



**BHARATHIDASAN UNIVERSITY
TIRUCHIRAPPALLI- 620 024**

B.Sc. Botany

(For the candidates admitted from the academic year 2014 -15 onwards offered through
Centre for Distance Education)

Course Duration: 3 Years – (Non-Semester System)

Eligibility: Higher Secondary (+2) Pass with Physics, Chemistry, Botany and Biology

Year	Paper	Title of the Paper	Exam Hours	Marks
I YEAR	Language Paper – I		3	100
	English Paper –I		3	100
	Core Paper I	Algae, Fungi, Lichens, Bryophytes Plant Pathology and Plant Protection	3	100
•	First Allied	Zoology Practical 25 Theory 75	3	100
	Core Paper II	Practical – I Covering theory paper -I	3	50
				450
II YEAR	Language Paper II		3	100
	English paper II		3	100
	Core Paper III	Pteridophytes, Gymnosperms , Palaeobotany, Anatomy and Embryology	3	100
•	Second Allied	Chemistry Practical 25 Theory 75	3	100
	Core Paper IV	Practical II Covering Theory Paper III	3	50
				450
III YEAR	Core Paper V	Cell Biology, Genetics and Evolution	3	100
	Core Paper VI	Morphology, Taxonomy, Economic Botany, Ecology and Phytogeography	3	100
	Core Paper VII	Plant Physiology, Biochemistry and Biophysics	3	100
	Elective Paper	Horticulture / Microbiology / Herbal Botany	3	100
	Core Paper –VIII	Practical - III Paper covering V & VI	3	100
	Core Paper IX	Practical - IV Paper Covering VII	3	100
				600
TOTAL MARKS				1500

- Note:
1. For all Theory and Practical Papers passing minimum is 40% (50 Marks) 20 Marks
 2. Compulsory Record, Herbarium and field note book should be submitted at the time of practical examination.
 3. Environmental Studies UGC paper is compulsory to study in 1st year

Core Paper –I
Algae, Fungi, Lichens, Bryophytes, Plant Pathology and Plant Protection

Unit- I : Algae

General characteristics, Classification. (Fritsch, 1935) Vegetative structure and reproductions of the following genera *Oscillatoria*, *Volvox*, *Caluerpa*, *Ectocarpus*, *Polysiphonia*, *Gracilaria* - Economic importance of Algae.

Unit- II : Fungi and Lichens

General characteristics, Alexopolus Classification. Vegetative structure and reproduction of the following – *Albugo*, *Pencillium*, *Polyporus*.

Lichens – occurrence, types, structure, reproduction and economic importance of Fungi and Lichens.

Unit- III: Bryophytes

Bryophytes – General characteristics of Bryophytes, Classification (K. R. Sporne), Distribution, Structure, Reproductions and Life History of following types: *Riccia*, *Porella*, *Anthoceros*, *Polytrichum* (Developmental study not necessary).

Unit- IV : Plant Pathology

Host, causal agent, Symptoms and control measures of the following diseases: Mycoplasma-Little leaf of Brinjal, Virus – Tobacco Mosaic Virus, Bacteria – Citrus canker, Fungi- Red rot of Sugar cane, Tikka disease of ground nut, Blast disease of paddy.

Unit- V : Plant Protection

Methods of Plant Protection – Cultural practices – Physical, Chemical and Biological Control and quarantine methods. Methods and applications of fungicides and pesticides. Toxic hazards of pesticides – Plant protection appliances – seed protections.

