

DR. J. MOHAMMED HUSSAIN  
 Assistant professor of Botany  
 JJC  
 Pudukkottai.

Day/Year	I	II	III	IV	V
I		II MSc	II M.Sc Libry Net		III BSc
II	II MSc	III BSc		III BSc	III BSc
III	I MSc practical			II MSc	
IV	III BSc	II MSc	III BSc		
V				II MSc	
VI	II MSc	III BSc			

**B.Sc. Botany CBCS 2017 onwards****SEMESTER VI  
ORGANIC FARMING****Course Code : U6RBOSBE3****Course: Skill-based Elective****Hours/Week : 5****Credit : 2****Objectives**

- To discuss on the impact of products of chemical based agriculture.
- To discuss on the importance of sustainable agriculture.

**UNIT I**

Soil - physical, chemical properties. Soil pollution - oil, chemicals - fertilizers, pesticide and herbicide - non-degradable solids, biomagnification, consequences of land pollution - damage to soil and crops, heavy metal contamination. Soil residues and impact of monoculture.

**UNIT II**

Organic farming - definition, basic concept of organic farming, integrated plant nutrient supply management, integrated insect pest and diseases management, integrated soil and water management. Sustainable agriculture practice - crop rotation, crop diversification, mixed cropping, biological nitrogen fixation.

**UNIT III**

Management of organic wastes and green manures: Farm manures, Composts, Mulches, Tillage and Pest control. Organic manures - organic residue, chemical nature of organic manure, green manure, importance of green manure, crops of green manure, oil cake. Animal based organic manure - cow dung, poultry waste, vermicompost - methods, production and utilization. Preservation of Panchakavya.

**UNIT IV**

Biofertilizers - classification, nitrogen fixers - Rhizobium, Azotobacter, cyanobacteria, Azolla, Frankia. Azospirillum and Vasicular Mycorrhizae. Pest and disease management: classification of pest, integrated pest management - components; cultural, mechanical, physical control of pest. Biopesticides against microbial parasites, predators and insects.

**UNIT V**

GMO and regulations; organic produce - consumer confidence, conversion period. Inspection and certification. Accredited certifying agents (natl and intl), Equality assurance - logo and labeling.

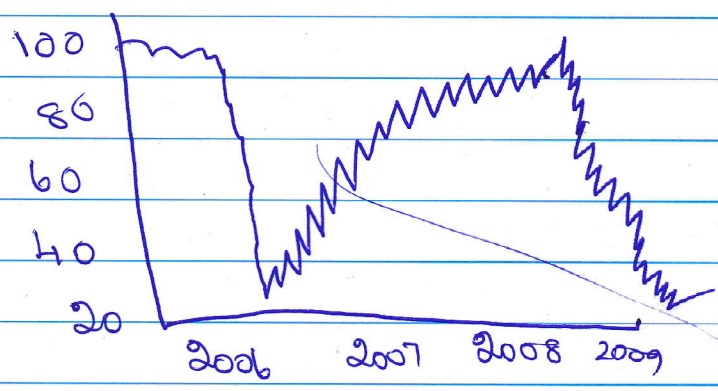
consumer confidence:

The conference Board consumer confidence index

The index now stands at 108.0 up from 103.6 August.

The present situation index based on consumers.

The Expectations index based on consumer short term outlook for income, business and labor market conditions.



*Dr. M. Arunugam*  
13/5/09

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SEMESTER VI  
PLANT BIOTECHNOLOGY

Course Code : U6RBOM3E2

Course: Major-based Elective

Hours/Week : 5

Credit : 4

Objective:

- To understand the basic and applied aspects of biotechnology.
- To learn the basics of r-DNA technology

UNIT I

History of Biotechnology - Definition - Traditional and Modern. Biotechnology interdisciplinary area, global impact and current excitement (health care, agriculture, genomics, proteomics).

UNIT II

Vectors and their applications: Cloning vectors – pUC, pBR322 – Agrobacterium based vectors. Binary and co-integrated vectors – GUS and GFP assays -- Marker assisted selections – Herbicide and antibiotic resistance markers.

UNIT III

r-DNA technology: Isolation of RNA – Reverse Transcription PCR – Cdna collections – r-DNA technology - Enzymes involved – Restriction enzymes – types – exonucleases and endonucleases. Ligases.

UNIT IV

*Plant genome* organization: Functional organization (nuclear, chloroplast and mitochondrial DNA). Physical nature of gene - (promoters, enhancers, transcription factors – (zinc finger and Lysine z finger models) and their applications in modern Biotechnology.

UNIT V

Gene Silencing in plants: Transcriptional and Post - Transcriptional Gene Silencing (TGS, PTGS) – RNAi in general – Flower colour modulations with RNAi – Delay of fruit ripening.

SUGGESTED BOOKS

	I	II	III	IV	V
I				PBT	
II					PBT
III					PBT
IV			PBT		

## Delay of Fruit ripening.

- \* Acc (aminocyclopropane-1-carboxylic acid) is the enzyme
- \* Acc produced by Acc synthase.
- \* \* Though Anti sense technology, Acc oxidase enzyme (or) protein (or) gene results in the suppression of ethylene production.
- \* These by delaying fruit ripening.

