

BHARATHIAR UNIVERSITY, COIMBATORE:641 046 B.Sc. BOTANY

(For students admitted during the academic year 2017 – 2018 batch & onwards)

REVISED SCHEME OF EXAMINATION - CBCS PATTERN

<i>traP</i>	Study Components	Course title	<i>/srh .snl keew</i>	Examinations				<i>tiderC</i>
				<i>rH.ruD</i>	<i>AIC</i>	<i>kraM</i>	<i>latoT skraM</i>	
	SEMESTER I							
I	Language – I		6	3	25	75	100	4
II	English - I		6	3	25	75	100	4
III	Core Paper – Plant diversity I		8	3	25	75	100	4
	Core Practicals - I		2	-	-	-	-	-
	Allied -I Paper I Zoology / Chemistry		4	3	20	55	75	3
	Allied Practicals		2	-	-	-	-	-
IV	Environmental Studies #		2	-	-	50	50	2
	SEMESTER II							
I	Language – II		6	3	25	75	100	4
II	English - II		6	3	25	75	100	4
III	Core Paper II - Plant diversity II (Bryophytes, Pteridophytes, Gymnosperms & Palaeobotany)		8	3	25	75	100	4
	Core Practical - Paper I		2	3	40	60	100	4
	Allied -II - Paper II Zoology / Chemistry		4	3	20	55	75	3
	Allied Practical - I		2	3	20	30	50	2
IV	Value Education – Human Rights #		2	3	-	50	50	2
	SEMESTER III							
I	Language – III		6	3	25	75	100	4
II	English - III		6	3	25	75	100	4
III	Core Paper III Cell Biology & Lab techniques		5	3	25	75	100	4
	Core practical		2					
	Allied III - Paper I Chemistry / Zoology		4	3	20	55	75	3
	Allied Practical		2	-	-	-	-	-
	Skill based Subject Paper I – Biodegradable waste management		3	3	20	55	75	3
	Tamil @ / Advanced Tamil# (OR) Non-major elective - I (Yoga for Human Excellence)# / Women’s Rights#		2	3		50	50	2

	SEMESTER –IV						
I	Language – IV	6	3	25	75	100	4
II	English - IV	6	3	25	75	100	4
III	Core Paper IV-Anatomy& Embryology	5	3	25	75	100	4
	Core Practical II - Paper IV, V & VI	2	3	40	60	100	4
	Allied IV - Paper II Chemistry / Zoology	4	3	20	55	75	3
	Allied III Practical	2	3	20	30	50	2
IV	Skill based Subject Paper II -Medicinal Botany and Human Welfare	3	3	20	55	75	3
	Tamil @ /Advanced Tamil # (OR) Non-major elective -II (General Awareness #)	2	3		50	50	2
	SEMESTER – V						
III	Core Paper V - Taxonomy of Angiosperms & Economic Botany	5	3	25	75	100	4
	Core Paper VI – Genetics Plant Breeding and Biostatistics	4	3	25	75	100	4
	Core Paper VII -Ecology & Phytogeography	4	3	25	75	100	4
	Core Paper VIII- Microbiology-Fundamentals of Microbiology	4	3	25	75	100	4
	Core Practical Paper V,VI&VII	4	-	-	-	-	-
	Elective – I	4	3	25	75	100	4
	Elective Practical	2	-	-	-	-	-
IV	Skill based Subject – Paper III – Economic botany	3	3	20	55	75	3
	SEMESTER – VI						
III	Core Paper IX Biophysics Biochemistry & Plant Physiology	5	3	25	75	100	4
	Core Paper- X Horticulture	5	3	25	75	100	4
	Elective – II	5	3	20	75	100	4
	Elective – III	5	3	20	75	100	4
	Core Practical III- Paper V, VI &VII		3	40	60	100	4
	Core Practical- IV - Paper IX & X	4	3	30	45	75	3
	Elective Practical - Practical for Elective subjects I, II & III & Core paper VIII	3	3	30	45	75	3
	Skill based Subject Practical – for SKB Paper I, II & III	3	3	30	45	75	3
	Extension Activities @	-	-	50	-	50	2
	Total					3500	140

@ No University Examinations. Only Continuous Internal Assessment (CIA)
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List of Elective papers (Colleges can choose any one of the paper as electives)

Elective – I	A	Microbiology – Applied Microbiology
	B	Plant Pathology
	C	Fundamentals of computer applications
Elective – II	A	Biotechnology – Concept & Techniques
	B	Seed Technology
	C	Pomology
Elective - III	A	Biotechnology – Applied biotechnology
	B	Ethnobotany
	C	Bioinformatics

PAPER - I

8 Hrs / Week

PLANT DIVERSITY - I

Algae, Fungi, Lichen, and Plant Pathology

Unit - I

Algae : Classification of Algae - G.M. Smith, Economic importance of algae. Study of the structure, reproduction and life cycle of Volvox, Oedogonium, Caulerpa and Chara

Unit - II

Structure, reproduction and life cycle of Navicula, Dictyota, Polysiphonia and Nostoc.

Unit - III

Fungi and Lichen : Classification of fungi (Alexopoulos & Mims 1973) structure and reproduction of Albugo, Saccharomyces, Aspergillus, Puccinia and Polyporous.

Unit - IV

Structure and reproduction of Fusarium. Structure and reproduction of Lichens, crustose, foliose and fruticose. Economic importance of fungi.

Unit - V

Plant Pathology : Study of the following plant diseases with special reference to the symptoms, causal organisms, and disease cycle and control measure of

1. Blast disease of rice
2. Red rot of sugarcane
3. Tikka disease
4. Citrus canker
5. TMV

Practical : Study of the types mentioned in the syllabus.

References :

- Algae-S.Sundararajan., Anmol Publications., New Delhi. 2
College Botany - Vol. I. Gangulee and Kaur New Central Book Depot., Calcutta. Cryptogamic Botany. Vol. I- G.M. Smith. Tata McGraw Hill., New Delhi.
A text Book of Botany - Algae - B.P. Pandey. S.Chand & Co., New Delhi. Algae - Vashishta, P.C S.Chand & Co., New Delhi.

Algae - B.P. Pandey S.Chand & Co., NewDelhi. Algae&Bryophytes.,A.Ragland., Saras Publication.,Nagercoil., Tamil Nadu Phycology, A.Ragland., Saras Publication.,Nagercoil., Tamil Nadu Fungi&Plant Pathology., A.Ragland., Saras Publication.,Nagercoil., Tamil Nadu Fungi ,Bacteria and Viruses, DubeH.C., Agrobios., Jodhpur Virology.,S.Sundararajan.,Anmol Publications.,New Delhi.2

A text Book of Botany – Algae.,Kavita&Tyagi., Scintific Pub.,Jodhpur. Fungi- SKSingh.,Campus Books Int.,NewDelhi.

PAPER - II

8 Hrs / Week

PLANT DIVERSITY - II

(Bryophytes, Pteridopytes, Gymnosperms and Palaeobotany)

Unit - I : Bryophytes

Classification of Bryophytes (Rothmaler). Structure and reproduction of Marchantia ,Anthoceros and Polytrichum.

Unit - II : Pteridophytes

Cassification of Pteridophytes (K.R.Sporne) Stelar evolution, Structure and Reproduction of Selaginella and Equisetum.

Unit - III

Heterospory and Seed Habit, Structure and Reproduction of Adiantum and Marsilea

Unit - IV : Gymnosperms.Classification of Gymnosperms (K.R.Sporne) Structure and Reproduction of Cycas and Gnetum.

Unit - V : Palaeobotany.Geological time scale, Radio carbon dating, Fossils and kinds of fossils. Study of the following :Lepidodendron (Stem), Lepidocarpon (Fruit) and Stigmaria (Root).

Practicals: Study of the types mentioned below. Bryophytes : Marchantia, Anthoceros and Polytrichum.

Pteridophytes : Selaginella, Equisetum, Adiantum and Marsilea. Gymnosperms : Cycas and Gnetum.

Palaeobotany : Lepidodendron Lepidocarpon and Stigmaria

References :

A text Book of Botany - Pteridophytes - B.P. Pandey. S.Chand & Co., NewDelhi. Pteridophyta - Vashishta, P.C S.Chand & Co., NewDelhi.

Morphology of Pteridohytes - K.R. Sporne. BI Publications NewDelhi. An introduction of Embryophyta - Pteridophyta - N.S.Parihar Cryptogamic Botany. Vol.II- G.M. Smith. Tata

McGraw Hill.,New Delhi. Morphology of Gymnosperms .- K.R. Sporne.BI Publications
NewDelhi. An introduction of Palaeobotany - Arnold.,Agrobios., Jodhpur., Gymnosperms - P.C.
Vashishta S.Chand & Co., NewDelhi. Gymnosperms - B.P. Pandey S.Chand & Co., NewDelhi.
Phytogeography and Paleobotany.,Kumar.,N.C.,Emkay Publication.,Delhi,51.
Pteridophytes,Gymnosperms&Palaeobotany,A.Ragland.&V.Kumaresan.,Saras
Pub.,Nagercoil,TN
A text Book of Botany - Gymnosperms RMJohn *et al* Scintific Pub.,Jodhpur. A text Book of
Botany- Pteridohytes., RMJohn *et al* Scintific Pub.,Jodhpur
Pteridophytes.,SKSingh.,Campus Books Int.,NewDelhi.

PAPER -III

5 Hrs / Week

CELL BIOLOGY & LAB TECHNIQUES

Unit - I

Cell Biology: Structure of Plant Cell – Prokaryotic and Eukaryotic cell, Structure and function of cellwall, plasmamembrane, endoplasmic reticulum, ribosomes, Golgi bodies and lysosomes.

Unit – II

Mitochondria, Chloroplast, Nucleus, Chromosome and giant chromosomes. (Structure and function only)

Unit - III

Cell Division - Mitosis, Meiosis Nucleic acid - Structure of DNA (Watson & Crick Model) ,
Replication of DNA (Semi-conservative method). RNA - types, Protein synthesis

Unit IV

Lab Techniques: Principles, Operation, Techniques and uses of pH meter, Colorimeter,
Spectrophotometer, Centrifugation. Microscopy - light TEM and SEM.

Unite - V

Principles and elementary knowledge of Chromotography (paper, T L C & Column),
Electrophoresis (Basics).

Practicals : In the next semester (IV)

- 1.Study of mitosis using Onion roots
- 2.Study of cell organelles through slides and Photographs
- 3.Demonstration of pH meter, Colorimeter, Clinical centrifuge and chromatography of leaf pigments - paper only

References :

Cytology P.S.Verma & Agarwal V.K. S.Chand & Co., NewDelhi.
Cell biology,Genetics,MolecularBiologyandEvolution.Vermaand Agarwal S.Chand & Co.,
NewDelhi.

Laboratory Manual.,J.Jayaraman., Wiley Eastern Ltd.,NewDelhi. Cell Biology -C.B. Powar
Himalya publishing New Delhi. Genetics- Verma and Agarwal., S. Chand and Co.New Delhi.
Developmental Botany., A.Ragland., Saras Publication.,Nagercoil., Tamil Nadu Cell Biology,
N.Arumugam, Saras Publication.,Nagercoil., Tamil Nadu Genetics,R.P Meyappan, Saras
Publication.,Nagercoil., Tamil Nadu

PAPER - I V

5 Hrs / Week

ANATOMY AND EMBRYOLOGY

Unit - I

Structure and function of Apical Meristems - Root Apex and Shoot Apex - Theories of Meristems. Structure and function of simple and permanent tissues - Parenchyma, Collenchyma, Sclerenchyma, Xylem and Phloem. Structure and types of stomata.

Unit - II

Types of vascular bundles, Primary Structures of Dicot and Monocot root and stem. Structure of Dicot and Monocot leaf. Secondary growth of Dicot stem and root.

Unit - III

Anomalous secondary growth in Dicots - Intraxylary phloem, Successive cambia, cortical and medullary vascular bundles and Arborescent monocots (Primary anomalies)

Unit - IV

EMBRYOLOGY :- Structure and development of microsporangium, male gametophyte, Types of ovules, megasporangium, female gametophyte (Polygonum type)

Unit - V

Double fertilization, endosperm - Structure, development and types of endosperm. Structure and development of dicot embryo (Capsella). Polyembryony, Parthenocarpy and Apomixis

Practicals :

Anatomy Study of tissues mentioned in the theory

1. Identifying stomatal types using leaf peel method (Any one example)
2. Stem - Primary structure - Tridax, Cucurbita, Sorghum
3. Root Primary structure - Bean. Canna. Vanda
4. Leaf - Nerium & Grass
5. Anomalous Secondary thickening - Boerhaavia, Nyctanthes, Achyranthus.

Embryology: T.S of anther. 2. Various stages of development of male and female gametophyte, endosperm, embryo sac and polyembryony to be studied from permanent slides. 3. Embryo Mounting - Tridax - Crotalaria.

References :

A text book of Plant Anatomy - P.C. Vashishta S.Chand & Co., NewDelhi. An introduction to the Embryology of Angiosperms - P.Maheswari
The Embryology of Angiosperms,S.S.Bhojwani &Bhatnagar,S.P. Vani Educational Books New Delhi.
Plant Anatomy - A. Fahn.Pergman Press., Oxford., London.
A text book of Plant Anatomy.,E.J.J.Prakash., Emkay Publication.,Delhi,51 Plant Anatomy - Esau. K Wiley Eastern Ltd.,NewDelhi.
Anatomy of seed plants - Esau. K. Wiley Eastern Ltd.,NewDelhi. Plant anatomy - Pandey, B.P. S.Chand & Co., NewDelhi.
Plant Anatomy&Microtechnique,V.Kumaresan, Saras Publication.,Nagercoil., Tamil Nadu.

PAPER - V

5 Hrs / Week

TAXONOMY OF ANGIOSPERMS AND ECONOMIC BOTANY

Unit - I :

Descriptive terms used in taxonomy -Phyllotaxy, Inflorescence, floral parts, fruits. Taxonomy and its significance. Systems of classification - Natural - Bentham & Hooker, Modern Takhtajan (outline only)

Unit - II

Herbarium technique and uses, Nomenclature -ICBN, Priority, Typification, Effective and Valid publication. Author citation. Modern trends in Taxonomy (general)

Unit - III

A detailed study of the following families and the economic importance of types and pollination mechanisms wherever applicable. Annonaceae, Capparidaceae, Sterculiaceae, Rutaceae, Anacardiaceae, Curcubitaceae and Apiaceae.

Unit - IV

Rubiaceae, Asterace, Sapotaceae, Apocynaceae, Acanthaceae and Lamiaceae.

Unit - V

Amaranthaceae, Euphorbiaceae, Orchidaceae, Liliaceae and Poaceae.

Practicals :

- 1.Taxonomical studies of selected plant species included in the families mentioned in the theory syllabus.

- 2.Study of economic products of the plants belonging to the families mentioned in the theory syllabus.
- 3.Students should submit - 20 herbarium sheets of local plants at the time of practical examination.
- 4.Field trip-for 5 days to study vegetation in Tamil Nadu and neighboring states.
- 5.Tour report should also be submitted during the practical examination.

References :

Taxonomy,Embryology&Horticulture., A.Ragland., Saras Publication.,Nagercoil., Tamil Nadu
Taxonomy of Angiosperms. Singh, V. and D.K. Jain, S.Chand & Co., NewDelhi.
Taxonomy of Angiosperms. Pandey, B.P. S.Chand & Co., NewDelhi. Narayanaswamy, R.C. and
K.N.Rao, Outlines of Botany.Vishvanathan &Co Chennai. Economic Botany.,TMHill.,Tata
McGraw Hill., NewDelhi...
Economic Botany Pandey, B.P., S.Chand & Co., NewDelhi..
Taxonomy of Angiosperms. Vasudevan Nair, R., Tata McGraw Hill., NewDelhi
A Handbook of Herbarium Methods. Jain, S.K. and R.R.Rao, S.Chand & Co., NewDelhi..
Morphology and Economic Botany of Angiosperms. Sundara Rajan, S.,Anmol Publi.,New
Delhi.2
Taxonomy of Angiosperms, A.Ragland., Saras Publication.,Nagercoil., Tamil Nadu An
Introduction to Systematic Botany.AK Ganguly&NCKumar.,Emkay Pub.,Delhi Flowering
Plants. Orgin and Despersal.,A M Takhtajan., Oliver Boyd Ltd.,Edinburgh. Lawrence, G.H.M.,
1951, Taxonomy of Vascular Plants. Tata Mc Grw-Hill, New Delhi

Paper VI - GENETICS, PLANT BREEDING AND BIOSTATISTICS 4 hrs/week

Unit - I

Monohybrid and Dihybrid cross, Test cross, Back cross, Incomplete dominance, Gene Interaction (Complementary, Supplementary, Duplicate and Inhibitory), Polygenic, Inheritance.

Unit - II

Linkages and crossing over Multiples alleles - Blood groups in man, Polyploidy, Sex determination.

Unit - III

Mutation types, physical and Chemical Mutagens, Cytoplasmic inheritance, Gene structure, Genetic code, DNA barcoding.

Unit - IV

Plant breeding - Objectives, Plant introduction, Selection, Hybridization, hybrid vigour, - Achievement in Crop breeding - Sugarcane.

Unit - V

Biostatistics – Data, Types and methods of collection of Data, Sampling techniques, Frequency distribution. Presentation of Data – Tabulation – Parts of Table, Types of table, Graphic representation of data- Histogram, Frequency curve, Frequency polygon and Ogives. Analysis of data – Arithmetic Mean, Median and Mode. Measures of dispersion – Standard Deviation and standard error. Test of significance – Chi-Square test.

Practicals :

- 1.Observation of charts for Mendelian ratios, Gene interaction and Linkage - Simple Problems in genetics.
- 2.Simple problems in mean, median, mode in Bio - Statistics and T-test.

References :

Principles of Plant breeding., Allard - Tata McGraw Hill.,New Delhi. Essential of genetics - Powar
Fundamentals of Genetics Singh, B.D. S.Chand & Co., NewDelhi. Plant breeding -Singh, B.D. S.Chand & Co., NewDelhi.
Principle and Practice of Plant breeding- Sharma B.D-
Principles of Genetics.- Sinnot, Dunn and Dobzhansky, Tata McGraw Hill.,New Delhi

PAPER - VII

4 Hrs / Week

ECOLOGY AND PHYTOGEOGRAPHY

Unit - I :

Ecology-Principles and approaches, Structure and function of Ecosystem, Role of climatic, edaphic and Biotic factors on plants, Biogeochemical cycles (Nitrogen, Carbon)

Unit - II

Autecology and synecology-vegetation-physiognomy Raunkiaer s life form ,units of vegetation (formation, association, consociation, fasciation and society). Methods of studying vegetation - Quadrat, Belt and Line transect.

Unit - III

Plant succession, Hydrophytes, Mesophytes , Xerophytes ,Halophytes and Epiphytes - morphological and Anatomical features in relation to their habitats (Adaptation)

Unit - IV

Dispersal and migration, concept of Barriers, Continental drift, endemism, plants and plant communities as indicators.

Unit - V

Plant geography -principles and vegetational types of India - Tropical Rain forest, shoals and deciduous forest - sand dunes and mangroves scrub jungle, phytogeographical regions of India.

Practicals :

- 1.Study of morphological and anatomical adaptations of hydrophytes, mesophytes, xerophytes, halophytes and epiphytes using representative samples.
- 2.Determination of frequency and density constituent of plant species in a terrestrial community through quadrat and transect (line and belt)
- 3.Phytogeographical regions of India.

References :

Plant Ecology, Shukla & Chandal., S. Chand and Co. New Delhi.
Textbook of Plant Ecology, Ambast R.S. - Students and Friends & Co. Varanashi.
Fundamentals of Ecology, Odum Eugene Philadelphia & Saunders, Tokyo, Toppon. Elements of Ecology., Sharma, P.D. Rastogi's Company Ltd., Publications Meerut. Environment and Pollution, N. Arumugam & V. Kumaresan, Saras Pub., Nagercoil., Tamil Nadu Manual of Plant Ecology., Oxford & IBH Publish., Pvt. Ltd., New Delhi.
Plant Ecology, AK Agarwal., Agrobios .Jodhpur.
The Geography of Flowering Plants-Ronald Good., Longman Group Ltd London.

PAPER -VIII

4 Hrs / Week

FUNDAMENTALS OF MICROBIOLOGY

Unit - I :

Definition and scope of microbiology. Historical development of industrial microbiology. Concepts, characterization and classification of microorganisms. Sterilization techniques.

Unit - II

Soil microbiology-Types of microorganism in soil, Role of microorganisms in plant growth, factors affecting microbial growth. Microbiology of air-Role of microorganism in air, methods of purification of air.

Unit - III

Bacteria:General characters, Morphology, ultra structure, nutrition, growth and reproduction. Mycoplasma , Actinomycetes– structure,and reproduction.

Unit - IV

Viruses : General characters, morphology, ultra structure, structure and replication of T₂ phage, TMV, HIV,transmission of viruses. Satellite virus.

Unit - V

Culture of microorganism (bacteria, fungi, actinomycetes), pure culture, Maintenance and preservation of culture, concepts of Gram staining.

References :

Industrial Microbiology, L.E.Casida, J.R.Willey Eastern Ltd., ISBN,
Flood, Feed and Fuel from Biomass, Ed. D.S. Chahal, Oxford & IBH, Publishing Ltd., New Delhi, 1

Experimental Microbial Ecology, RG. Burns and J. Howard Slater, Black Well Scientific Pub.Oxford

Microbiology, Paul A Ketchum, John Wiley and Sons., USA
Microbiology - Pelezar, M.J. Reid, R.D. and E.C.S. Chan, Tata Mc Graw Hill,NewDelhi.
Modern Food Microbiology, Ed. Jay, J.N. CBS Publishers, Delhi .
General Microbiology, 6th edition, Schiesel, H.B. Cambridge University Press.
Hand Books of Indigenous fermented food parcel. Edition Steindrans, KH, Inc, NewYork,
Microbiology, 3rd Edition, Wintrien, G.M. and M.D.Lechtman, Macmillan Publishing London.,
Microbiology, Fundamentals and applications S.S.Purohit,Agrobios Jodhpur.
Microbiology ALBhatia., Avinash Kar Publi.,Jodhpur Fundamentals of Microbiology.,Vijaya Ramesh k. MJ Pub.,Chennai. Applied Microbiology,TrivediPC Agrobios.,Jodhpur.

PAPER - IX

BIOPHYSICS, BIOCHEMISTRY AND PLANT PHYSIOLOGY5Hrs / Week

Unit - I :

Biophysics : Electromagnetic radiation, Absorption and action spectra. Laws of thermodynamics (Basics). High energy compounds. Bioenergetics of mitochondria and chloroplast.

Unit - II

Biochemistry : Acids, basis and solutions. *pH* and buffer systems. Structure and Basic functions of protein, lipids and carbohydrates.

Unit - III

Plant Physiology : Water relations - osmosis, absorption of water, water potential and its components, active and passive absorption of water. Transpiration - its kind, significance and factors. Physiology of stomatal movement, ascent of sap.

Unit - IV

Photosynthesis - Pigments system, light and dark reactions. C4 and CAM Pathways. Respiration - aerobic and anaerobic - Glycolysis, Krebs cycle - electron transport system.

Unit - V

Growth regulators - auxins, gibberellins, Kinetins, ethylene and ABA. Physiology of flowering (Photoperiodism).