REFERENCE BOOKS

ALGAE

1. Fritsch F.E. (1935 The Structure & Reproduction of Algae 1945) : Cambridge University Press, Cambridge, U.K. Vol. I-791 pp., Vol. II-939 pp.
2. Venkateswarlu, V. (1970) : A Text Book of Algae Maruti Book Depo, Hyderabad, India, 266 pp.,
3. H.D. Kumar & Singh, H.N. (1976) : A Text Book of Algae Affiliated East West Press Pvt.Ltd., New Delhi, Madras 216 pp.,
4. Bold, H.C., & Wynne, M.J. (1978) : Introduction to the Algae: Structure & Reproduction Prentice Hall of India, New Delhi, 706 pp.,
5. Vashista, B.R. (1988) : Botany for degree students-Algae. S. Chand & Co., (P) Ltd., New Delhi – 567pp.,
6. Pandey, B.P. (1993) : A Text book of Botany-Algae S. Chand & Co., (P) Ltd., New Delhi-280 pp.,
7. Kumaresan, V. (1997) : Algae & Bryophytes Saras Publications, Nagercoil, India-399+154 pp.,

8. Annie Ragland (1998-99) : Algae & Bryophytes Saras publications, Nagercoil., 184 pp.,

FUNGI

1. Vashista, B.R. (1982) : Botany for degree Students- Fungi S.Chand & co., New Delhi – 544pp.,
2. Mehrotra, R.S. & K.R. Aneja (1990) : An Introduction to Mycology Wiley Eastern Ltd., New Delhi, Bangalore, Bombay, Calcutta, Guwahati, Hyderabad, Lucknow, Madras, Pune -766pp.,

BRYOPHYTES

1. Watson, E.V. (1968) : British Mosses & Liverworts Cambridge University Press, U.K. 465pp.,
2. Vashista, B.R. (1983) : Botany for Degree students-Bryophyta S.Chand & Co., New Delhi-392pp.,
3. Palaniyappan, S. (1988) : Bryophyta (In Tamil) T.K. Publishing House, Chennai - 174pp.,

PLANT PATHOLOGY

1. Bilgrami, K.S. & H.C. Dube (1990) : A Text Book of Plant Pathology Vikas publishing House Pvt., Ltd.,New Delhi, India-344 pp.,
2. Dube, H.C . (1992) : A Text Book of fungi, Bacteria & Virus Vikas Publishing House (P) Ltd., New Delhi-240pp.,
3. Pandey, B.P. (1999) : Plant pathology-Pathogens & Plant Diseases S. Chand & Co., New Delhi-492 pp.,
4. Singh, R.S. (2000) : Introduction to Principles of Plant pathology(3rd Edition) Oxford & IBH Publishers, New Delhi, Calcutta-534pp.,

PLANT PROTECTION

1. Bap Reddy, D. & N.C. Joshi (1992) : Plant Protection in India Allied Publishers Ltd., New Delhi, Bombay, Calcutta, Madras, Nagpur, Ahmedabad, Bangalore, Hyderabad, Lucknow-550pp.,
2. Chattopadhyay, S.B.(1991) : Principles & Procedures of Plant Protection (3rd Edition) Oxford & IBH Publishing cosec2□ .,(P)Ltd., New Delhi, Bombay, Calcutta-584pp.,
3. Chatterjee, P.B. (1997) : Plant Protection Techniques Bharati Bhawan, patna, India- 324pp.,

Core Paper II - Practical I

(Paper covering Core Paper – I)

Algae, Fungi and Bryophytes

- To make suitable micro preparations of the type study
- To identify micro slides relevant to the syllabus
- To identify Algae in algal mixture

Lichens

- A study of vegetative and reproductive structure of genera included

Plant Pathology

- Study of diseases of plant materials stated in theory

Plant Protection

- Study of tools, chemicals, fungicides and pesticides
- To maintain a record note book.

Core Paper III

Pteridophytes, Gymnosperms , Palaeobotany, Anatomy and Embryology

Unit- I : Pteridophytes

General Characteristics, Classification (Sporne), Structure, Reproduction and Life cycle of the following genera. Psilotum, Lycopodium, Equisetum and Marsilea. Stellar Evolution – Homospory, Heterospory and seed Habit.

Unit- II : Gymnosperms

General Characteristics, Classification (Sporne), Structure, Reproduction and Life Cycle of the following genera. *Pinus* and *Gnetum*.

Unit- III : Palaeobotany

Fossil, Fossil types and Fossilization methods – Geological time scale, Carbon dating. A brief study of the following form genera. Rhynia, Lepidodendron and Calamites.

Unit- IV : Anatomy

Classification of Tissues. Meristems and their types. Complex tissues, xylem and phloem. Stomatal types. Secondary growth and Anomalous secondary growth.

Unit- V : Embryology

Development of Anther, Microsporogenesis, Male gametophyte development, Development of ovule. Megasporogenesis, Female gametophyte development (Polygonum type) Double fertilization, Endosperm types and Development. Embryogeny of Dicot and Monocot.

REFERENCES

PTERIDOPHYTES

1. Sporne, K.R. (1970) : The Morphology of Pteridophytes (The Structure of Ferns and Allied Plants) Hutchinson University Library, London
2. Sundara Rajan, S. (1994) : Introduction to Pteridophyta New Age International Publishers Ltd., Wiley Eastern Ltd., New Delhi, Bangalore, Bombay, Calcutta, Guwahati, Hyderabad, Lucknow, Madras, Pune, London
3. Vashista, P.C. (1997) : Botany for Degree Students-Pteridophyta. S. Chand & Co., New Delhi,
4. Rashhed, A. (1999) : An Introduction to Pteridophyta Vikas publishing Co., New Delhi,

GYMNOSPERMS

1. Coulter, J.M.& C.J. Chamberlain (1964) : Morphology of Gymnosperms Central Book Depot, Allahabad
2. Sporne, K.R. (1971) : The Morphology of Gymnosperms (The Structure and Evolution of Primitive seed Plants) Hutchinson University Library, London
3. Vashista, P.C. (1996) : Botany for Degree Students-Gymnosperms(2nd Edn.) S. Chand & Co.,New Delhi,
4. Sharma, O.P. (1997) : Gymnosperms Pragati Prakashan, Meerut, India
5. Bhatnagar, S.P. & Alok Moitra (1997) : Gymnosperms New Age International (P)Ltd., Publisher, New Delhi, Bangalore, Calcutta, Chennai, Guwahati, Hyderabad, Lucknow, Mumbai, Pune
6. Srivastava, H.N. (1998) : Gymnosperms Pradeep Publications, Jalandhar, India

PALAEOBOTANY

1. Scott, D.H. (1962) : Studies in Fossil Botany (Vol.I & Vol.II) Hafner Publishing Co., N.Y.
2. Delavoryas, T. (1962) : Morphology and Evolution of Fossil Plants Holt, Rinehart & Winston, N.Y. Chicago, San Francisco, Toronto, London
3. Shukla, A.C. & Misra, S.P. (1975) : Essentials of Paleobotany Vikas Publishing House (P)Ltd., Delhi,Bombay, Kanpur
4. Sharma, M. (1992) : Plant Fossils-a Link with the Past (A Birbal Sahni Birth Centenary Tribute)
5. Birbal Sahni Institute of Paleobotany, Lucknow, India

ANATOMY

1. Vasishta, P.C. (1977) : A Text Book of Plant Anatomy S. Nagin & Co., Jullunder & New Delhi-460pp.,
2. Eames, A.J., & Mc Daniels, L.H. (1979) : An Introduction to Plant anatomy Tata-McGraw-Hill Publishing Co., (P)Ltd., Bombay, New Delhi
3. Esau. K. (1980) : Plant Anatomy, (2nd Edition) Wiley Eastern Ltd., New Delhi, Bangalore, Bombay, Calcutta, Madras, Hydrabad
4. Krishnamurthy,K.V. (1980): Wood Tetrahedron Publications, Trichy, India
5. Pandey, B.P. (1989) : Plant anatomy S. Chand & Co., New Delhi

EMBRYOLOGY

1. Swamy. B.G.L. & Krishnamoorthy. K.V. (1980) : From flower to fruit Tata McGraw Hill Publishing Co., Ltd., New Delhi.
2. Maheswari, P. (1985) : An Introduction to the Embryology of Angiosperms Tata McGraw Hill Publishing Co.,Ltd., New Delhi-
3. Dwivedi, J.N. (1988) : Embryology of Angiosperms Rastogi & Co., Meerut, India
4. Muneeswaran, A. (1990) : Angiosperm Embryology Titan Books,Madurai, India
5. Bhojwani, S.S. & Bhatnagar, S.P. (2000) : The Embryology of Angiosperms (4th Edition) Vikas Publishing House(P)Ltd., UBS Publisher's Distributors, New Delhi
6. Annie Regland (2000) : Developmental botany(Embrylogy of Angiosperms) Saras Publications, Nagercoil, Tamilnadu, India

