - 7	Resource partitioning	
Lecturer - 8	Character displacement Allopatric	
Lecturer - 9	Character displacement and Sympatric.	
Lecturer - 10	Ecosystem structure and function	
Lecturer - 11	Food Chain, Food Web,	
Lecturer - 12	Energy flow	
Lecturer - 13	Mineral cycles (carbon & nitrogen)	
Lecturer - 14	Primary production	
Lecturer - 15	Methods of measurement of primary productivity.	
Unit - I		
Lecturer - 16	Introduction to population ecology	
Lecturer - 17	Density, Natality, Mortality,	
Lecturer - 18	Dispersion Population size,	
Lecturer - 19	Age structure, Life tables	
Lecturer - 20	Population growth curves	

Lecturer - 21	Population regulation;	
Lecturer - 22	life history strategies (r and K selection)	
Lecturer - 23	Introduction to Species Interactions	
Lecturer - 24	Types of Species Interactions	
Lecturer - 25	Positive interactions	
Lecturer - 26	Mutualism, Symbiosis	
Lecturer - 27	Commensalism, Protocooperation.	
Lecturer - 28	Negative interaction Exploitation,	
Lecturer - 29	Herbivores, Carnivores,	
Lecturer - 30	Antibiosis, competition.	
Unit - III		
Lecturer - 31	Introduction to Community Ecology	
Lecturer - 32	Frequency, density, Abundance	
Lecturer - 33	Cover and Basal area Physiognomy, Phenology	
Lecturer - 34	Stratification, sociability	
Lecturer - 35	Vitality and Life form	
Lecturer - 36	Synthetic - Presence and constance	
Lecturer - 37	Fidelity Dominance.	
Lecturer - 38	Raunkiaer concept	
Lecturer - 39	Levels of species diversity and its measurement	
Lecturer - 40	Ecotones	
Lecturer - 41	Biodiversity: Monitoring; Hotspots (with reference to India)	
Lecturer - 42	Major drivers of biodiversity change.	
Lecturer - 43	Ecological Succession: Types; mechanisms	
Lecturer - 44	Changes involved in succession	
Lecturer - 45	Concept of climax- Monoclimax and Polyclimax theories	
Unit - IV		
Lecturer - 46	Biogeography: Plant distribution,	
Lecturer - 47	Theory on plant distribution (Age and area theory,)	
Lecturer - 48	Theory of tolerance	
Lecturer - 49	Major terrestrial biomes;	
Lecturer - 50	Biogeographical zones of India.	
Lecturer - 51	Koppens Classification of climate	
Lecturer - 52	Thornthwaites Classification of climate	
Lecturer - 53	Pollution -Global environmental change	
Lecturer - 54	Atmosphere composition and structure	
Lecturer - 55	Green house gases	
Lecturer - 56	Global warming, Ozone depletion	
Lecturer - 57	Principles of conservation In-situ - Protected areas	
Lecturer - 58	National parks, Wildlife sanctuaries	
Lecturer - 59	Biosphere reserves and Project tiger Ex situ - Botanical gardens	
Lecturer - 60	Zoological parks and cryopreservation.	

Reference books

1. E.P. Odum 1996 Fundamentals of ecology
2. E.J Koromondy .1996 Concept of Ecology
3. P.D Sharma. 1996 Ecology and environment

4. S.P. Misra .S.N. 2010 Pandey Essentail Enviromental studies

5. N.S Subrahmanyam and Sambamurty 2000 Ecology

Paper-II
Plant Molicular Biology (Common Paper)