### \* Antisense technology?

Antisense DNA technology is a method to inhibit  $\text{செயல்பாடு}$  (or)  $\text{செயல்பாட்டிற்கு}$  (or) downregulate the production of a target protein by using Antisense DNA (or) RNA molecules.

\* The Antisense sequence is a DNA (or) RNA that is ~~not~~ perfectly complementary to the target nucleotide sequence present in the cell.

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## NOTES OF LESSON

Dr. P. RAJA

EVEN SEMESTER

2021-2022

Dr. PR	I	I M.Sc.		II B.Sc.	I M.Sc.	
	II	II B.Sc. Practical				
	III	II B.Sc.		II B.Sc.	I M.Sc. Practical	
	IV	I M.Sc.		II B.Sc.		
	V	I M.Sc.		I M.Sc.	II B.Sc.	
	VI	II B.Sc. Practical			I M.Sc.	

***B.Sc. Botany Syllabus (CBCS)******2019 onwards*****SEMESTER IV****MORPHOLOGY, TAXONOMY OF ANGIOSPERMS AND ECONOMIC BOTANY****Course Code : U4R1BOCC7****Course: Core Course****Hours/Week : 5****Credit : 5****Objectives**

- To observe the variations among plants, especially angiosperms
- To study the morphology of angiosperms
- To observe the modifications of plant parts
- To understand the way of nomenclature and classifying the plants
- To study the salient features of angiosperm families
- To study the economic importance of angiosperms

**UNIT I:**

Morphology: Root and its modifications; stem and its modification. Phyllotaxy. Inflorescence types – Description of floral parts (Calyx, Corolla, Androecium and Gynoecium) – Floral diagram. Floral formula – Outline classification of fruits.

**UNIT II:**

Types and System of classification: Artificial system (Carolus Linnaeus), Natural system (Bentham & Hooker), Phylogenetic system (Engler & Prantl).

**UNIT III:**

Binomial Nomenclature – International Code for the Nomenclature of Algae, Fungi and Bacteria (ICN) – Rules of ICN – Plant collection, Preparation and management of Herbarium – Botanical Survey of India (BSI) – Taxonomy in relation to cytology – Taxonomy in relation to phytochemistry.

**UNIT IV:**

Detailed study on salient features, description, distribution and economic importance of the following families: Annonaceae, Lythraceae, Malvaceae, Rutaceae, Fabaceae, Cucurbitaceae.

**UNIT V:**

Rubiaceae, Asteraceae, Solanaceae, Apocynaceae, Acanthaceae, Lamiaceae, Euphorbiaceae, Liliaceae and Poaceae. Economic importance of Cereals, Spices and Condiments, Resins and other yielding plants.

13/5/22  
v-4

Cinnamomum - spice

Cinnamomum vera  
Lauraceae

Leaves and Bark used as spice

Cardamom - Elettaria cardamom  
Zingiberaceae

fruit used as spice and  
condiment

Resin - oxidation product of volatile  
essential oils  
- found in trees, insoluble in  
water

### Oil yielding plants

Castor seed - Ricinus communis

Euphorbiaceae

Castor oil

Contraceptive gelling  
washing powder

Ground nut - Arachis hypogaea

Fabaceae

Peanut butter

Ground nut candies

vegetable ghee

Peanut oil

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13/5/22

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Tamil Nadu

K. Thamarai chechi,  
Assistant professor,  
Department of botany,  
Lesson Plan note,  
JJ college of Arts and Science (A).

## TIME TABLE

S.No	Day order	1	2	3	4	5
1.	<u>I</u>	<u>II M.sc</u>			<u>II B.sc</u> Practical	
2.	<u>II</u>	<u>III B.sc</u>	<u>II M.sc</u>	<u>II B.sc</u>		
3.	<u>III</u>	<u>II M.sc</u>	<u>II M.sc</u>		<u>III B.sc</u>	
4.	<u>IV</u>	<u>II B.sc</u> Practical		<u>III M.sc</u>	<u>III B.sc</u>	
5.	<u>V</u>			<u>II B.sc</u>		<u>II B.sc</u>
6.	<u>VI</u>			<u>II M.sc</u>		<u>II B.sc</u>

II B.sc Botany - Applied Zoology  
 subject code: U4R1ZOAC6

III B.sc Botany - Ecology and Phytogeography  
 subject code: U6R1BOCC6

II M.sc Botany - Herbal Recipes and Remedies  
 subject code: P4R1BOEC4

II B.Sc Botany

## SEMESTER IV

Allied course (Zoology II)

Applied Biology

*Zoology*UPRZOAC6  
Course code: URBOAC6

Hours / week: 5

Course: Core course

Credits: 5

**Objectives**

- To learn about the Economic Importance of animals
- To enlighten the students about the Earthworm Species, honey bees and social behavior. Vermiculture and silkworm and its self-employment opportunities.
- Students may be benefitted by the culture practices
- To make them aware of commercially important animals.

**UNIT: I**

Vermiculture: Species of earthworms, Biology of *Lampito maruitii*. Preparation of Vermicompost and Methods. