



**BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024.**

**B.Sc. Botany – Course Structure under CBCS**

(For the candidates admitted from the academic year 2010-2011 onwards)

Semester	Part	Course	Title	Instu Hours/Week	Credit	Exam Hours	Marks		Total	
							Int.	Extn.		
I	I	Language Course – I (LC) – Tamil*/Other Languages ** #		6	3	3	25	75	100	
	II	English Language Course- I (ELC)		6	3	3	25	75	100	
	III		Core Course – I (CC)	Algae & Bryophytes	5	5	3	25	75	100
			Core Course – II (CC)	Practical I-Covering the Core Courses I & III	3	-	***	-	-	-
			Core Course – III (CC)	Fungi, Lichens, Plant Pathology & Plant Protection	2	-	***	-	-	-
			First Allied Course –I (AC)	---	5	4	3	25	75	100
			First Allied Course – II (AC)	Practical	3	-	***	-	-	-
				30	15				400	
II	I	Language Course – II (LC) -- Tamil*/Other Languages ** #		6	3	3	25	75	100	
	II		English Language Course–II (ELC)	6	3	3	25	75	100	
			Core Course – II (CC)	Practical I-Covering the Core Courses I & III	3	4	3	40	60	100
	III		Core Course – III (CC)	Fungi, Lichens, Plant Pathology & Plant Protection	3	5	3	25	75	100
			First Allied Course – II (AC)	Practical	2	2	3	40	60	100
			First Allied Course – III (AC)	--	5	4	3	25	75	100
	IV	Environmental Studies		3	2	3	25	75	100	
IV	Value Education		2	2	3	25	75	100		
				30	25				800	
III	I	Language Course – III (LC) – Tamil*/Other Languages ** #		6	3	3	25	75	100	
	II	English Language Course- III (ELC)		6	3	3	25	75	100	
	III		Core Course – IV (CC)	Pteridophytes, Gymnosperms & Paleobotany	6	5	3	25	75	100
			Core Course – V (CC)	Practical II–Covering the Core Courses IV & VI	3	-	***	-	-	-
			Second Allied Course – I	.	5	4	3	25	75	100
			Second Allied Course – II	Practical	2	-	***	-	-	-
	IV	Non Major Elective I - for those who studied Tamil under Part I a) Basic Tamil for other language students b) Special Tamil for those who studied Tamil upto +2 but opt for other languages in degree programme	Biofertilizers & Biopesticides	2	2	3	25	75	100	
				30	17				500	

IV	I	Language Course –IV (LC) - Tamil*/Other Languages ** #		6	3	3	25	75	100	
	II	English Language Course – IV (ELC)		6	3	3	25	75	100	
	III	Core Course – V (CC)	Practical II–Covering the Core Courses IV & VI		2	3	3	40	60	100
		Core Course – VI (CC)	Anatomy, & Embryology		5	5	3	25	75	100
		Second Allied Course - II	Practical		2	2	3	40	60	100
		Second Allied Course - III			5	4	3	25	75	100
	IV	Non Major Elective II - for those who studied Tamil under Part I a) Basic Tamil for other language students b) Special Tamil for those who studied Tamil upto +2 but opt for other languages in degree programme	Horticulture		2	2	3	25	75	100
IV	Skill Based Elective I			2	4	3	25	75	100	
				30	26				800	
V	III	Core Course – VII (CC)	Cell and Molecular Biology		5	5	3	25	75	100
		Core Course – VIII (CC)	Genetics & Evolution		5	5	3	25	75	100
		Core Course – IX (CC)	Morphology, Taxonomy & Economic Botany		5	5	3	25	75	100
		Core Course – X (CC)	Practical III covering the core courses VII, VIII & IX		6	4	3	40	60	100
		Major based Elective – I	Medical Botany		5	5	3	25	75	100
	IV	Skill based Elective –II			2	4	3	25	75	100
		Skill based Elective – III			2	4	3	25	75	100
				30	32				700	
VI	III	Core Course – XI (CC)	Plant Physiology, Biochemistry & Biophysics		6	5	3	25	75	100
		Core Course – XII (CC)	Plant Ecology and Phytogeography		6	5	3	25	75	100
		Core Course – XIII (CC)	Practical IV – Covering the Core Courses XI & XII		6	4	3	40	60	100
		Major based Elective II	Biostatistics and Computer Applications in Botany		6	5	3	25	75	100
		Major based Elective III	Biotechnology		5	4	3	25	75	100
V	Extension activities			-	1	-	-	-	-	
	Gender Studies			1	1	3	25	75	100	
				30	25				600	
		Total		180	140				3800	

**Note:**

- |              | Internal Marks | External Marks |
|--------------|----------------|----------------|
| 1. Theory    | 25             | 75             |
| 2. Practical | 40             | 60             |
3. Separate passing minimum is prescribed for Internal and External marks

The passing minimum for CIA shall be 40% out of 25 marks [i.e. 10 marks]

The passing minimum for University Examinations shall be 40% out of 75 marks [ i.e. 30 marks]

\* for those who studied Tamil upto +2 (Regular Stream)

\*\* Syllabus for other Languages should be on par with Tamil at Degree level

# those who studied Tamil upto 10<sup>th</sup> or +2, but opt for other languages in degree level under Part I should study special Tamil in Part IV

\*\*\* Examination at the end of the next semester.

Extension activities shall be out side the instruction hours.

### List of Allied Courses

#### Group – I (Any one)

1. Zoology
2. Geology

#### Group – II (Any one)

1. Chemistry
2. Plant Geography

செய்முறை பாடங்கள் உள்ள இயைபுப் பாடங்களுக்கு (4+2+4) தரபுள்ளிகள்

செய்முறை பாடங்கள் இல்லாத இயைபுப் பாடங்களுக்கு(3+3+4) தரபுள்ளிகள்

#### Note :

1. Either group of Allied Courses may be offered in the first year / second year for all the UG courses.
2. As a part of Botany Degree Course every student shall undertake a tour and Field study of Vegetation under the guidance of the staff for not less than (FIVE DAYS within the state) in the III year and submit a minimum number of 25Herbarium sheets. Students shall submit duly certified record of their practical Work for all the practical examinations and those who do not submit the record shall not be permitted to the concerned practical examination.

The IA components for the practicals are skill – 10 marks, Test 2 x 10 = 20 Marks, Observation – 10 marks [for Taxonomy practicals Herbarium marks to be included in the IA component in the place of skill Marks]

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## CC – I - ALGAE & BRYOPHYTES

### Theory:-

#### Unit I

Algae - General characteristics of the various divisions of algae (F.E. Fritsch) Habit and habitats of Freshwater, Marine and Soil algae. Economic Importance(Human relevance ) of algae.

#### Unit II

Vegetative forms, size, cell structure, pigmentation, food reserves, methods of reproduction of the following genera mentioned in the following units:- Oscillatoria, Chlamydomonas, Volvox, Chlorella, Cladophora, Oedogonium, Cosmarium, Caulerpa & Diatoms.

#### Unit III

Vaucheria, Ectocarpus, Dictyota, Polysiphonia & Gracilaria.

#### Unit IV

Bryophytes:- General Characteristics, Classification, Morphology, Structure, reproduction of the main classes of Bryophytes.

#### Unit V

A detailed study of the following genera:- Riccia, Porella, Anthoceros & Polytrichum.

### REFERENCES

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Vol. I-791 pp., Vol. II-939 pp.,
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McGraw-Hill Book Co., New York ix +546pp.,
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Hutchinson, London. 189 pp.,
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Edward Arnold, London-278 pp.,
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- H.D. Kumar &  
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216 pp.,
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- Wynne, M.J. (1978) : Introduction to the Algae: Structure & Reproduction  
Prentice Hall of India, New Delhi, 706 pp.,
- Vashista, B.R. (1988) : Botany for degree students-Algae.  
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- H.D. Kumar (1989) : Algal Cell Biology  
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Hyderabad, Bangalore, -386pp.,
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(In Tamil ) Tamilnadu Text Books society, Madras –pp.,
- Rangarajan, R. ( ) : “Indiyavin Kadalvazh algakkal” (In Tamil)  
(In Tamil)Tamilnadu Text Books society, Madras – pp.,
- Prema  
Santhanakrishnan (1973) : Indiyakkadalvazh algakkal” (Marine Algae of India)  
(In Tamil)Tamilnadu Text Books society, Madras-384pp.
- V.S. Sundaralingam (1978) : “Thallophyta”(In Tamil)  
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- Bilgrami, K.S., &  
L.C. Saha (1996) : A text Book of Algae  
CBS Publishers & Distributors (P) Ltd., New Delhi  
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- Kumaresan, V. (1997) : Algae & Bryophytes  
Saras Publications, Nagercoil, India-399+154 pp.,
- Annie Ragland (1998-99) : Algae & Bryophytes  
Saras publications, Nagercoil., 184 pp.,

## **BRYOPHYTES**

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New Phytologist, Indian Reprint. Pp.,

- Smith, G.M. (1955) : Cryptogamic Botany Vol. II. (2<sup>nd</sup> Edition)  
(Bryophytes & Pteridophytes)  
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Rajeeva Prakashan, Meerut, India-288pp.,
- Jeyaraman (1978) : “Indiyavin liverwortugal” (In Tamil)  
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- Vashista, B.R. (1983) : Botany for Degree students-Bryophyta  
S.Chand & Co., New Delhi-392pp.,
- Chopra, R.N. & Kumara, P.K. (1988) : Biology of Bryophytes  
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Calcutta, Hyderabad, Madras-340 pp.,
- Palaniyappan, S. (1988) : Bryophyta ( In Tamil)  
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Pradeep Prakashan, Meerut-India-215 pp.,
- Rashid, A. (1998) : An Introduction to Bryophyta  
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Allied Printers (P) Ltd., New Delhi, Mumbai, Calcutta,  
Lucknow, Chennai, Nagpur, Bangalore, Hyderabad,  
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- Chopra, R.N. & P.K. Kumara (1988) : Biology of Bryophytes  
Wiley Eastern Ltd., New Delhi, Bangalore, Bombay,  
Calcutta, Hyderabad, Madras – 320pp.,

**Practical for Core Course I :** A study of both vegetative and reproductive structures(whenever available) of Genera included in the theory.

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## **CC –II – Practical I – Covering the Core Courses I & III**

- 1) To make suitable micro preparations of the type studied.
- 2) To identify microslides and specimens relevant to the syllabus
- 3) To maintain a record notebook
- 4) To make local field strips

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## CC – III – Fungi, Lichens, Plant Pathology & Plant Protection

### Theory:

**Unit 1. Fungi** – A study of the General Characteristics and mode of life of main classes of Fungi (C, J Alexopoulos). Methods of isolation and culture of fungi. Economic importance of fungi.

**Unit – 2.** A study of the structure and reproduction in the following genera of the following units – *Plasmodiophora*, *albugo*, *Penicillium*, *Peziza*.

**Unit – 3.** *Polyporus*, *Puccinia*, *fusarium*, *Mycorrhiza*.

**Unit – 4. Lichens** – occurrence, classification, structure, reproduction and uses of lichens. Type – *Usnea*.

### Plant Pathology

Mycoplasma – Little leaf of Brinjal

Virus – Tobacco Mosaic Virus.

Bacteria – Citrus canker.

Fungus – Red rot of sugarcane – Tikka disease of Groundnut, Blast disease of paddy

**Unit 5. Plant Protection.** Methods of protection- Cultural practices – Physical, Chemical & Biological controls and quarantine methods. Methods of application of fungicides and pesticides. Toxic hazards of pesticides – Plant protection appliances – seed protection.

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#### FUNGI

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- Elizabeth Moore -  
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John Wiley & Sons., Inc.,  
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Cambridge University Press –669 pp.,

Srivastava, J.P. (19 ) : Introduction to fungi  
Central Book Depot, Allahabad, India - pp.,

Chopra, G.L. (19 ) : A text Book of Fungi (14<sup>th</sup> Edition)  
S. Nagin & Co., Meerut, India pp.,

Sharma, O.P. (19 ) : Text Book of Fungi  
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## **PLANT PATHOLOGY**

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Tamilnadu Text Book Society, Chennai, India.201pp.,

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Microbiology & Bryophyta  
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### **PLANT PROTECTION**

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Lucknow-550pp.,
- Chattopadhyay, S.B.(1991) : Principles & Procedures of Plant Protection (3<sup>rd</sup> Edition)  
Oxford & IBH Publishing cosec<sup>2</sup>θ .,(P)Ltd., New Delhi,  
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Bharati Bhawan, patna, India-324pp.,

**Practical for Core Course III** : A study of vegetative & reproductive structures of  
Genera included in the theory.

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## **CORE COURSE IV PTERIDOPHYTES, GYMNOSPERMS & PALEOBOTANY**

### **Unit I**

Pteridophytes -general characteristics and classification by Smith, morphology, structure, Reproduction and life-histories of the following genera:- Psilotum, Lycopodium, Selaginella and Equisetum.

### **Unit II**

Adiantum, Marsilea, Stelar evolution in Pteridophytes. Heterospory and origin of seed habit.

### **Unit III**

Gymnosperms- general characteristics and classification of Gymnosperms by Sporne, Morphology, structure and mode of reproduction and life- histories of the following:- Cycas, Pinus and Gnetum.

### **Unit - IV**

Paleobotany- fossils and methods of fossilization- Geological time-scale-an elementary knowledge of the computation of the age of fossils-Radio-Carbon dating.

### **Unit - V**

A brief study of the following fossil forms:- Rhynia, Lepidodendron, Lepidocarpon, Calamites & Williamsonia.

## **REFERENCES**

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Cambridge University Press, Cambridge, London, N.Y.,  
New Rochelle, Melbourne, Sydney
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(A Birbal Sahni Birth Centenary Tribute)  
Birbal Sahni Institute of Paleobotany, Lucknow, India

### **Practical :**

A study of the Morphology and anatomy of both vegetative and reproductive parts of the living genera and fossil forms of the following Genera.

### **PTERIDOPHYTES**

- Psilotum - Demonstration only  
Lycopodium - Stem and Cone only  
Selaginella - "  
Equisetum - Stem, cone slide Demonstration only  
Adiantum - Rachis, Sorus  
Marsilea - Stem, Sporocarp slides

### **GYMNOSPERMS**

- Cycas - Rachis, Leaflet – TS; Coralloid root, male cone microsporophyll,  
Megasporephyll – Demonstration only  
Pinus - Needle –TS, Young stem – TS;  
Male & Female cone – Demonstration only  
Gnetum - Stem –TS ,,  
Male & Female Strobilus – Demonstration only

### **PALEOBOTANY**

Rhynia, Lepidodendron, Lepidocarpon, Calamites (Slides), Williamsonia

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## **NON MAJOR ELECTIVE I - BIOFERTILIZERS AND BIOPESTICIDES**

### **Unit I**

Biofertilizers – Definition, kinds of microbes as biofertilizers, Rhizobium-legume Symbiotic association – mass cultivation and carrier materials.

### **Unit II**

Cultural method of Azospirillum, Azotobacter, Azolla and anabaena, carrier materials.

### **Unit III**

Mycorrhiza - VAM association, types, isolation and inoculum production.

### **Unit IV**

Pesticides – Introduction – Biological Magnification concept. Biopesticides – Viral origin, fungal origin

### **Unit V**

Biopesticides – Bacterial origin , Bacillus thuringiensis mechanism of action and application. Advantages of Biopesticides and Commercialization

### **Reference:**

1. Subba Rao, N.S. 2000 Soil Microbiology. Oxford and IBH Publishing Co. Ltd.
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## CC V – PRACTICAL II – COVERING THE CORE COURSES IV & VI

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### CC – VI – ANATOMY AND EMBRYOLOGY

#### Unit I

Anatomy-Plant tissue- classification, Meristems, definition, differentiation, redifferentiation and dedifferentiation.

Classification of meristems- apical meristems and lateral meristems intercalary meristem, various Concepts of apical meristem theories, apical cell theory, Tunica – Carpus and Histogen theory

Permanent tissue – simple - Paerenchyma, collenchyma and sclerenchyma, Laticifers, Xylem and phloem.

Epidermal tissue system, stomatal types.

#### Unit II

Epidermal Tissue system, stomatal types, complex permanent tissue: Xylem – Components, Ontogeny and Phylogeny; Phloem – Components, Ontogeny and Phylogeny. Laticifer types.

#### Unit - III

Primary structure of root, stem and leaf in dicots and monocots. Secondary growth - normal in stem and root-annual rings – heart Wood, sapwood,

Periderm formation

Anomalous secondary growth in dicot stems-Eg., Nyctanthes and Boerhaavia and monocot stem-Dracaena.

Nodal anatomy uni-and trilacunar types.

#### Unit IV

Embryology- Development of anther;. Microsporogenesis; Microgametogenesis; Ultrastructure of pollen wall-structure and development of ovule, megasporogenesis, Megagametogenesis (Polygonum-type of embryo-sac development), Fertilization.

#### Unit V

Endosperm-Nuclear, cellular and helobial and Ruminant types. Development of embryo – dicot and Monocot.

Basic concepts of apomixis, apospory, Polyembryony and Parthenogenesis

### REFERENCES

#### ANATOMY

Foster, A.S. (1960) : Practical Plant anatomy

- Esau, K. (1965) : Vascular Differentiation in Plants.  
Holt, Rinehart & Winston, N.Y., Chicago,  
San Francisco, Toronto, London
- Vasishta, P.C. (1977) : A Text Book of Plant Anatomy  
S. Nagin & Co., Jullunder & New Delhi-460pp.,
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Plant Anatomy Part II: Experiements &  
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Tamilnadu Text Book society, Chennai, India,
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Rastogi Publications, Meerut, India
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- Fahn, A. (1997) : Plant Anatomy  
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## **EMBRYOLOGY**

- Maheswari, P. (1963) : Recent Advances in the Embryology of Angiosperms  
(Ed., ) International Society of Plant Morphologists-  
University of Delhi
- Swamy. B.G.L. &  
Krishnamoorthy. K.V. (1980) : From flower to fruit  
Tata McGraw Hill Publishing Co., Ltd., New Delhi.



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Springer –Verlag, Heidelberg & Narosa  
Publishing House, New Delhi
- Verghese, T.M. (1984) : An Introduction to Experimental & Applied  
Embryology of Angiosperms  
Oxford & IBH publishing cosec<sup>2</sup>θ, New Delhi,  
Bombay, Calcutta
- Maheswari, P. (1985) : An Introduction to the Embryology of Angiosperms  
Tata McGraw Hill Publishing Co.,Ltd., New Delhi-
- Raghavan, V. (1986) : Embryogenesis in Angiosperms  
(A developmental and experimental study)  
Cambridge University Press, Cambridge, London,  
N.Y.,New
- Dwivedi, J.N. (1988) : Embryology of Angiosperms  
Rastogi & Co., Meerut, India
- Muneeswaran, A. (1990) : Angiosperm Embryology  
Titan Books, Madurai, India
- Bhojwani, S.S. &  
Bhatnagar, S.P. (2000) : The Embryology of Angiosperms (4<sup>th</sup> Edition)  
Vikas Publishing House(P)Ltd., UBS  
Publisher's Distributors, New Delhi
- Annie Regland (2000) : Developmental botany(Embryology of Angiosperms)  
Saras Publications, Nagercoil, Tamilnadu, India

### **Practical :**

Anatomy: Preparation of Transverse sections of the following plant parts to observe and record the internal structure. Monocot and Dicot stem, and leaf (Primary structure), normal secondary thickening in dicot stem and root. . Anamalous secondary thickening in Dracaena, Nyctanthes and Boerhaavia stems. Nodal anatomy-uni-& trilacunar.

Embryology: T.S. of anther (young and mature) at various stages of development. Pollen types L.S.

Of ovule, Types of ovules-orthotropous and Anatropous. Embryo genesis, Embryo Dissection.

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## **NON MAJOR ELECTIVE II – HORTICULTURE**

### **Unit I**

Horticulture :- Importance and scope of Horticulture, Classification of horticultural crops – fruits, vegetables crops, climate, soil, water, nutrition needs of horticultural crops,

### **Unit 2**

Plant propagation methods, cutting, layering, grafting, budding, stock-seion relationship. Use of plant regulators in horticulture .

### **Unit 3**

Garden designs, types of gardens – formal, informal and kitchen garden, units of garden, hedge, border, pojiary arches and lawn maintenance. –

### **Unit 4**

Floriculture, cultivation of commercial flowers – rose and jasmnes . Cultivation of important fruit trees – Mangoes and Banana.