Practicals :

1. Rate of respiration in flower buds/germinated seeds using simple respiroscope.
2. Separation of leaf pigments by paper chromatography
3. Measurement of the rate of Photosynthesis under varying concentration CO₂ concentration
4. Effect of Light intensity on O₂ evolution during photosynthesis.
5. Effect of light intensity on transpiration. Determining the rate of transpiration using Ganong's potometer .
6. Qualitative analysis of Carbohydrates, Proteins and lipids.

References :

Plant Physiology-Salisbury and Ross.,Prantices Hall.,New Delhi
Biophysics & Plant Physiology-A.Ragland.,Saras Publication.,Nagercoil., Tamil Nadu
Plant Physiology-Devlin.,Affiliated East West .,New Delhi.,
Introductory Plant Physiology-Noggle and Fritz., Prantices Hall.,New Delhi Fundamentals of
Plant Physiology-V.K. Jain., S. Chand and Co.New Delhi. Biochemistry- J.L. Jain., S. Chand
and Co.New Delhi.
Biostatistics-P.Ramakrishnan., Saras Publication.,Nagercoil., Tamil Nadu Basics Biophysics for
Biologist.,Danial M., Agrobios.Jodhpur
Plant Physiology, A.Ragland *et al*, Saras Publication.,Nagercoil., Tamil Nadu Laboratory
Manual of Biochemistry -J. Jayaram Wiley Eastern Ltd.,NewDelhi. Plant Physiology,
S.Sundararajan.,Anmol Publications.,New Delhi.2
Principles of Plant Physiology,R.S.Singh.,Oxford & IBH Publications.,New Delhi. Plant
Physiology research methods.,S S Narwal *et al.*,Scintific Pub.,Jodhpur. Plant
Physiology,Kumar&Purohit.,Agrobios, Jodhpur.

PAPER - X

5Hrs / Week

HORTICULTURE

Unit - I :

Scope and divisions of Horticulture - methods of vegetative propagation - cutting, layering and grafting - organic manures - fertilizers - irrigation.

Unit - II

Gardening : Types of gardens, Indoor garden, Kitchen garden and Public garden. Important ornamentals - habit and types - garden components - lawn making, glass house, rockery, water garden and topiary.

Unit - III

Production technology - Cultivation of vegetables - Brinjal, Tomato and Onion. Cultivation of fruits - Banana, Mango and Apple growth regulators in horticulture. Plant protection measures for horticulture.

Unit - IV

Commercial horticulture I

Cultivation of flowers - Jasmine, Rose, Orchid, Anthurium. Cultivation of plantation crops - Tea, Cardamom and Coffee- Cultivation of medicinal plants - Periwinkle, Aloe and Gloriosa.

Unit - V

Commercial horticulture II

Extraction of Jasmine concrete and Papain - Bonsai Flower arrangement - Cut flowers - Preservation of fruits and vegetables.

Practicals :

Demonstration of vegetative methods of propagation - Flower arrangement with cut flowers.

References :

An introduction to Horticulture - N. Kumar Narosa Pub., NewDelhi Vegetables – Choudhury Narosa Pub., NewDelhi

Horticulture - Manibhusan Rao., Vishvanathan&Co.,Cennai. Home Gardening - Trivedi, P. Narosa Pub., NewDelhi

Introduction to Spices Plantation Crops Medicinal and Aromatic Plants Plant Breeding- GSChahal *et al.*,Narosa Pub., NewDelhi.

Weed control RC Mandal .. JV Publi.,House.,Jodhpur Organic Farming DGelhot JV Publi.,House.,Jodhpur.

Vistas in Horticulture., SK Bhattacharya., Gene Tech Books., New Delhi.2 Commercial Floriculture.,SK Chatopadhyaya, Gene Tech Books., New Delhi.2

SKILL BASED SUBJECT:

PAPER – I

(3 Hours / Week)

BIODEGRADABLE WASTE MANEGMENT

UNIT – I Environmental pollution – introduction, definition, kinds of pollutants in water, air and soil. Effects and control measures.

UNIT - II Solid waste – biodegradable and non biodegradable, polymers, plastic wastes and E.wastes. Persistence of pesticides and its biomagnifications.

UNIT –III Industrial waste - classification, sludge treatment processes. Treatment of industrial effluents (primary and Tertiary-Biological screening).

UNIT - IV Waste management – Biocomposting-SCP production-Vermitechnology – principles and management.

UNIT - V Bioremediation – definition, in-situ bioremediation, bioremediation of hydrocarbons, heavy metals and xenobiotics

Practicals

1.Determination of Soil pH

2.Effluent analysis (Paper / Distillery) – dissolved oxygen, free carbon dioxide, carbonate and bicarbonate, turbidity, total solids, dissolved solids, hardness, chloride,

3.Analysis of vermicompost – Nitrogen, Phosphorus, Potassium and Carbon.

4.Analysis of effluents of any one industry – dissolved oxygen, free carbon dioxide, calcium, magnesium, nitrate and sulphur.

References :

1.Shukla, R.S and Chandal P.S. 2003. Ecology and Soil Science, S. Chand and Company Ltd., New Delhi

2.Asthana D.K. and Meera Asthana, 1998, Environment : Problems and Solutions, First edition, S. Chand and Company Ltd.

3.Padmanabh Dwivedi, 2004. Environmental Pollution and Environmental Management, Scientific Publishers Jodhpur (India).

4.Gupta P.K. 2000. Methods in Environmental Analysis : Water, Soil and Air, First edition, Agrobios (India).

5.Arun Kumar, Environmental problems, protection and control, Anmol Publication Pvt. Ltd.

6.Sharma P.D. 2004, Ecology and Environment, Seventh edition, Rastogi publications, Meerut.

7.Bhatia A.L. and Kohli K.S. 2005. Environmental Biology, Publishers – Ramesh Book Depot Jaipur.

8.Purohit S.S. 2004. Environmental Pollution – Causes, Effects and Control, Agrobios, India.

9. Palaniappan, S.P. and K. Annadurai, 2003. Organic farming theory and practice, Scientific Publishers, Jodhpur, India.
10. Sathe, T.V. 2004, Vermiculture and organic farming, Daya Publishing Home, New Delhi.
11. Agarwal, S.K. 1996. Industrial Environment, APH Publishing Corporation, New Delhi.
12. Jogdand, S.N. 1995, Environmental Biotechnology, First edition, Himalayan Publishing House, Bombay.
13. Wulf Crueger and Anneliese Crueger, 1996 Biotechnology : A text book of Industrial Microbiology, Second edition, Sinauer Associates inc. Sunderland MA 01375.

14. Kudesia, V.P. 1990. Industrial Pollution, First edition, Pragati Prakashan Publishers, Meerut
15. Lal Singh, 1998. Practical Agricultural, Chemistry and Soil Science, Bishen Singh Mahendra Palsingh, Dehradun.
16. Gupta. P.K. 2002. Methods in Environmental Analysis : Water, Soil and Air, First edition, Agrobios (India.)
17. Rao, K.S. 1993. Practical Ecology. Anmol Publications, New Delhi.
18. Bhatia, A;L. and Kohil K.S. 2005. Environmental Biology, Publishers – Ramesh Book Depot, New Delhi

**SKILL BASED SUBJECT : Paper II -
MEDICINAL BOTANY & HUMAN WELFARE 3 Hrs / Week**

Unit - I: Pharmacognosy - Definition and History. A general account of different survey of Different systems of Medicines - Indian systems of medicine - Siddha Ayurveda and Unani systems. Classification of drugs (elementary). Chemistry of Drugs(Basics).

Unit - II: Morphological and Histological studies - Chemical constituents. Therapeutic and other Pharmaceutical uses of Bark - Cinchona, Leaves - Adathoda and Eucalyptus, Flower - Clove.

Unit - III: Fruits and seed - Wood apple, Goosberry and Poppy seed, Underground stem - Ginger, Unorganized drugs. Gum - Acacia, Resin - Turpentine, Fixed oil - Castor oil.

Unit - IV: A brief account of the following : a) Drugs acting on the Central Nervous system – Belladonna and Aswakantha b) Drugs used in the disorders of the Gastro Intestinal tract –, Pepper and Ginger c) Cardio Vascular drugs – Digitalis and Rawolfia.