Core Paper - IV Practical II

(Covering Theory Paper III)

Pteridophytes

Study of Morphology, Anatomy and Reproductive parts of *Psilotum*, *Lycopodium*, *Equisetum* and *Marsilea*.

Gymnosperms

Study of Morphology, Anatomy and Reproductive parts of *Pinus* and *Gnetum*

Palaeobotany

Study of Fossil materials of *Rhynia*, *Lepidodendron* and *Calamites*.

Anatomy

Study of Plant Tissues, Parenchyma, Collenchyma, Sclerenchyma, Xylem and Phloem. T.S. of Dicot stem, root and leaf. Study of monocot stem, root and leaf. Normal secondary Growth in dicot stem and root. Anomalous secondary growth in *Boerhaavia*, *Nyctanthes* and *Dracaena*. Nodal anatomy.

Embryology

T.S. of Anther

Types of Ovule

Stages of Dicot Embryo

Core Paper- V

Cell Biology, Genetics and Evolution

Unit- I : Cell Biology

Ultra Structure of Plant cell, cell wall- Primary and Secondary, Cytoplasm, Plasma membrane, Endoplasmic reticulum, Golgi complex, Lysosome, Mitochondria, Plastids, Ribosomes and Nucleus.

Unit- II : Cell Biology

Chromosomes: Morphology, Giant chromosomes-structure and types of DNA and RNA. Cell division- Amitosis, mitosis and meiosis.

Unit- III : Genetics

Mono hybrid and dihybrid ratio's (Mendel's laws). Deviation from Mendelian ratio, incomplete dominance (Mono and dihybrid), lethal factor, complementary factor and epistasis (dominant), multiple factor hypothesis, multiple alleles-blood groups.

Unit- IV : Genetics

Linkage and Crossing over, recombination cytological proof of crossing over, mapping of genes on the chromosomes, Sex linkage in *Drosophila* cytoplasmic inheritance, Sex determination in *Drosophila* and Plants. Polyploidy and types. Mutation- gene mutation, Physical and Chemical mutagens.

Unit- V : Evolution

Evolution – Origin of life, evolutionary concepts in explaining the diversity of life. Theories of Lamarck, Charles Darwin and the modern synthetic theories.

REFERENCES

CELL BIOLOGY

1. Sharma N.S. 2005, Molecular Cell Biology, International Book distributors, Dehradun
Verma P.S. and Agarwal V.K. 1986, Cell Biology and Molecular Biology (Cytology)
S. Chand and Company, New Delhi
2. Power C.B., 1984, Cell Biology, Himalaya Publishing Co. Mumbai
3. De. Robertis and De Robertis, 1998, Cell and Moleceular Biology, K.M. Verghese and Company

GENETICS

1. Sinnott, E.W., L.C. Dunn & J. Dobshansky (1958) : Principles of Genetics(5th Edition) McGraw Hill Publishing Co., N.Y. Toronto, London-459pp.,
2. Chandrasekaran, S.N. & Parathasarathy , S.V. (1965) : Cytogenetics and Plant Breeding P. Varadhachari & Co., Madras-655pp.,
3. Gardner, E.J. & Snusted, D.P. (1984) : Principles of Genetics(7th edition) John Wiley & Sons, N.Y. Chichester, Brisbane, Toronto, Singapore-400pp.,
4. Dnyansagar, V.R. (1986) : Cytology & Genetics Tata McGraw Hill Publishing Co., Ltd., New Delhi -403pp.,
5. Palaniyappan, S. (1987) : Marabiyal (Genetics-In Tamil) V.K. publishing House, Madras-152pp.,
6. Meyyan, R.P., (2000) : Genetics & Evolution Saras Publication, Nagercoil, India-380pp.,
7. Gupta, P.K. (2000) : genetics Rastogi Publishers, Meerut, India-611pp.,
8. Agarwal., V.K. (2000) : Simplified course in Genetics(B.Sc., Zoology) S. Chand & Co.,New Delhi-168pp.,
9. Daniel Sundararaj, D. & G. Thulsidas (1972) : Introduction to Cytogenetics & Plant Breeding (3rd edition) Popular Book Depot., Madras-361pp.,