Lecturer	Topic	Remarks
Unit - I		
Lecturer - 1	Overview of Plant Molecular Biology	
Lecturer - 2	Biotechnology	
Lecturer - 3	Plant tissue culture	
Lecturer - 4	Culture media	
Lecturer - 5	Culture techniques.	
Lecturer - 6	Totipotency	
Lecturer - 7	Cyto- differentiation.	
Lecturer - 8	Micro propagation	
Lecturer - 9	Somatic embryogenesis	
Lecturer - 10	Synthetic seeds and	
Lecturer - 11	Somaclonal variation.	
Lecturer - 12	In vitro production of secondary metabolites.	
Lecturer - 13	Brief account of anther culture	
Lecturer - 14	Haploidy. I	
Lecturer - 15	Isolation and fusion of protoplasts	
Unit - I		
Lecturer - 16	Recombinant DNA technology	
Lecturer - 17	Biosafety measures.	
Lecturer - 18	Intellectual property rights Patents.	
Lecturer - 19	Vectors,	
Lecturer - 20	Restriction end nucleases and DNA ligases.	
Lecturer - 21	Gene cloning	
Lecturer - 22	Genomicsd and cDNA libraries	
Lecturer - 23	Detection and isolation of a gene within a library by immuno- d	
Lecturer - 24	Nucleic acid (colony) hybridization	
Lecturer - 25	Southern blotting	
Lecturer - 26	Northern and western blotting.	
Lecturer - 27	Restriction fragment length polymorphisms	
Lecturer - 28	RFLPs and DNA Fingerprinting	
Lecturer - 29	RNAi technology,	
Lecturer - 30	Gene knockout technology.	
Unit - III		
Lecturer - 31	Introductio to Genetic engineering	
Lecturer - 32	Genetic engineering method	
Lecturer - 33	Production of transgenic plants	
Lecturer - 34	Agro bacterium Mediated gene transfer	
Lecturer - 35	Direct gene transfer	

Lecturer - 36	Micro projectile method	
Lecturer - 37	Genetic transformation of chloroplasts	
Lecturer - 38	Hairy root cultures.	
Lecturer - 39	Status of transgenic plants in India	
Lecturer - 40	Sanger's method of DNA sequencing	
Lecturer - 41	Human genome project	
Lecturer - 42	Importance of human genome project	
Lecturer - 43	Brief account of chemical synthesis of genes.	
Lecturer - 44	Cryopreservation	
Lecturer - 45	Germplasm storage	
Unit - IV		
Lecturer - 46	Polymerase Chain reaction	
Lecturer - 47	Brief account of molecular markers:	
Lecturer - 48	Randomly Amplified Polymorphic DNA (RAPD)	
Lecturer - 49	Amplified length fragment polymorphism (AFLP)	
Lecturer - 50	Simple Sequence Repeats (SSR)	
Lecturer - 51	Expressed sequence tags (ESTs).	
Lecturer - 52	Mapping of quantitative trait loci (QTLs)	
Lecturer - 53	Marker-assisted selection	
Lecturer - 54	Applications of Biofertilizers	
Lecturer - 55	Biopesticides	
Lecturer - 56	Single cell protein	
Lecturer - 57	Biodiesel	
Lecturer - 58	Microbial production of vitamins	
Lecturer - 59	Organic acids	
Lecturer - 60	Alcohols.	

Reference books

1. Y.P.S. Bajaj. Biotechnology in Agriculture and Forestry. Vol. 1 to 16. 1986-1990.
2. I. Vasil. Plant tissue culture. Vol. 1 to 4. Ed. I. Vasil. 1993. Ed.
3. Balasubramanian. Concepts in Biotechnology. Universities Press. 1996. Ed.
4. Prathibha Devi. Principles and methods in Plant Molecular Biology, Genetics and Biochemistry. Agrobios Publ. 2000. Ed.
5. S.S. Purohit . Agricultural Biotechnology. 1999. Ed.
6. H. D. Kumar. Biotechnology.1992.Ed.
7. Trehan. Biotechnology. 1994. Ed.
8. K. K. De Plant tissue culture. 1992. Ed.
9. Narayanaswamy. Plant tissue culture. 1994. Ed.
10. Smith, R.H.2000 Plant Tissue Culture:Techniques & Experiments Acad PressN.Y.

Paper-III

Taxonomy of Angiosperms and Ethno Botany

Lecturer	Topic	Remarks
Unit - I		
Lecturer - 1	Method to describe a new Taxon with reference to Genus	
Lecturer - 2	Method to describe a new Taxon with reference to species	
Lecturer - 3	Contribution of R.M.T. Dahlgren	
Lecturer - 4	R.M.T. Dahlgren Classification system	
Lecturer - 5	Thorne Classification system	
Lecturer - 6	Kubitzki Classification system	
Lecturer - 7	Comparisons between Thorne & Kubitzki Classification systems	
Lecturer - 8	Plant identification – taxonomic keys	
Lecturer - 9	Indented Key	
Lecturer - 10	Bracketed Key	
Unit II		
Lecturer - 11	Botanical Institutions and Taxonomy	
Lecturer - 12	Botanical Survey of India - CNH	
Lecturer - 13	Botanical Laboratory	
Lecturer - 14	Indian Botanical garden	
Lecturer - 15	Kew Gardens, London, UK	
Lecturer - 16	Contributions of Kew Garden	
Lecturer - 17	Smithsonian Institutions, Washington, D.C., USA	
Lecturer - 18	Contributions of Smithsonian Institutions	
Lecturer - 19	Floral diversity in - Annonaceae	
Lecturer - 20	Malvaceae	
Lecturer - 21	Apocynaceae	
Lecturer - 22	Apocynaceae Economic Importance	
Lecturer - 23	Asclepiadaceae	
Lecturer - 24	Asclepiadaceae Economic Importance	
Lecturer - 25	Hydrocharitaceae	
Lecturer - 26	Lemnaceae	
Lecturer - 27	Growth of taxonomy in South India	
Lecturer - 28	Importance of floristic studies	
Unit-III		
Lecturer - 29	Taxonomy of) Nymphaeaceae	
Lecturer - 30	Euphorbiaceae	
Lecturer - 31	Euphorbiaceae role in modern economy	
Lecturer - 32	Podostemaceae	
Lecturer - 33	Musaceae	
Lecturer - 34	Arecaceae	
Lecturer - 35	Arecaceae Economic Importance	
Lecturer - 36	Seed Morphology	
Lecturer - 37	external features	
Lecturer - 38	Embryo	
Lecturer - 39	Endosperm	
Lecturer - 40	Seed coat anatomy	
Lecturer - 41	Corner's classification of seed coat	
Lecturer - 42	seed coat and its role in taxonomy	
Unit-IV		
Lecturer - 43	Ethnobotany: Concept	

Lecturer - 44	scope	
Lecturer - 45	Objectives	
Lecturer - 46	Ethnobotany as an inter-disciplinary science.	
Lecturer - 47	The relevance of Ethnobotany in the present context	
Lecturer - 48	Methodology of ethnobotanical studies-Herbarium	
Lecturer - 49	Field work	
Lecturer - 50	Ancient literature	
Lecturer - 51	Archaeological findings	
Lecturer - 52	Temples and sacred groves	
Lecturer - 53	Plants Vs. Tribal Life - Food plants	
Lecturer - 54	Food cycles	
Lecturer - 55	Intoxicants and Beverages	
Lecturer - 56	Ropes and Bindings materials	
Lecturer - 57	Resins and oils	
Lecturer - 58	Poisons as baits	
Lecturer - 59	Role of ethno botany in modern medicine-sarpagandha, cinchona	
Lecturer - 60	Pepaver, Chaulmoogra, Digitalins, Arogyapacha, Periwinkle	

Reference books

1. Wills, J.C. Dictionary of Flowering plants, 1971
2. Santapau, H and A.N. Henry. Dictionary of Flowering plants in India, CSIR, 1973
3. D.J. Mabberly, Plant Book (2nd Edi.) 1997. Cambridge Univ. Press
4. Hubbard, C.E. Grasses, 1954. Penguin Books, London
5. Henry and Chandrabose. An Aid to International code of Botanical Nomenclature
6. Hutchinson, J. The families of Flowering plants (3rd Edi.) b1973.
7. Lawrence, G.H. Taxonomy of Vascular plants. 1951
8. Sivarajan, V.V. (Ed. Robson) Introduction to Principles of Plant Taxonomy
9. V.N. Naik. Taxonomy of angiosperms
10. Cronquist. A. The Evolution and classification of flowering plants. 1988
11. Takhtajan. A. Outline of classification of flowering plants. Botanical Rev. 1980.
12. Davis P.H. and Heywood, V.H. Principles of Angiosperm Taxonomy

Paper-IV Pharmacognosy

Lecturer	Topic	Remarks
Unit - I		
Lecturer - 1	Introduction and Scope of Pharmacognosy	
Lecturer - 2	Pharmacognosy and modern medicine	
Lecturer - 3	Crude plant drugs	

Lecturer - 4	Sources :Geographical	
Lecturer - 5	Biological, Cell Culture and Sea	
Lecturer - 6	Classification: Morphological (Organized and unorganized)	
Lecturer - 7	Taxonomical, Chemical	
Lecturer - 8	Pharmacological and alphabetical	
Lecturer - 9	Indigenous tradional drugs	
Lecturer - 10	Market adulterations of plant drugs	
Lecturer - 11	Punarnava,	
Lecturer - 12	Shankhapuspi (Clitoria)	
Lecturer - 13	Indian goose-berry	
Lecturer - 14	Tulasi	
Lecturer - 15	Commiphora, Kalmegh	
Unit - I		
Lecturer - 16	Root drugs: Glycyrrhiza and Ipecac	
Lecturer - 17	Raulvolfia,	
Lecturer - 18	Satavari	
Lecturer - 19	Coleus,	
Lecturer - 20	Ginger,Andrographis	
Lecturer - 21	Clitoria ,	
Lecturer - 22	Senna	
Lecturer - 23	Bark drugs: Terminalia arjuna	
Lecturer - 24	Holorrhena	
Lecturer - 25	Flower drugs: Saffron	
Lecturer - 26	Seed drugs: Piper longum	
Lecturer - 27	Mucuna	
Lecturer - 28	Fruit drugs: Cumin, Amla	
Lecturer - 29	Senna pods	
Lecturer - 30	Whole plant drugs: Catheranthus roseus	
Unit - III		
Lecturer - 31	Introduction Evaluation of the drugs	
Lecturer - 32	Organoleptic Evaluation	
Lecturer - 33	MicroscopicEvaluation	
Lecturer - 34	Physical Evaluation	
Lecturer - 35	ChemicalEvaluation	
Lecturer - 36	Biological evaluation	
Lecturer - 37	Introduction to Carbohydratal drugs	
Lecturer - 38	Accacia gum	
Lecturer - 39	Cardiac glycosides	
Lecturer - 40	Alkaloids,	
Lecturer - 41	Coleus, Satavari, Rauvolfia	
Lecturer - 42	volatile oils	
Lecturer - 43	Amla	
Lecturer - 44	Resins quinines	
Lecturer - 45	Steroids	
Unit - IV		
Lecturer - 46	Powder analysis: Curcuma	
Lecturer - 47	Clove	
Lecturer - 48	Senna	

Lecturer - 49	Fennel	
Lecturer - 50	Cinnamon	
Lecturer - 51	Industrial preparation of Crude Drugs	
Lecturer - 52	Types of reactors used and extraction methods	
Lecturer - 53	Active principles	
Lecturer - 54	Non-active principle of drugs	
Lecturer - 55	Importance of crude drugs	
Lecturer - 56	Import and Export potentials of Crude Drugs	
Lecturer - 57	Preparation of crude drugs in Ayurveda	
Lecturer - 58	Preparation of crude drugs in sidha	
Lecturer - 59	Preparation of crude drugs in unani	
Lecturer - 60	Quality control test – contamination, Adulteration	

Reference books

1. Cultivation of Medicinal plants - Purohit & Vyas CBS, 2006
2. Introduction to Medicinal Chemistry (12996). Aler Gingauz. Wiley publications.
3. Medicinal Chemistry (2001). Graham L. Patrick. Oxford University Press