Unit - V: Medicinal plant Biotechnology - Genetics- Breeding methods applied to medicinal herbs-NMPB. Drug Adulteration. Methods of Drug evaluation.

Practicals :

- 1.Morphology and anatomy of medicinal plants mentioned in the syllabus.
- 2.Identification of medicinal plants and their useful parts in examination.

References :

Pharmacognosy - GE Trease and WC Evans. E LBSociety. Baelliere Tindall. London.
Pharmacognosy & Pharmacotherapeutics.Saroskar and S.D.Bhandarkar Popular Pakashan, Bombay.

Textbook of Pharmacognosy- T.E. WALLIS Fifth Edition. CBS Publishers and distributors Delhi.

Pharmacognosy - S.S.Handa and V.K.Kapoor second edition. Vallabh Prakash, Delhi.
Pharmacognosy - S.S.Handa and V.K.Kapoor second edition CBS publishers and distributors, Delhi.

An introduction to Medicinal Botany &Pharmacognosy-N.C KumarEmkay Publications. New Delhi.

Pharmacognosy - C.K.Kokate, A. Purohit and S.R.Gokhale 12th Edition Nirali Prakas A Hand Book of Medicinal Plants, Prajapathi ND Agrobios .Jodhpur
A Hand Book of Medicinal Herbs.,DeshpandeDJ Agrobios .Jodhpur

SKILL BASED SUBJECT : PAPER III- ECONOMIC BOTANY 3Hrs/week

UNIT – I : Scope of economic botany . Origin , distribution, cultivation & economic importance of Cereals , pulses, oil crops, vegetables, fruits & nuts (General account only)

UNIT – II : Origin , distribution , cultivation & economic importance of Spices Condiments , cosmetics , essential oils , beverages .

UNIT – III : Origin, distribution , cultivation & economic importance of Timber , fuel, Fibers & dyes .

UNIT – IV : Storage facilities and preservation methods of Cereals , pulses , oil crops , vegetables , fruits & nuts .

UNIT – V : Trading of economically important products . (general account only)Conservation and sustainable utilization of economically important products .

REFERENCES : 1 . Economic Botany – Pandey .B . P. 2 . Economic Botany –Hill . A . F
3 . Origin of cultivated species – Bailey
4 . A dictionary of the Economic products of India –Wall .G . (6 volumes)

Practicals

Identification and study of common name, botanical name, family, parts used, uses of the following:

Cereals- paddy, wheat

Pulses-Red gram, chick pea

Oil crops-Ground nut, sesame

Nuts-Almond , cashew

Spices-Cardamom, cinnamon

Condiments- Mustard, saffron

Cosmetics-Aloe, henna

Essential oil- Eucalyptus oil, clove oil

Beverages- Tea, coffee

Timber- Teak, rose wood

Fibre- Jute, coir

Dye-Indigofera,Punica

ELECTIVE I – A : APPLIED MICROBIOLOGY

Unit - I :

Introduction to applied microbiology. Various applied aspects of microbiology. Fermentation - kinds of fermentors; fermentation media - composition ; sterilization, contamination and screening.

Unit - II

Water microbiology . Water purification, determination of sanitary quality - chemotherapy and control of microorganisms through antibiotics. Source and mode of action of penicillin. Basic principles of immunology - structure of antigen and antibody and their reaction.

Unit - III

Food microbiology: Milk-physical and chemical composition, pasteurization, dairy products (manufacture of cheese) Microbial flora of fresh food, microbial examination of foods- Food poisoning. Botulism.

Unit - IV

Industrial microbiology: Manufacture of alcohol, ethanol, antibiotics - streptomycin, Vitamin-B₁₂, enzyme-cellulase, amino acids, Glutamic, organic acid-citric acid.

Unit - V

Production of microbial biocides-historical background, bacteria, protozoa, fungi, actinomycetes. Microbial Biotechnology and Pollution control.

Practicals :

- 1.A study of Rhizosphere and mycorrhizae.
- 2.Preparation of culture media for bacteria, fungi and actinomycetes.
- 3.Estimation of bacteria, fungi and actinomycetes (plate count) from soil and water by series dilution method.
- 4.Preparation of agar streak and agar slants, sterilization and inoculation.
- 5.Identification of gram staining bacteria using milk or curd.
- 6.Observation of microbes using hanging - drop method.
- 7.Knowledge on antimicrobial activities using antibiotics.

References :

- Industrial Microbiology, L.E.Casida, J.R.Willey Eastern Ltd., ISBN,
Flood, Feed and Fuel from Biomass, Ed. D.S. Chahal, Oxford & IBH, Publishing Ltd., New Delhi, 1
Experimental Microbial Ecology, RG. Burns and J. Howard Slater, Black Well Scientific Pub.Oxford
Microbiology, Paul A Ketchum, John Wiley and Sons., USA
Microbiology - Pelezar, M.J. Reid, R.D. and E.C.S. Chan, Tata Mc Graw Hill, New Delhi.
Modern Food Microbiology, Ed. Jay, J.N. CBS Publishers, Delhi .
General Microbiology, 6th edition, Schiesel, H.B. Cambridge University Press.

Hand Books of Indigenous fermented food parcel. Edition Steindrans, KH, Inc, New York,
Microbiology, 3rd Edition, Wintrien, G.M. and M.D.Lechtman, Macmillan Publishing London,.
Microbiology, Fundamentals and applications S.S.Purohit, Agrobios Jodhpur.
Fundamentals of Microbiology., Vijaya Ramesh k. MJ Pub., Chennai. Applied
Microbiology, Trivedi PC Agrobios., Jodhpur.
Sequence analysis in molecular biology" Alexleons and M. Leon " Academic Press. New York

ELECTIVE I – B : PLANT PATHOLOGY

Unit- I: Introduction, Historical account of plant pathology- Definition-
Pathogen, disease, virulence, resistance/ susceptibility, epidemics
Brief account of major epidemics, Koch's postulates.

Unit – II: Classification of plant diseases, dissemination of propagules of pathogens, factors governing outbreak of diseases. Pathogenesis- Inoculum, inoculum potential, penetration and entry, combination of the host, factors affecting infections.

Unit – III: Role of enzymes in disease development, cell wall degrading enzymes. Toxins in relation to plant diseases: A general account, mode of action and types.

Unit – IV: Fungal diseases and deficiency symptoms: Symptoms, causal organism, disease cycle and control measures of the following fungal diseases. Club root of crucifers, Powdery mildew of wheat, Late blight of potato. Deficiency symptoms: General account, measures to rectify.

Unit – V: Disease management: Legislative methods, cultural methods, soil and sand treatment, biological control, chemical control, control through resistant varieties.

References

- 1.Plant pathology by G.P.Gupta
- 2.Illustrated dictionary of Plant pathology Vyas, N.L
- 3.Microbial Plant pathology- Whitney ,P.J
- 4.Plant pathology- Singh, R.S.
- 5.Plant pathology-Mehotra, R.S.
- 6.Introduction to principle of Plant pathology ed.3- Singh, R.S.
- 7.Lab. Manual of Plant pathology- Pathak U.N

8.Text book of Modern Plant pathology- Bilgrami.K.S & Dube....

ELECTIVE PAPER I - C

FUNDAMENTALS OF COMPUTER APPLICATIONS

Unit - I: Introduction to computer - components of computer - capabilities of computer - hardware - software-classification of software language-machine language -high level language-compilers, translators-input output storage devices .

Unit - II: Introduction to internet-data communication concepts - WWW e-mail- Social net works, URL, FTP,INTERNET, Service Provider - Internet addressing (Domain IP)-Net Browser, search engines, web server -web site.

Unit - III: Operating system, Windows, Linux and Android.Virus and antivirus. Wi-Fi, Bluetooth and Cloud computing (overall view)

Unit -IV: - Microsoft word - creation of documents ,table and applications ofMicrosoft word. Microsoft Excel-spread sheet, workbook charts and table and applications of Microsoft excel.

Unit -V: - Microsoft -Power Point - slide presentation and applications. Data base management system (introduction only) MS Access - Creating a database.

Practicals:

- 1.Creating, editing and printing a document in MS-Word
- 2.Creating a table in MS-Excel
- 3.Creating a chart in MS-Excel
- 4.Creating slide presentation in MS-Power-point
- 5.Web Browsing
- 6.E-Mailing

References :

Fundamentals of Computer., Rajaraman.V Prentice hall of India PVT Ltd., New Delhi
Digital Design-Mooris mano., Prentice hall of India PVT Ltd., New Delhi.

Structured Computer Organisation., Tanenbaum A.S,Prentice Hall of India PVT Ltd., New Delhi

Introduction to Computers. Peter Norton, Tata Mc Graw-Hill, New Delhi

Teach Yourself Windows in 24hrs Greg Perry, Techmedia Publication, New Delhi

Lean Windows 98 in a week end Michal Meadhra and Faithe Wempen Galotia, New Delhi.

The Internet-Complete Reference, Harley Hahn, Tata Mc Grw-Hill, New Delhi.

ELECTIVE II - A : BIOTECHNOLOGY - CONCEPTS AND TECHNIQUES

Unit - I :

Biotechnology - definition, history and importance - Plant tissue culture, concepts and techniques, constituents of MS and White's media. Sterilization techniques - Callogenesis, regeneration, micropropagation through somatic embryogenesis and suspension culture.

Unit - II

Anther culture, Pollen culture (Androgenic haploids), isolation and culture of protoplast, somaclonal - variations - somatic hybridization, cybrids, synthetic seeds. In vitro establishment of mycorrhizae.

Unit - III

Genetic engineering - Procedure for gene cloning, isolation of specific genes, enzymes used in gene cloning - polymerases, restriction endonucleases, ligases and reverse transcriptase. Genetically modified food plants (A brief account).

Unit - IV

Cloning vectors - Plasmids, phages, cosmids, transposons and YAC. Gene cloning in higher plants - use of CaMV and Agrobacterium Ti - Plasmid as vehicle. Methods of direct gene transfer - electroporation, micro injection and liposomes. Isolation and screening of rDNA.

Unit - V

Application and uses of PCR, RFLP, RAPD and DNA finger printing techniques in biotechnology. Southern, Northern and Western blotting techniques agarosegel - electrophoresis.

References :

Applied Biotechnology.,L P Rema.,MJ Public.,Chennai. Plant Biotechnology,B Nirmala MJ Public.,Chennai.

Applied Plant Biotechnolgy, S. Ignacimuthu - Vishvanathan&Sons.,Chennai. Basic
Biotechnology, S. Ignacimuthu - Vishvanathan&Co.,Chennai
Plant Biotchnolgy, S. Ignacimuthu - Vishvanathan&Co.,Chennai
A Text Book of Biotechnology, R.C.Dubey.,Agrobios.Jodhpur.
Biotechnology, S.S. Purohit and S.K. Mathur - Agrobios.Jodhpur
Biotechnology the Biological Principle, M.P. Trehan and Others.,TataMcGrow Hill.,New Delhi.
Biotechnology.,V.Kumaresan., Saras Publication.,Nagercoil., Tamil Nadu
Outlines of Biotechnology., Emkay Public., Delhi.,51.

ELECTIVE PAPER II- B : SEED BIOLOGY

UNIT - I : Morphology and structural details of seeds

Cereals : Paddy / Wheat
Pulses : Dolichos / Glycine
Oil seeds : Castor
Fibers : Cotton
Vegetables : Cucurbita
Study on importance of seed .

UNIT – II : Chemical composition of seeds mentioned above . Germination - General account .
Factors affecting germination . Changes that take place during germination (physical and
chemical) Treatments given to quicken germination .

UNIT – III : Seed germination test under laboratory conditions .Using paper (BP & TP) sand
and soil . The environmental test conditions also be discussed . Evaluation of germination test .

UNIT – IV : Seed viability ; Topographical Tetrazolium Test .
Preparation of solution and methods of application & evaluation . Seed vigour : Concept , Direct
and Indirect vigour tests .

UNIT – V : Dormancy – Primary and secondary dormancies . Significance , factors involved ,
methods used to break dormancy .

References ;

- 1.Germination of seeds – Mayer A. M & Poljakoff Mayer – 1975
- 2.Seed physiology -Bryant J . A 1985 –Edward Arnold , London .
- 3.Recent advancement in the anatomy of Tropical seed plants . Chowdhury K A U B Jawahar
Nagar New Delhi .
- 4.Seed technology – Rattan Lal Agarwal – 2nd edn .
- 5.A text book of General Botany for colleges & Universities.
2nd edn - Chapman & Hall . London .
- 6.Anatomy of seed plants .

- 7.Economic Botany – B . P. Pandey
8.Economic Botany in the tropics .

ELECTIVE II – C : POMOLOGY

- UNIT – I:** Tropical fruits cultivation - . Past and present status of tropical fruits in India. General appraisal of fruit growing regions / Zones in India and Tamil Nadu
- UNIT-II :** Production, productivity, varieties- exportable varieties. Climate and soil requirements— propagation techniques - planting.
Nutrition-nutrient deficiency and management – flowering, fruit set, bearing problems – special horticultural technique
Harvesting techniques – post harvest handling & post harvest treatments - ripening of fruits - storage and processing of Mango, Banana
- UNIT – III:** Climate and Soil environments- varieties- Propagation-Planting requirements, manures and manuring of Papaya, Guava, Sapota, Acid lime, Lemon, Sweet orange, Jack fruit and Pine apple.
- UNIT – IV:** Subtropical and humid zones of India and Tamil Nadu – importance and scope of fruit crops in these zones – varieties, propagation and planting and aftercare, – management of nutrient – water needs – weed management – Training and pruning method – physiology of flowering, use of plant growth regulators – harvesting procedures – post harvest aspects of the following crops.
Mandarin, , avocado, , litchi, , carambola,
- UNIT – V:** Classification of temperate fruits – detailed study of area, production, varieties, climate and soil requirements – propagation – planting density – cropping systems– training and pruning –use of growth regulators – nutrient and weed management – harvesting – post harvest handling and storage

in the following crops. Apple, pear, plum, strawberry, cherries.

REFERENCE BOOKS

1. Bose, T. K. S. K. Mitra, and D. S. Rathore. 1998. Temperate Fruits – Nayaprakash, Calcutta
2. Bose, T. K. 1996. Fruits of India – Tropical and sub – tropical. Nayaprakash, Calcutta
1. Bose T.K. S. K. Mitra and M. K. Sadhu. 1988 Mineral Nutrition of Fruit Crops. Naya Prokash, Calcutta.
3. Bose, T. K., S. K. Mitra and D. Sanyal, 2001. Fruits: Tropical and subtropical volume I. Naya Udyog, Calcutta
4. Gardener, Bradford and Hooker. 1952. Fundamentals of fruit production. Mc Graw Hill Book Co. Inc. London.
5. Fruit culture in India (1967) Singh, S., Krishnamoorthy. S., and Katyal, S. L. ICAR, New Delhi.
6. Fruit growers in India, W. B. Hayes Kitabishan, Allahabad.

7. Fruits : Tropical and subtropical (1990) T. K. Bose & S. K. Mitra, Nayaprakash, 206 Bidhan Saram, Calcutta – 700 116, India
8. Temperate fruits (1990) – S. K. Mithra, T. K. Bose and D. S. Rathore. Horticulture and Allied Publisher .
9. Chattopadhyay, T. K. 1994. A text book of Pomology (Vol 1-3) Kalyani Publishers, New Delhi.
10. Collins, J.L. 1960. The Pineapple: Botany cultivation and utilization, New York, Wiley.
11. Kumar, N. Introduction to Horticulture, Rajalakshmi Publications, Nagercoil.
12. Pal, J.S. 1997. Fruit Growing, Kalyani Publishers, New Delhi.
13. Shanmugavelu, K. G. 1987. Production technology of fruit crops SBA Publications, Calcutta.
14. Singh, S. S. Krishanmurthi and S. L. Katyal 1967. Fruit culture in India, ICAR, New Delhi.
15. Singh, S. P. 1995. Commercial Fruits, Kalyan Publishers, Ludhiyana.
16. Veeraraghavathatham, D., M. Jawaharlal, S. Jeeva and S. Rabindran 1996. Scientific Fruit culture, Suri Associates, Coimbatore

ELECTIVE III – A : BIOTECHNOLOGY - APPLIED BIOTECHNOLOGY

Unit - I :

Food Technology - SCP as microbial food for future - mass cultivation and nutritional value of Spirulina, Scenedesmus, Yeast and Methylophilus.

Mushroom Technology - Cultivation techniques and nutritional value of Pleurotus sajor and Agaricus bisporus.

Unit - II

Biofertilizers - Advantages mass cultivation and application technique of Rhizobium, Azospirillum, Blue Green Algae (nitrogen fixers), Phosphobacteria, and VAM.

Unit - III

Application of genetic engineering in agriculture (transgenic plants) medicine and insulin, hormones, vaccines, antibiotics, monoclonal antibodies and hybridoma techniques.

Unit - IV

Biological control of pathogens and weeds through engineered microbes. Bacillus thuringiensis, mycoherbicides and insects, production of secondary metabolites. Bacterial toxins and penicillin. Enzymes engineering and its uses.

Unit - V

Waste water effluent treatment and recycling for food, feed and bio - fertilizers. Treatment of paper and distillery effluents-oxidation ponds. Biomass and bio-energy production of hydrogen. Petrochemical plants Calotropis/ Heavia. Biodiesel- Jatropha- source of alternate fuel.

Practical for biotechnology paper I & II :

- 1.Cultivation of *Pleurotus sajor*.
- 2.Preparation of M.S.Medium-sterilization and inoculation of explants - shoot tip culture.
- 3.Synthetic seed preparation. Culture of yeast, Spirulina, Nostoc and Azolla.
- 4.Demonstration of biofertilizers - Azospirillum, Agrobacterium and antibiotics - specimens or slides or photographs.

5. Petrochemical and biodiesel Plants - specimens.
6. Blotting techniques - observation of photographs.

References :

Applied Plant Biotechnology, Vishvanathan & Sons., Chennai.
Basic Biotechnology, S. Ignacimuthu - Vishvanathan & Co., Chennai Plant Biotechnology, S. Ignacimuthu - Vishvanathan & Co., Chennai
A Text Book of Biotechnology, R.C. Dubey., Agrobios., Jodhpur.
Biotechnology, S.S. Purohit and S.K. Mathur - Agrobios., Jodhpur
Biotechnology the Biological Principle, M.P. Trehan and Others., Tata McGraw Hill., New Delhi.
Biotechnology., V. Kumaresan., Saras Publication., Nagercoil., Tamil Nadu
Biotechnology and Biology of Plants PC Trivedi., Avinash Kar Publi., Jodhpur Microbial
Biotechnology., PC Trivedi., Avinash Kar Publi., Jodhpur Biotechnology., V. Kumaresan., Saras
Publication., Nagercoil., Tamil Nadu Outlines of Biotechnology., Emkay Public., Delhi., 51.

ELECTIVE III- B : ETHNOBOTANY

Unit: I. Ethnobotany: Introduction, concept, scope and objectives. Ethnobotany as an interdisciplinary science. The relevance of ethnobotany in the present context. Major ethnic groups in Tamilnadu. (Any five)

Unit II. Methodology of Ethnobotanical studies. a) Field work b) Herbarium c) Ancient Literature d) Temples and sacred places. Plants used by the tribals: a) Food plants b) intoxicants and beverages c) Resins and oils and miscellaneous uses.

Unit III Plants and Tribal medicine: Significance of the following plants in ethno botanical practices (along with their habitat and morphology) a) *Azadiractha indica* b) *Ocimum sanctum* c) *Vitex negundo*. d) *Gloriosa superba* e) *Tribulus terrestris* f) *Pongamia pinnata* g) *Cassia auriculata* h) *Indigofera tinctoria*. Role of ethnobotany in modern medicine with special example *Rauwolfia serpentina*., *Trichopus zeylanicus*.

Unit. IV. Role of ethnic groups in conservation of plant genetic resources . Participatory forest management. Sharing of wealth concept with few examples from India.

Unit V Ethnobotany as a source of drug.

a) Reserpine b) Artemisin c) Gulipid d) Cocaine e) Strychnine.

References

1.S.K. Jain, Manual of Ethnobotany, Scientific Publishers, Jodhpur, 1995.
2.S.K. Jain (ed.) Glimpses of Indian. Ethnobotny, Oxford and I B H, [New Delhi](#) – 1981 3.S.K. Jain (ed.) 1989. Methods and approaches in ethnobotany. Society of ethnobotanists,

Lucknow,

4.S.K. Jain, 1990. Contributions of

India.

Indian ethnobotny. Scientific publishers, Jodhpur.

5. Cotton C.M. 1997. Ethnobotany – Principles and applications. John Wiley and sons – Chichester
6. Rajiv K. Sinha – Ethnobotany The Renaissance of Traditional Herbal Medicine – INA – SHREE Publishers, Jaipur-1996
7. Faulks, P.J. 1958. An introduction to Ethnobotany, Moredale pub. Ltd. London
8. Gary J Martin, 2008. Ethnobotany A Methods manual, Earth scan, London.

ELECTIVE III- C : BIOINFORMATICS

Unit I: Introduction to Bioinformatics, Knowledge Base in Biology, Information Technology in Biology, Types of Sequences used in Bioinformatics- DNA Sequences, RNA Sequences, Protein Sequences, application of Bioinformatics, fields related to Bioinformatics

Unit II: Biological databases and its significance- objectives , properties and classification of Biological databases, Hard – link relationships between databases, Symbols used in databases

Unit III: Nucleotide Sequence Databases, Nomenclature of DNA Sequences, Structure of Nucleotide Sequence Databases, GenBank format, Gene expression Databases

Unit IV: Proteomics - Classification based on shape, composition function; Nomenclature of Protein Sequences ; Genomics- Comparative Genomic Databases, organism specific Genomic databases.

Unit V: Gene finding, protein prediction, biomolecular visualization, phylogenetic analysis & Drug designing

REFERENCES

- 1 . Rajaraman.V “Fundamentals of computer” Prentice Hall of India PVT Ltd. New Delhi 1996.
- 2 . Mooris mano “Digital Design” Prentice Hall of India PVT Ltd.,,New Delhi,1996
3. Tanenbaum A.S, Structured computer Organisation “Prentice Hall of India Pvt Ltd.”, New Delhi`
1990
4. Peter Norton, :Introduction to computers”Tata Mc Graw-Hill, New Delhi 1998
5. Alexeev and M. Leon “Internet in a Nutshell”
6. PGDCA Books vol.16 and 7-Bharathiar university
7. A.D. Baxevanis and B.J. Francis (Eds) “Bio-informatics”- A practical guide to the analyzing of gene protein”-john wiley and sons(1998)

8. Missener and A.S. Krawetz, "Bio-informatics to bio-informatics" Addison Wesley Longman Ltd (1999)
9. Bioinformatics for beginners K. Mani and Vijayaraj
10. Introduction to Bioinformatics S. Sundara Rajan and R. B
11. Introduction to Bioinformatics Arthur M. Lesle
12. Bioinformatics- A biologist's guide to bio-computing and the internet 2000. Stuart M. Brown.
13. Bioinformatics "Sequence and Genome analysis. 2001. David W. Mount.
14. Bioinformatics – R. Sundaralingam, V. Kumaresan.

CORE PRACTICAL-I (Papers I & II)

(Algae, Fungi, Lichens, Plant Pathology; Bryophytes, Pteridophytes, Gymnosperms and Palaeobotany)

Time: 3 Hrs

Max. Marks: 60

- | | |
|--|---------------|
| 1. Make suitable micro preparations of A, B & C. Draw labeled sketches.
Identify Giving reasons and submit the slides for valuation | 3x5=15 Marks |
| 2. Identify any TWO algal members from the algal mixture D | 2x5=10 Marks |
| 3. Identify, draw diagrams and write notes on E, F, G, H, I, J, K, L, M
.and N | 10x3=30 Marks |
| ----- | |
| 55 Marks | |
| Record 5 Marks | |
| ----- | |
| Total | 60 Marks |
| ----- | |

CORE PRACTICAL-I (Papers I, & II)

(Algae, Fungi, Lichens, Plant Pathology; Bryophytes, Pteridophytes, Gymnosperms and Palaeobotany)

Practical- I-KEY

- | | |
|------------------------------|--|
| 1.A- Algae/ Fungi | |
| B- Bryophytes/ Pteridophytes | |
| C- Gymnosperms | (slide-2, Sketch & Reasons -3)3x5=15 Marks |

2.D- Algal Mixture (Identification-1, Sketch-2 & Notes-2)	2x5=10 Marks
3.E- Algae	
F and G-Fungi	
H-Lichen	
I and J Bryophytes	
K-Pteridopytes	
L- Gymnosperms	
M-Pale botany	
N- Plant Pathology (Identification-1, Sketch & Notes -2)	10x3=30 Marks

	55
Record	5

Total	60 Marks

CORE PRACTICAL II (PAPERS III & IV)

[Cell biology& Lab techniques, Anatomy& Embryology]

Time: 3.00 Hrs

Max. Marks 60

1. Make squash of specimen A. Draw Sketches, Identify any one stage.

7

Submit the slide for valuation.

2. Make suitable micro preparation of B & C. Draw labeled Sketches.

Identify giving reasons & submit the slide for valuation.

2X6=12

3. Mount the embryo of the given specimen D & submit the slide for Valuation.

5

4. Take the peel of given leaf and identify the stomatal type. Draw diagram and write notes.

6

5. Identify F,G,H,I & J

5x5=25

55

RECORD

5

Total

60

CORE PRACTICAL II (PAPERS III & IV)

KEY

1. A: Squash [Identification-1, Slide-2, Sketch & Notes-4]	7
2. B & C: Anatomy [Identification-1, Slide-2, Sketch-1, Notes-2]	2x6=12
3. D: Embryo Mounting [Tridax / Crotalaria] [Slide-2, Sketch & Notes-4]	6
4. E: Leaf mounting. [Identification-1, slide-2, sketch & Notes-2]	5
5. F: Cell biology	
G: Lab techniques	
H: Anatomy	
I and J Embryology	
[Identification-1, Sketch-2, & Notes-2]	5x5 =25
Record	55
	5
Total	60

CORE PRACTICAL-III (Papers VII, VIII, IX & XII)
(Taxonomy & Economic Botany; Genetics, Plant Breeding & Biostatistics; Ecology
Phytogeography)

Time 3 Hrs

Max. Marks 60

1. Assign specimen A and B to its respective family giving reasons 2x5=10
2. Describe specimen C in technical terms. Draw sketches of floral Parts, Construct floral diagram & write floral formula-----10
3. Assign the specimen D to its respective habitat, giving the morphological adaptations ----- 5
4. Make micro preparations of E. Draw labeled sketches. Submit the slide for valuation. Write down its anatomical adaptations -----5
5. Analyse the plant communities present in the constructed Quadrat /Line Transect/Belt transect F by Quantitative method. Present the data and give the inference -----10
6. Work out the given ProblemG -----5

7. Work out the given Problem H -----5

Herbarium 5

Record 5

Total 60

CORE PRACTICAL-III (Papers V, VI, & VII)

**(Taxonomy & Economic Botany; Genetics, Plant Breeding & Biostatistics; Ecology
Phytogeography)**

Time 3 Hrs

Max. Marks 60

KEY

1. A&B Taxonomy (Identification -1 , Reasons -4) 2x5=10
2. C. Taxonomy (sketches-3,Floral diagram-2,Floral Formula-1,Notes-4) 10
3. D. Epiphyte/Halophyte (Identification-1,sketch-2,Notes-2) 5
4. E. Hydrophyte / Xerophyte/Mesophyte (Identification -1, Slide-1 Sketch-2,Notes-1) 5
5. F. Quadrat / Line transect / Belt transect- (Identification-1,Graph& Notes-9) 10
6. G. Genetics Problem 5
7. H. Biostatistics problem 5

50

Herbarium 5

Record 5

Total 60

CORE PRACTICAL – IV (Papers VII & VIII) (Biophysics, Biochemistry, Plant Physiology and Horticulture)

Time: 3Hrs Max.Marks:45

1. Write Procedure, apparatus required for the experiment A . Give the inference from the experiment and leave the setup for valuation ----- 15
2. Test the presence of Carbohydrate/Protein in the given sample B-----10
- 3 . Write notes on C, D & E -----3x5 = 15

CORE PRACTICAL-IV (Papers VII&VIII) (Biophysics, Biochemistry,Plant physiology & Horticulture)

Key

- 1.. Physiology A(Requirements-5, Procedure-5, Result-5 15
2. Biochemistry B(Requirements-2, Procedure- 3
. Result-5)----- 10
3. Horticulture C, D & E (vegetative propagation methods,
garden types –photos, Commercial horticulture – any
product)
(Identification – 1, sketch &Notes - 4) 3X5=15

Record = 5
Total = 45

**CORE PRACTICAL – IV (PAPERS Electives I, II, &III
COREVIII)**

Time: 3Hrs

Max.Marks:45

1. Write the procedure for the Gram Staining and identify the type of bacteria Present in the given sample A. 10 Marks
2. Write down the procedure for Preparing a medium/culture/inoculation Techniques/Hanging drop Method 5 Marks
3. Identify the apparatus given in C and D and write notes on their use 2x5= 10 Marks
4. Write notes on E, F,G, H, & I 5x3=15 Marks

40 Marks

Record 5 Marks

Total 45 Marks

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CORE PRACTICAL – IV (PAPERS Electives I, II, III&CORE III

Time: 3Hrs

Key

Max.Marks:60

1. A- Gram staining 10 Marks
2.B- Culture methods/ inoculation techniques/ Hanging drop
. method 5 Marks

3. C- Apparatus used in Microbiology
D-Apparatus used in Biotechnology 2x5=10 Marks

4. E& F - Microbiology
(Pleurotus sajor, spoiled food , dairy products,culture types
Bacteria /virus/mycoplasma/actinomycetes (photograph)

G,H & I-Biotechnology

(Synthetic seeds, shoot tip culture, callus, VAM, Nostoc ,
Azolla, Azosprillum, Agro bacterium, MS Medium,
Transgenic Plants, Petro chemical& Biodiesel plants, SCP etc,)

5x3 = 15 Marks

40 Marks

RECORD 05 Marks

Total 45 Marks

SKILL BASED SUBJECT: PRACTICAL (Paper I, II & III)(Biodegradable waste management, Medicinal botany & human welfare and Economic botany)

Time: 3Hrs	Max.Marks:45
1. Write the procedure and Requirements for estimating the chemical parameter of the given sample A	15 Marks
2. Make suitable micro preparation of B. Draw sketches and write notes.	8 Marks
3. Write notes on C	5 Marks
4. Identify and tabulate D, E, F & G	4x3=12 Marks

	40 Marks
	Record 5 Marks

	Total 45 Marks

SKILL BASED SUBJECT: PRACTICAL (Paper I, II & III)

Key

1. A-Biodegradable waste management experiment (Requirement-5, Procedure-5, Result-5)-----	15
2. B- Medicinal botany – stem/leaf (identification–1, slide–2, sketch -2 & notes-3)	8
3. C- Spotters- Medicinal botany (bark, stem, leaves, flowers, fruits) (Identification – 1, Botanical name – 1, uses and active principle - 3)-----	5
4. Economic Botany – D, E, F & G (Common name & Botanical name-1, family & part used-1, uses-1)	4X3=12
	40
Record -----	5
Total -----	45