EVOLUTION

Verma, P.S. & V.K . Agarwal (1999) : Concepts of Evolution S. Chand & Co., New Delhi-148pp.,

Core Paper- VI

Morphology, Taxonomy, Economic Botany, Plant Ecology and Phytogeography

Unit- I : Morphology

Phyllotaxy of leaves. Structure of Monocot and Dicot flower, Inflorescence- types- racemose, cymose, mixed and special types. Outline classification of fruits.

Unit- II : Taxonomy

Binomial nomenclature- Systems of classification – Bentham and Hooker's with Merits and Demerits. Herbarium Techniques. A detailed study of following families and their economic importance: Annonaceae, Rutaceae, Anacardiaceae, Cappariaceae, Tiliaceae, Leguminosae (Papilionoideae, Caesalpinoideae and Mimosoideae), Cucurbitaceae and Apiaceae.

Unit- III : Taxonomy

Rubiaceae, Asteraceae (Compositae), Apocyanaceae, Asclepiadaceae, Solanaceae, Convolvulaceae, Acanthaceae, Verbenaceae, Amaranthaceae, Euphorbiaceae, Orchidaceae, Liliaceae and Gramineae (Poaceae).

Unit- IV : Economic Botany

A brief study of the following Economic plants and their main economically important products

- (i) Food – cereals (Oryza), Millets (Pearl millet), Pulses (Black gram), Edible Oil (Sesame), Root tubers – (Manihot, Sugar beet), Sugar – (Saccharum),
- (ii) Fibres – Textiles (*Gossypium*) others (*Crotalaria*, Agave)
- (iii) Medicinal - *Withania somnifera*, *Ocimum*, *Phyllanthus*, *Solanum trilobatum*
- (iv) Forest products – Timber (Teak), Tannins, Gums, Resins (Terpentine)

Unit- V : Plant Ecology and Phytogeography

General Ecology – Approaches to the study of Ecology, Autecology, Synecology.- Climatic- edaphic and Biotic factors – Ecosystems, Forest ,Grassland, Marine and Desert ecosystems. Ecological classification of plants- Morphological and Anatomical features (Hydrophytes and Xerophytes). Forest conservation- afforestation – rare, endangered, endemic and threatened species. Vegetational types of India, phytogeographic zones and biodiversity regions in India.

REFERENCES

TAXONOMY

1. Lawrence, G.H.M. (1953) : Taxonomy of Vascular Plants Oxford & IBH Publishers, New Delhi, Calcutta-823pp.,
2. Ramaswami, S.N., S.Lakshminarayana & V.Venkateswaralu (1976) : Taxonomy (Systematic Botany) for degree course Maruthi Book Depot, Guntur, Hyderabad – 312pp.,
3. Narayanaswamy, R.V. & Rao, K.N. (1976) : Outlines of botany S. Viswanathan Printers & Publishers, Chennai-31-983 pp.,
4. Singh, V. & D.K. Singh (1983) : Taxonomy of angiosperms Rastogi Publications, Meerut, India-564pp.,
5. Pandey, B.P. (1997) : Taxonomy of Angiosperms S. Chand & Co., (P)Ltd., New Delhi-600pp.,
6. Mathews, K.M. (1987-90) : Flora of TamilNadu & Carnatic (1-4vols.) Rapinat Herbarium, Trichy.

ECONOMIC BOTANY

1. Hill.,A.W. (1952) : Economic Botany McGraw Hill Book Co., New York. Pp.,
2. Verma, V. (1974) : A Text Book of Economic Botany Emkay Publications, New Delhi 236pp.,
3. Sambamurthy, A.V.V.S. & Subrahmanyam, N.S. (1989) : A Text Book of Economic Botany Wiley Eastern Ltd., New Delhi, Bangalore, Bombay, Calcutta, Guwahati, Hyderabad, Lucknow, Madras, Pune-875pp.,
4. Pandey, B.P. (2000) : Economic Botany S. Chand & Co., New Delhi-534pp.,

PLANT ECOLOGY

1. Odum E.P. (1971) : Fundamentals of Ecology (2nd Edn.) Saunders & Co., Philadelphia & Natraj Publishers, Dehradun –574pp.,
2. Verma, P.S. & Agarwal, V.K.. (1999) : Concept of Ecology (Environmental Biology) S. Chand & Co., New Delhi-264pp.,
3. Sharma, P.D. (2000) : Ecology & Environment Rastogi Publications, Meerut, India-7=653pp.,
4. Sundaram, R. (1972) : Thaavara Chuyach Choozhnilai yiyal. Tamilnadu Text Book Society-283pp.,
5. Chandrasekaran, P. (1996) : Chutruch choozhal Maasupadu (Environmental Pollution) T.K. Printers, Pudukkottai, Tamilnadu-417pp.,

PHYTOGEOGRAPHY

1. Mani, M.S (1974) : Ecology & Biogeography of India Dr. W. Junk Publishers, The Haque Good, R. (1997) : The Geography of flowering Plants (2nd Edn.) Longmans, Green & Co., Inc., London & Allied Science Publishers, New Delhi-495pp.,

Core Paper- VII

Plant Physiology, Biochemistry and Biophysics

Unit- I : Plant Physiology

Water relation: significance, - osmotic and non-osmotic uptake of water. Ascent of sap-cohesion theory: root pressure, transpiration, physiology of stomatal action- Translocation of solutes and assimilates. Mass flow, - Membrane permeability, mineral uptake: Passive and active. Role of major and Minor elements, mineral deficiency symptoms.

Unit- II : Plant Physiology

Photosynthesis: Absorption spectrum, Action spectrum, role of pigments enhancement effect, photosystems I & II. Photosynthetic electron transport, Photophosphorylation, Carbon Assimilation: Calvin cycle- Hatch & Slack pathway, CAM pathway- Respiration: respiratory substrates. Aerobic and anaerobic. Glycolysis. Krebs's cycle and oxidative phosphorylation, energetics of respiration.

Unit- III : Plant Physiology

Plant Growth: growth regulatory substances; auxins, kinetins, gibberellins, abscissic acid ethylene and their function. Role of hormones in flowering, senescence and abscission- Photoperiodism, phytochrome-vernalization.

Unit- IV : Biochemistry

- Enzymes: Nature and properties. Mechanism of enzyme action-factors affecting enzyme action, substrate concentration – inhibitors, cofactors. Protein Synthesis. Classification, Structure and functions of carbohydrates, lipids, Proteins: secondary plant products – alkaloids, flavonoids and terpenoids.

Unit- V : Biophysics

Biophysics-physical forces and chemical bonds, light diffraction-biological effect of ionising radiations- basic principles of spectroscopy- Laws of Thermodynamics and entropy-electron transfer processes. - Definition and determination of pH - Buffers and electrolytes and their functions - Fractionation of biological materials by chromatography - Centrifugation.

REFERENCES

PLANT PHYSIOLOGY

1. Devlin, R.M. (1969) : Plant Physiology Holt, Rinehart & Winston & Affiliated East West Press (P) Ltd., New Delhi -
2. Noggle, R. & Fritz (1989) : Introductory Plant Physiology Prentice Hall of India.
3. Dulsy Fatima, R.P. et. al (1994) : Elements of Biochemistry Saras Publications, Nagercoil, Tamilnadu
4. Jain, V.K. (1990) : Fundamentals of Plant Physiology S. Chand & Co., New Delhi
5. Pandey, S.N. (1991) : Plant Physiology Vikas Publishing House (P) Ltd., New Delhi India
6. Verma, S.K. (1999) : A Text –Book of Plant Physiology S. Chand & Co.,New Delhi
7. Verma, V. (2001) : A Text Book of Plant Physiology Emkay Publications, New Delhi

BIOCHEMISTRY

1. Lehninger, A.L. (1984) : Biochemistry (2nd Edition) Kalyani Publishers, Ludhiana, New Delhi
2. Jayaraman, J. (1981) : Laboratory Manual of Biochemistry Wiley Eastern Ltd., New Delhi
3. Jain, J.L. (1998) : Fundamentals of Biochemistry S. Chand & Co., New Delhi
4. Day, P.M. & Harborne, J.B.(Eds.,) (2000) : Plant Biochemistry Harcourt Asia (P) Ltd., India & Academic Press Singapore.

BIOPHYSICS

1. Narayanan, P. (2000) : Essentials of Biophysics New Age International Publishers(P)ltd., New Delhi Bangalore, Calcutta, Chennai, Guwahati, Hyderabad, Lucknow, Mumbai
2. Annie & Arumugam, N. (2000) : Biochemistry & Biophysics Saras Publications, Nagercoil, Tamilnadu,
3. Salil Bose, S. 1982 Elementary Biophysics, Vijaya Printers, Madurai

ELECTIVE PAPER - HORTICULTURE

UNIT- I : Horticulture-Importance and scope of Horticulture - Classifications of horticultural crops- fruits, vegetable crops, climate, soil, water nutritional needs of horticultural crops.

UNIT- II : Plant propagation methods, cutting, layering, grafting, budding, stock-scion relationship. Use of plant growth regulators in horticulture.

UNIT- III :Garden designs, types of gardens – formal, informal and kitchen gardens, units of garden, hedge, border, topiary, arches and lawn maintenance.

UNIT- IV : Floriculture, cultivation of commercial flowers- rose and jasmines. Cultivation of important fruit trees- Mango and Banana.

UNIT- V : Green house,Indoor gardening – Bonsai- flower arrangements- nursery management and maintenance.

Text Books

1. K. Manibushan Rao (1991), Text book of Horticulture M.C. Millan Publishers

Reference Books :

1.Introduction to Horticulture - N. Kumar (1986), Rajalakshmi Publishers

2.Breeding Asian Fields Crops - J.M. Pochiman & d. Borthakur.

3. Introduction to Cytogenesis and plant breeding - D.D. Sundaraj & G.Tulasidas

ELECTIVE PAPER - MICROBIOLOGY

Unit- I :

History of Microbiology – Classification of Microbes, Prokaryotic and Eukaryotic. General characteristics of Bacteria, Fungi, Viruses, Protozoa, Mycoplasma, Virioids and Prions.

Unit- II :

Morphology, Growth, Reproduction and Economic importance of Bacteria. Brief study of Arche bacteria, Eubacteria and Cyanobacteria.

Unit- III :

Culture of Microorganisms, Types of media, Pure culture techniques. Continuous culture-Fermentor types and fermentation techniques.

Unit- IV :

Microbes and their role in Industries- production of Acetic Acid, Ethanol, Penicillin, Glutamic acid, Amylase, SCP and Bio fertilizers.

Unit- V :

Disease cycle and Disease development, Host Parasite Interaction, Study of Air borne, Water borne and Soil borne diseases. AIDS, SARS and AVIAN flu- control measures.

REFERENCES

Microbiology

1. Dubey, R.C. and Maheshwari, D.K. (2007). A Textbook of Microbiology S. Chand and Co. Ltd., New Delhi.
2. Pelczar, M.J. Chan, E.C.S. and Krieg, N.R. (1993) . Microbiology. Tata McGraw Hill Publishing Co. Ltd., New Delhi
3. Power and Dagainwala (1994). General Microbiology. Himalayan Publishing House, Bombay.
4. Sharma, P.D. (1992). Microbiology. Rastogi & Co., Meerut.
5. Staley, J.T. et. al. (1991). Bergey's Manual of Systematic Bacteriology. Vol.I to IV. Williams & Wilkins, London.

ELECTIVE PAPER - HERBAL BOTANY

UNIT - I : History of herbal medicine – Classification of medicinal plants and their types
- Indian system of medicine - Siddha, Ayurvedha and Unani Systems.

UNIT- II : Phytotoxins - types - mode of action - list of toxin rich plants - and their toxicity (*Nux-vomica, Opium, Abrus, Nicotiana*)

UNIT- III: Botanical description and active principles in parts of herbal plants :
Leaves - *Murraya, Mint, Solanum nigrum* ; **Flower-** *Hybanthes, Clove*; **Fruits;** *Annona, Guava*; **Seeds** - Kadukkai, Thondrikkai ; **plant as a whole:** *Centella, Andrographis paniculata*; **Root** – *Withania somnifera*

UNIT- IV: Natural drugs - Chemistry and features of *Aloe, Atropa, Acorus calamus, Alpinia* and *Cinchona*.

UNIT- V : Method of drug action - Central nervous system - drug used in disorders of Gastro - intestinal tracts- Cardio vascular diseases, Urogenital systems and Psycho – active plants.

Text Books :

1. Jain, 2001 Medicinal plants. National Book Trust, New Delhi

References :

1. Gokhale S.M., M.C.K. Kokate and A.P. Purohit Pharmagonosy, Nirali Prakashan
2. Agarwal, 1985. Drug plants in India, Kalyani Publishers, Ludhiyana
3. Bhattacharya, S.K. 1988 Hand book of medicinal plants. Pointer publishers, jaipur.
4. Acharya Vipul Rao – Herbs- that heal Diamond Pocket Books Pvt. Ltd., New Delhi
5. An introduction to Medicinal Botany and Pharmacognosy – N. C. Kumar, Emkay Publications, New delhi, 2004.
6. Indian Medicinal Plants (Vol. I – V) K. R. Kirtikar and B. D. Basu 1975.

Core Paper VIII – Practical III

(Papers covering V & VI)

Cell Biology

A study of Cell structure in Plants and its organelles using electron micrographs from standard publications. Study of mitosis and meiosis using squash and smear Technique.

Genetics

Problems on simple Monohybrid and Dihybrid ratios. Simple Problems on interaction of factors included in the theory.

Morphology, Taxonomy and Economic Botany

Training in dissection, observation, identification and sketching on floral parts of plants belonging to the families mentioned in the syllabus. Description of plants using technical terms. Field visit to local area and submission of 25 Herbarium specimens.

Economic plants covered in theory part in taxonomy and economic botany.

Plant Ecology and Photogeography

Study of morphological and anatomical features of hydrophytes and xerophytes.

Study of morphological features of epiphytes, parasites and halophytes.

Study of vegetation by quadrat and line transect methods

Determination of soil and water pH

Analysis of soil and water to detect the amount of dissolved salts in the given sample

The light and dark bottle experiment for primary productivity study

Retentivity, absorption and capillarity of soil

Core Paper IX - Practical IV

(Paper covering VII)

Plant Physiology, Biochemistry and Biophysics

For demonstration only

1. Enzyme activity using amylase.
2. Colorimeter – Operation and working principle
3. pH meter - Operation and working principle
4. Centrifuge - Operation and working principle

To be performed by each student.

1. Colorimetric estimation of sugars
2. Colorimetric estimation of Starch
3. Determination of osmotic pressure of onion/Rhoeo leaf.
4. Effect of light intensity on transpiration using Ganong's potometer.
5. Determination of stomatal frequency and estimation of transpiration rate.
6. Determination of absorption and transpiration ratio of twigs.
7. Measurement of respiration rate using germinating seeds and flower buds with simple respiroscope.
8. Separation of plant pigments by paper chromatography.
9. Determination of photosynthetic rate in water plants under different CO₂ concentrations.
10. Measurement of oxygen evolution under different coloured lights using Wilmott's bubbler.