### **Unit 5**

Green house, Indoor gardening – Bonsai – flower arrangements – nursery management and maintenance

## **REFERENCES**

- Bose, T.K. & Mukherjee, D. (1972) : Gardening in India  
Oxford & IBH Publishing Co., Kolkatta, Mumbai,  
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- Sandhu, M.K. (1989) : plant Propagation  
Wiley Eastern Ltd.,New Delhi, Bangalore, Bombay,  
Calcutta, Madras, Hyderabad, Pune-287pp.,
- Lex Lauries & Victor H. Rice- (1950) : Floriculture – fundamental and practices.  
McGraw Hill Publishers, N.Y.
- Kumar , N. (1997) : Introduction to Horticulture  
Rajalakshmi Publications, Nagercoil, India-  
(28 Chapters & approx. 300pages)
- Naik ( ) South Indian Fruits and their culture  
Vardhachary & Co., Madras.
- Edmond Musser & Andres ( ) : Fundamentals of Horticulture  
McGraw Hill Book Co.,
- Gardener ( ) : Basic Horticulture

Mac Millan, N.Y.

Randhawa ( ) : Ornamental Horticulture in India  
Today & Tomorrow Publishers, New Delhi

Sundararajan, J.S.  
Muthuswamy, J. ( ) : A guide to horticulture  
Shanmugavelu, K.G.  
Balakrishnan, R. Thiruvankadam Printers, Coimbatore.

## CC VII – CELL AND MOLECULAR BIOLOGY

### Unit I

Structure of Prokaryotic and eukaryotic cells – Ultra structure of cell organelles – Plastids, Mitochondria, Golgi body, ER microbodies – peroxisomes and glyoxysomes – Lysosome – Ultra structure and functions of plasma membrane

### Unit II

Nucleus – Nucleolus – Structure of euchromatin and heterochromatin, Special types of chromosomes – Lamp brush chromosome and polytene chromosome – mitosis, meiosis, Cell cycle and stages – Protein synthesis – an overview

### Unit III

Genetic material – Properties and replication of genetic material – Structure – Hershey & Chase experiment. C-value paradox – organization of DNA sequences – Satellite DNA, repetitive DNA sequences

### Unit IV

Bacterial genome: Transcription and its control in prokaryotes, initiation, elongation and termination. DNA supercoiling (positive and negative) gene regulation in prokaryote & Eukaryotes

### Unit V

Chloroplast and mitochondrial genome – Semi autonomous organization, Receptors, Signal transduction pathway protein phosphorylation

### Practical for Cell and Molecular Biology

1. Observation of plant cells in the onion peeling and Taro leaf
2. Non-living inclusions: Raphides, cystolith and Starch grains
3. Cell division: Mitosis and Meiosis – Squash technique in onion root tips and Tradescantia / Taro flower bud respectively
4. Isolation of cell organelles through differential centrifugation
5. photographs: Ultra Structure

### Books for Study:

1. Sharma N.S. 2005, Molecular Cell Biology, International Book distributors, Dehradun
2. Verma P.S. and Agarwal V.K. 1986, Cell Biology and Molecular Biology (Cytology) S. Chand and Company, New Delhi

### Books for Reference:

1. Old, R.W. and Primrose S.B. 1994, Principles of Gene Manipulation Blackwell Science, London
2. Grierson, D. and Convey S.N. 1989, Plant Molecular Biology, Blackie Publishers, New York
3. Lea, P.J. and Leegood R.C. 1999, Plant Biochemistry and Molecular Biology, John Wiley and Sons, London
4. Power C.B., 1984, Cell Biology, Himalaya Publishing Co. Mumbai
5. De Robertis and De Robertis, 1998, Cell and Molecular Biology, K.M. Verghese and Company

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## CC – VIII- GENETICS & EVOLUTION

### Unit I

Genetics-Monohybrid and Dihybrid Ratios(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 II

Linkage, crossing over, recombination, cytological proof of crossing over, mapping of genes on the chromosomes, sex linkage-Drosophila (eye colour) and humans(colour blindness), cytoplasmic inheritance.

### Unit III

Sex determination in Drosophila, humans and plants – changes in chromosome structure, number and behaviour, their genetic effects, polyploidy, types.

### Unit IV

Biochemical genetics of Neurospora, Gene action. Gene units-cistron, recon, Muton, codon and operon. Gene mutation, physical and chemical mutagens. Mutation rate –its role in evolution.

### Unit V

Evolution-Evolutionary concepts in explaining the diversity of life. Theories of Lamarck, Charles Darwin, and the modern synthetic theories.

## REFERENCES

### GENETICS

- Sinnott, E.W.,  
L.C. Dunn &  
J. Dobshansky (1958) : Principles of Genetics(5<sup>th</sup> Edition)  
McGraw Hill Publishing Co., N.Y. Toronto,  
London-459pp.,
- Winchester, A.M. (1958) : Genetics(3<sup>rd</sup> Edition)  
Oxford & IBH Publishing House, Calcutta, Bombay,  
New Delhi-504pp.,
- Singleton, R. (1963) : Elementary Genetics  
D. Van Nostrand Co., Ltd., Inc., N.Y. & Affiliated  
East West Press (P) Ltd., New Delhi-482pp.,
- Chandrasekaran, S.N. &  
Parathasarathy, S.V. (1965) : Cytogenetics and Plant Breeding  
P. Varadhachari & Co., Madras-655pp.,

- Strickberger, M.W. (1976) : Genetics(2<sup>nd</sup> Edition)  
MacMillan Publishing Co., Inc., N.Y., London  
-914pp.,
- Herskowitz, I.H. (1977) : Principles of Genetics(2<sup>nd</sup> Edition)  
MacMillan Publishing Co., Inc., N.Y.  
& collier-Macmillan, London-836pp.,
- Hexter, W. &  
H.T. Yost(Jr) (1977) : The Science of Genetics  
Prentice hall of India(P)Ltd.,New Delhi-596pp.,
- Watson, J.D. (1977) : Molecular Biology of the Gene  
W.A. Benjamin, Inc., Menlo Park-Colifornia,  
Reading-Massachusetts, London, Amsterdam,  
Don Mills, Ontario, Sydney-739pp.,
- Srb, A.M. Owen,R.D. &  
Edgar, R.S. (1979) : General Genetics  
Eurasia Publishing House(P)ltd., New Delhi-557pp.
- Gardner, E.J. &  
Snusted, D.P. (1984) : Principles of Genetics(7<sup>th</sup> edition)  
John Wiley & Sons, N.Y. Chichester, Brisbane,  
Toronto, Singapore-400pp.,
- Lewin, B. (1985) : Genes IV  
Wiley Eastern Ltd., New Delhi, Bombay, Calcutta,  
Madras, Hyderabad-716pp.,
- Dnyansagar, V.R. (1986) : Cytology & Genetics  
Tata McGraw Hill Publishing Co., Ltd., New Delhi  
-403pp.,
- Palaniyappan, S. (1987) : Marabiyal (Genetics-In Tamil)  
V.K. publishing House, Madras-152pp.,
- Sinha, U.& Sinha, S. (1989) : Cytogenetics, Plant Breeding & Evolution  
Vikas publishing House, New Delhi-408pp.,
- Ahluwalia, K.B. (1990) : Genetics  
Wiley Eastern Ltd.,New Delhi, Bangalore,Bombay,  
Calcutta, Madras, Hyderabad -372pp.,
- Sandhya Mitra (1994) : Genetics-A Blue Print of Life  
Tata McGraw Hill Publishing Co., Ltd., New Delhi-  
1052pp.,
- Sarin, C. (1994) : Genetics  
Tata McGraw Hill Publishing Co.,Ltd.,New Delhi-

- 528pp.,
- Renganathan, T.K. & Shanmugavel, S. (1996) : Genetics & Genetic Engineering  
Commercial Offset Printers, Sivakasi, India-107+72pp.,
- Winter, P.C ., Hickey, G.I. & Fletcher, H.L. (1999) : Instant Notes in Genetics  
Viva Books (P)Ltd., New Delhi, Mumbai, Chennai-342pp.,
- Jain, H.K. (1999) : Genetics-Principles, Concepts & Implications  
Oxford & IBH Publishing Co., (P) Ltd., New Delhi-454pp.,
- Meyyan, R.P., (2000) : Genetics & Evolution  
Saras Publication, Nagercoil, India-380pp.,
- Gupta, P.K. (2000) : genetics  
Rastogi Publishers, Meerut, India-611pp.,
- Agarwal., V.K. (2000) : Simplified course in Genetics(B.Sc., Zoology)  
S. Chand & Co.,New Delhi-168pp.,
- Daniel Sundararaj, D. & G. Thulsidas (1972) : Introduction to Cytogenetics & Plant Breeding  
(3<sup>rd</sup> edition) Popular Book Depot., Madras-361pp.,

## EVOLUTION

- Savage, J.M. (1969) : evolution (2<sup>nd</sup> Edition)  
Amarind Publishing Cosec<sup>2</sup>θ (P)Ltd., New Delhi, Bombay, Calcutta, N.Y.-152PP.,
- Gottlieb, LD. & Jain, S.K. (1988) : Plant Evolutionary Biology  
Chapman & Hill, London, N.Y-414pp.,
- Shukla, R.S. & P.S Chandel (1996) : Cytogenetics, Evolution & Plant Breeding  
S. Chand & Co., New Delhi-560pp.,
- Verma, P.S. & V.K . Agarwal (1999) : Concepts of Evolution  
S. Chand & Co., New Delhi-148pp.,
- Anna Sproule (1998) : Charles Darwin  
Scientists who have changed the world  
Orient Longmans, Hyderabad-64pp.,

**Practicals :** Problems on simple monohybrid and dihybrid ratios. Simple problems on interaction on factors included in the theory.

## CC –IX - MORPHOLOGY, TAXONOMY & ECONOMIC BOTANY

### Unit I

Morphology - Inflorescence - types- racemose, cymose, mixed and special types. Descriptive terminology of flower and floral parts.

Fruit-classification. Details of simple, fleshy, dry dehiscent and dry indehiscent, aggregate and multiple fruits.

### Unit II

Taxonomy:- Binomial nomenclature. Systems of classification-Bentham & Hooker and Engler & Prantl. Merits and Demerits of their systems. Herbarium Techniques.

### Unit III

A detailed study of the following families and their Economic Importance- Annonaceae, Capparidaceae, Tiliaceae, Rutaceae, Anacardiaceae, Leguminosae, (Papilionoideae (Fabaceae) Caesalpinoideae (Caesalpiniaceae) & Mimosoideae (Mimosaceae) Cucurbitaceae, Apiaceae,

### Unit IV

Rubiaceae, & Asteraceae. Apocyanaceae, Asclepiadaceae, Solanaceae, Convolvulaceae, Acanthaceae, Verbeneaceae, Amarantaceae, Euphorbiaceae, Orchidaceae, Liliaceae and Gramineae (Poaceae).

### Unit V

**Economic Botany :-** A brief study of the following Economic Plants and their main economic importance products:-

- (1) Food –Cereals (Oryza, Eleusine); Pulses- (Phaseolus), Edible oil-Seasamum; Root tubers Manihot; Sugar –Saccharum.
- (ii) Fibres-Textiles(Gossypium);Others-Crotolaria, Agave.
- (iii) Medicinal plants -Ocimum, Phyllanthus, Solanum.
- (iv) Forest products – Timber (Teak,Jack).Tannins, Gums, Resins, Turpentine.

## REFERENCES

### TAXONOMY

Porter, C.L. ( ): Taxonomy of flowering Plants  
Eurasia Publishing House, New Delhi.

Lawrence, G.H.M. (1953) : Taxonomy of Vascular Plants  
Oxford & IBH Publishers, New Delhi, Calcutta-823pp.,

Mitra, J.N. (1964) : An Introduction to Systematic botany & Ecology



The World Press (P) Ltd., Calcutta –694pp.,

- Jefferey, C. (1968) : An Introduction to Plant Taxonomy  
J.A. Churchill, London-142pp.,
- Mathur, R.C. (1970) : Systematic Botany (Angiosperms)  
Agra Book Stores-Lucknow, Ajmer, Allahabad, Delhi,  
Kanpur, Meerut, Varanasi – 520pp.,
- Ramaswami, S.N.,  
S.Lakshminarayana &  
V.Venkateswaralu (1976) : Taxonomy (Systematic Botany) for degree course  
Maruthi Book Depot, Guntur, Hyderabad –312pp.,
- Narayanaswamy, R.V.  
& Rao, K.N. (1976) : Outlines of botany  
S. Viswanathan Printers & Publishers, Chennai-31-983 pp.,
- Singh, V. &  
D.K. Singh (1983) : Taxonomy of angiosperms  
Rastogi Publications, Meerut, India-564pp.,
- Sivarajan V.V. (1993) : Introduction to the Principles of Plant Taxonomy  
(2<sup>nd</sup> Edn.,) (N.K.P. Robson(Ed.,) Oxford & IBH  
publishing Co., New Delhi-292pp.,
- Gurcharan Singh (1999) : Plant Systematics \_Theory & Practice  
Oxford & IBH Publishing Co., (P)Ltd.,  
New Delhi370pp.,
- Pandey, B.P. (1997) : Taxonomy of Angiosperms  
S. Chand & Co., (P)Ltd., New Delhi-600pp.,
- Naik, V.N. (1996) : Taxonomy of Angiosperms(9<sup>th</sup> Edition)  
Tata McGraw Hill Publishing Co., (P)Ltd.,  
Delhi-304pp.,
- Vashista, P.C. (1997) : Taxonomy of Angiosperms  
S. Chand & Co., New Delhi, Jullunder 884pp.,
- Subramanian, N.S. (1999) : Laboratory Manual of Plant Taxonomy (2<sup>nd</sup> Edition)  
Tata McGraw Hill Publishing Co., New Delhi-685pp.,
- Jaques, H.E. (1999) : Plant Families-How to know them?  
Agro Botanical Publishers(India)-Bikaner-174pp.,
- Palaniyappan, S. (2000) : Angiospermgalin vagaippadu (Taxonomy of  
Angiosperms)  
V.K. Publishing House, Chennai- 224pp.,
- Mathews, K.M. (1987-90) : Flora of TamilNadu & Carnatic (1-4vols.)  
Rapinat Herbarium, Trichy.

Lawrence., G.H.M. ( ): An Introduction to Plant Taxonomy  
The Central Book Depot, Allahabad.

Sharma. O.P. ( ) : Plant Taxonomy  
Tata McGraw Hill Publishing Co., New Delhi- pp

## **ECONOMIC BOTANY**

Hill.,A.W. (1952) : Economic Botany  
McGraw Hill Book Co., New York. Pp.,

Gupta, S.K.&  
Kaushik, M.P. (1973) : An Introduction to Economic Botany  
K. Nath & Co., Meerut, India-147pp.,

Verma, V. (1974) : A Text Book of Economic Botany  
Emkay Publications, New Delhi 236pp.,

Govinda Praksh &  
sharma, S.K. (1975) : Introductory Economic Botany  
Jai Prakash Nath & Cosec<sup>2</sup>θ ., Meerut, India-196pp.,

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.,

Sen. S. (1992) : Economic botany  
New Central Book Agency, Calcutta-240pp.,

Ashok Bendre &  
Ashok Kumar (1998-99) : Economic Botany  
Rastogi Publications, Meerut, India-274pp.,

Pandey, B.P. (2000) : Economic Botany  
S. Chand & Co., New Delhi-534pp.,

### **Practical :**

Training in dissection, observation, identification and sketching of floral parts of plants belonging to the families mentioned in the syllabus along with floral diagrams and floral formula. Description of plants in technical terms. Field study flora. Submission of 25 Herbarium specimens. Economic plants covered in theory part in taxonomy and economic botany and their importance.

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## **CC X – PRACTICAL III – COVERING THE CORE COURSES VII, VIII & IX**

### **MAJOR BASED ELECTIVE I – MEDICAL BOTANY**

#### **Unit I**

Importance and Relevance of Herbal drugs in Indian system of Medicine, Pharmacognosy – Aim and scope: Branches of Pharmacognosy – Phytochemicals – Reserve materials: Secretory materials: Excretory materials

#### **Unit II**

Medicinal gardening – Gardens in the Hills and plains: House gardens, plants for gardening – Poisonous plants – Types of plant poison: action of poisons: treatments for poisons; some poisonous plants; their toxicity and action

#### **Unit III**

Adulteration of crude drugs and its detection – methods of adulteration; types of adulteration. Medicinal plants of export values; Rejuvenating herbs; Medicinal uses of Non-flowering plants

#### **Unit IV**

Botanical description and active principles of Root drugs, Rhizomes woods and bark drugs (Two examples for each plant organs).

#### **Unit V**

Botanical description and active principles of leaves; Flowers, Fruits seed and entire plants ad drugs. Taxonomic study of some selected herbals (Two examples for each plant organs)

#### **Books for Study:**

1. Somasundaram S. 1997, Medicinal Botany (Maruthuvath Thavaraviyal) – (Tamil Medium Book)
2. Wallis, T.E. 1967, Text Books of Pharmacognosy
3. Jain S.K. Medicinal Plants
4. Srivastave A.K. 2006, Medicinal Plants, International Book distributors, Dehradun

#### **Books for Reference:**

1. Agarwal, O.P. 1985, Vol. II Chemistry of Organic – Natural products
2. Gamble, J. S. and Fisher, 1921, CEC I, II, III Flora of the Presidency of Madras Volumes
3. Mathew K.M., 1988, Flora of the Tamilnadu and Carnatic
4. nair N.c. and Henry a.M., 1983, Flora of Tamil Nadu, India Botanical Survey of India
5. Chopra r.N. Nagar S.L. and Chopra I.c., 1956, Glosary of Indian Medicinal Plants
6. Chopra R.N., Chopra I.C., Handa K.L. and Kapur L.D., 1994 Indigenous drugs of India
7. Chopra R.N. Badhuvar R.L. & Gosh G. 1965, Poisonous plants of India

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# CC XI - PLANT PHYSIOLOGY, BIOCHEMISTRY & BIOPHYSICS

## Unit I

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

Photosynthesis: Absorption spectrum, Action spectrum, role of pigments enhancement effect, photosystems I & II

Photosynthetic electron transport, Photophosphorylation,

Carbon Assimilation: Calvin cycle Hatch & Salck pathway, CAM pathway-

Respiration: respiratory substrates. Aerobic and anaerobic. Glycolysis. Kreb's Cycle and oxidative phosphorylation, energetics of respiration.

## Unit III

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

## Unit IV

Biochemistry- Physico-chemical forces acting on the living body

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 product – alkaloids flavonoids, terpenoids and anthocyanins

## Unit V

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.

- a) Definition of pH-its determination;
- b) Buffers and electrolytes and their functions.
- c) Fractionation of biological materials by chromatography,
- d) Centrifugation.

## References

### PLANT PHYSIOLOGY

Steward. F.C. (1964) : Plants at Work ( A summary of Plant Physiology)

- Addison-Wesley Publishing Co., Inc.,  
Reading, Massachusetts, Palo alto, London-
- Devlin, R.M. (1969) : Plant Physiology  
Holt, Rinehart & Winston & Affiliated East West  
Press (P) Ltd., New Delhi -
- Noggle, R. &  
Fritz (1989 ) : Introductory Plant Physiology  
Prentice Hall of India.
- Lawlor. D.W. (1989) : Photosynthesis, metabolism, Control & Physiology  
ELBS/Longmans-London.,
- Mayer Anderson &  
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D.Van Nostrand . Publishing Co., N.Y.
- Saraswathy  
Rangamannar ( 1973) : Thaavara valarchithai martram  
(Metabolism & Biosynthesis)  
Tamilnadu Text Book society
- Periyasamy, K (1978) : “Cell iyakka viyal” (cell Physiology)  
Tamilnadu text Book Society,
- Hans Meidner (1984) : Class Experiments in Plant Physiology  
George Allen & Unwin, London, Boston, Sydney
- Srivastava, H.N. (1986) : Plant Physiology  
Pradeep Publications, Jalandhar, India
- Dulsy Fatima, R.P. et. al 1993 : Biochemistry  
Saras Publications, nagercoil, Tamilnadu
- Dulsy Fatima, R.P. et. al (1994) : Elements of Biochemistry  
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- Jain, V.K. (1990) : Fundamentals of Plant Physiology  
S. Chand & Co., New Delhi
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A.K. Ghosh (1998) : Plant Physiology  
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New Delhi
- Verma, S.K. (1999) : Plant Physiology & Biochemistry  
S. Chand & Co., New Delhi
- Verma, S.K. (1999) : A Text –Book of Plant Physiology  
S. Chand & Co.,New Delhi
- Salisbury, F.B

- &C.W. Ross (1999) : Plant Physiology  
CBS Publishers and Printers, New Delhi
- Gill, P.S. (2000) : Plant Physiology  
S. Chand & Co., New Delhi
- Verma, V. (2001) : A Text Book of Plant Physiology  
Emkay Publications, New Delhi

## **BIOCHEMISTRY**

- Lehninger, A.L. (1984) : Biochemistry (2<sup>nd</sup> Edition)  
Kalyani Publishers, Ludhiana, New Delhi
- Trehan, K (1987) : Biochemistry  
Wiley Eastern Ltd., New Delhi
- Plummer, D.T. (1988) : An Introduction to Practical Biochemistry(3<sup>rd</sup> Edn.)  
Tata McGraw Hill Publishing Co., Ltd.,New Delhi
- Jayaraman, J. (1981) : Laboratory Manual of Biochemistry  
Wiley Eastern Ltd., New Delhi
- Stryer, L. (1989) : Biochemistrty  
W.H. Freeman & Co., New York, San Francisco
- Plummer, D. (1989) : Biochemistry –the Chemistry of life  
McGraw Hill Book Co., London, N..Y.  
New Delhi, Paris, Singapore, Tokyo
- Srivastava, H.S. (1990) : Elements of Biochesmitry  
Rastogi Publications, Meerut, India
- Wilson, K. &  
J. Walker (1994) : Principles and Techniques of Practical Biochemistry  
(4<sup>th</sup> Edition ), Cambridge University Press, U.K.
- Deb, A.C. (1998) : Concepts of Biochemistry (Theory and Practicals)  
Books & Allied (P) Ltd., Calcutta
- Jain, J.L. (1998) : Fundamentals of Biochemistry  
S. Chand & Co., New Delhi
- Day, P.M. &  
Harborne, J.B.(Eds.,) (2000) : Plant Biochemistrty  
Harcourt Asia (P) Ltd., India & Academic Press  
Singapore,

## **BIOPHYSICS**

- Casey, E.J. (1969) : Biophysics-Concepts and Mechanisms  
Van Nostrand Reinhold Co., & Affiliated  
East West Press (P) Ltd., New Delhi

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

**Practical :**

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/Rheo 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 CO<sub>2</sub> Concentrations.
10. Measurement of oxygen evolution under different coloured lights using Wilmott's bubbler.

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## CC –XII –PLANT ECOLOGY AND PHYTOGEOGRAPHY

### Unit I

General Ecology – Approaches to the study of Ecology, Autecology – Synecology, Plant environment – climatic, edaphic and Biotic factors (interference on Plant habitat by animals – Grazing and browsing, by humans – deforestation, Agriculture)  
Allelopathy.

### Unit II

Ecosystem concept – components abiotic, autotrophic producers & heterotrophic consumers, biomass ecological pyramids, Productivity – primary, secondary & gross; food chain – food web & energy flow – pond ecosystem.

### Unit III

Vegetation – Units of vegetation – formation, association, consociation, society – Development of vegetation: Migration – ecesis, colonization, Methods of study of vegetation ( Quadrate & transect). Plant succession – Hydrosere & xerosere. Ecological classification of Plants; Morphological and anatomical features of plants and their correlation to the habitat factors.

### Unit IV

Applied Ecology – Pollution and its control  
Atmospheric pollution – air – pollution – particulate matter.  
Chemicals, Acid rain, Radiation pollution, Noise pollution, Thermal pollution  
Soil pollution: Industrial effluents, agricultural pollution, plant residues, insecticides, pesticides, fungicides, herbicides.  
Water pollution – Industrial effluents ( water soluble metals – liquid effluents oil).

### Unit V

#### Phytogeography

Approaches to Phytogeography – Climate of India & its climatic zones, Botanical regions of India – Vegetational types of Tamilnadu: Evergreen, deciduous, scrub & Mangrove, Continuous and discontinuous distribution. Endemism 7 endemics.  
Basic knowledge on remote sensing.

#### REFERENCES:

Plant Ecology & Phytogeography

Daubenmire, R.F. ( ) : Plants & Environment (2<sup>nd</sup> Edn.,)  
John Wiley & Sons., N.Y.

Puri, .G.S. (1960) : Indian Forest Ecology(Vol.I & II)  
Oxford Book Co., New Delhi& Calcutta.

Billings, W.B. (1965) : Plants and the Ecosystem  
Wadsworth Publishing Co., Inc.,Belmont.



- Misra, R. (1968) : The Ecology work Book  
Oxford & INH Publishing Co., Calcutta
- Odum E.P. (1971) : Fundamentals of Ecology (2<sup>nd</sup> Edn.)  
Saunders & Co., Philadelphia & Natraj Publishers,  
Dehradun –574pp.,
- Ambasht, R.S. (1974) : Text book of Plant Ecology (3<sup>rd</sup> Edn.)  
Students & Friends Co., Varanasi - pp.,
- Odum E.P. (1975) : Ecology  
Holt, Rinert & Winston- pp.,
- Oosting, H.G. (1978) : Plants and Ecosystem  
Wadworth Belmont.
- Kochhar, P.L. (1975) : Plant Ecology(9<sup>th</sup> Edn.)  
S.Nagi & Co., Jullandhar pp.,
- Kormandy, E.J. (1978) : Concepts of ecology(2<sup>nd</sup> Edition)  
Prentice Hall of India (P) Ltd., New Delhi.
- Agrawal, K.C. (1987) : Environmental Biology  
Agro Botanical Publisher, India.
- Ananthakrishnan, T.N.(1978) : Bioresources Ecology(3<sup>rd</sup> Edn.)  
Oxford & IBH Publishing Co, (P)Ltd.,  
New Delhi, Bombay, Calcutta-226pp.,
- Misra, K.C. ( ) : Manual of plant Ecology(2<sup>nd</sup> Edition)  
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- Vashishta, P.C. (1989-90) : Plant Ecology  
Vishal Publications, Delhi, Jalandhar-284pp.,
- Kumar, H.D. (1992) : Modern Concepts of Ecology (7<sup>th</sup> Edn.)  
Vikas Publishing Co., New Delhi-377pp.,
- Dash, M.C. (1993) : Fundamentals of Ecology  
Tata McGraw Hill, New Delhi-373pp.,
- Shukla, R.S. &  
P.S. Chandel (1991) : Plant Ecology & Soil Science  
S.Chand & Co., New Delhi-305+97pp.,
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Saras Publications, Nagercoil, Tamilnadu-402pp.,
- Mackenzie, A..  
A.S. Ball &  
S.R. Vindee (1999) : Instant notes in Ecology  
Viva Books (P) Ltd., Delhi, Bombay, Chennai  
-321pp.,
- Kumar H.D. (2000) : Biodiversity & Sustainable Conservation  
Oxford & IBH Publishing Co., Ltd., New Delhi

- 420pp.,
- Sharma, P. D. ( ) : Elements of Ecology  
Rastogi Publications, Meerut.
- Newman, E.I. (2000) : Applied Ecology  
Blackwell Scientific Publisher, U.K-328pp.,
- Chapman, J.L. &  
M.J. Reiss (1992) : ecology (Principles & Applications)  
Cambridge University Press, U.K.-294pp.,
- Verma, P.S. &  
Agarwal, V.K.. ( 1999) : Concept of Ecology (Enviromental Biology)  
S. Chand & Co., New Delhi-264pp.,
- Sharma, P.D. (2000) : Ecology & Envoronment  
Rastogi Publications, Meerut, India-7=653pp.,
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Pollution) T.K. Printers, Pudukkottai, Tamilnadu-417pp.,
- Periyaswamy, K. ( ) : Elements of Plant Ecology  
Emkay Publications, New Delhi.
- Rajasekaran, K. ( ) : Koottu Chchoozhnilai Iyalum thaavara puvi iyalum  
Tamilnadu Text-Book Society
- BalachandraGanesan,  
K.R. ( ) : Choozhnilai iyal,parinaamam, Marabiyal.

### **PHYTOGEOGRAPHY**

- Cain, S.A . (1944) : Foudations of Plant Geography  
Harper & Brothers, N.Y.
- Mani, M.S ( 1974) : Ecology & Biogeography of India  
Dr. W. Junk Publishers, The Haque
- Good, R. (1997) : The Geography of flowering Plants (2<sup>nd</sup> Edn.,)  
Longmans, Green & Co., Inc., London & Allied  
Science Publishers, New Delhi-495pp.,

### **Practical :**

Study of morphological and anatomical features of hydrophytes and xerophytes. Study of morphological features of epiphytes, parasites and halophytes. Study of vegetation by the quadraat, line transect, estimation of frequency, density & Dominance cover. Determination of soil & water pH. Analysis of soil water to detect the presence of dissolved salts. The light and dark bottle experiment for primary productivity study in the aquatic ecosystem. Retentivity, absorpction and capillarity of soil.

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## CC XIII – PRACTICAL IV – COVERING THE CORE COURSES XI & XII

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### MAJOR BASED ELECTIVE II - BIOSTATISTICS & COMPUTER APPLICATION IN BOTANY

#### Theory:-

#### Unit I

**Bio statistics** – Definition of bio-statistics, statistical terms – random Sampling – approximation of data – statistical error-logarithms.

#### Unit II

Frequency distribution-graphical representation- distribution of data in Biology – mean, median and mode – measure of dispersion, standard deviation, standard error -coefficient of variation-limits of the mean – Probability- - Chi square test for goodness of fit.

#### Unit III

History of computers, Types of Computers, Basic computer concepts, parts of a computer-input (key board, Mouse) and Output devices (Monitors, Printers), computer memory (RAM,ROM), Storage Devices (Floppy disk, Compact disk, Hard disk), Central Processing Unit, Software, Hardware, Computer peripherals – Mouse, Modem.

#### Unit IV

Computer Network (LAN,WAN), DATA-Representation- Number systems- Binary, arithmetic, Organizing information- the database – definition-Data entry indexing – storage – retrieval – Operating systems – WINDOWS 2000

#### Unit V

- a). Word Processing software MS-Office.
- b). DESKTOP PRINTING(DTP)- Application software like- ADOBE Pagemaker, Corel Ventura and Microsoft Publisher and their uses.
- c). A Basic knowledge of Networking-Internet-email facilities, terminology connected with them and their uses in Botany.

No Practical for this paper. Only Demonstration of computer application in Botany at The Computer Science Department Laboratory (or) wherever a PC facility is available In the college.

#### Text Books:

1. Khan & Knanum : Fundamentals of Biostatistics, Ukkax publications, Hyderabad
2. R. Thiagarajan: Computers for Beginners Pvt., Ltd., Madras

#### Reference Books:

1. Mandal & Nambiar : Agricultural Statistics, Agrobios Publications, Jodhpur
2. P. Parihar: Biostatistics & Biometry, Agrobios Publications, Jodhpur
3. S. Palanichamy & M. Manoharan : Statistical methods for Biologists, Palani Paramount publications, New Delhi
4. N. Ramakrishnan: Fundamentals of Biostatistics, Sarao Publications, Naaagercoil
5. Peter Norton: Introduction to Computers, Tata MC Graw Hill Publishing Co., New Delhi
6. Ramesh Bangia: The Complete Computer course Cyber Tech. Publishers, New Delhi
7. M. Lotia, P. Nir & P. Lotia, Modern Computer Hardware course BPB Publishers, New Delhi
8. Texali: Lordstar professional 4.0 made simple. Tata Mc Graw Hill Publishing Co., New Delhi.

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## MAJOR BASED ELECTIVE III - BIOTECHNOLOGY

### Theory:-

#### Unit I

Biotechnology-Definition, importance, Application areas in biotechnology.  
Gene Transfer mechanisms in Bacteria: Transformation, transduction and Conjugation.

#### Unit II

Plasmids - General account; Plasmids as vectors Eg. pBR 322, Ti-plasmid;

Cosmids, phagemids, Lambda-phage; transposons; site directed mutation  
(mutagenesis)

#### Unit III

Genetic Engineering : Steps involved in gene cloning and Southern, Western blotting and PCR technique. Role of Agrobacterium in genetic engineering.

#### Unit IV

Agricultural biotechnology:  
Biomass production – Food (single cell proteins) Bio-fertilizers-Biological Nitrogen fixation.  
Tissue culture- sterilization methods, media preparation (MS medium)use different  
Parts as explant materials and callus growth.

#### Unit V

Environmental Biotechnology:- Waste treatment –solid (compost), Liquid  
(Industrial effluents), sewage treatment(domestic sewage)

No Practical for this paper.

#### Text Book:

1. R.C. Dubey: A text book of Biotechnology, S.Chand & Co., New Delhi
2. P. Parihar : A text book of Biotechnology, Argobios Publications, Jodhpur

#### Reference Book:

1. P.K. Gupta: Elements of Biotechnology, Restogi Publications, Meerut
2. Kalyan Kumar De: Plant Tissue culture, New central Book Agency, Calcutta
3. M.D. Kumar: A text book on Biotechnology, East west press, New Delhi
4. S.S. Purohit: Agricultural Biotechnology, Argobios Publications, Jodhpur
5. S. Ignacimuthu: Plant Biotechnology, Oxford & IBM Publishing Co., New Delhi
6. Trevan, Boffey, Goulding & Stanbury: Biotechnology – The Biological Principles, Tata Mc Graw Hill Publishing Co., New Delhi
7. A.K Chatterji: Introduction to Environmental Biotechnology, Prentice Hall India Pvt., Ltd., New Delhi

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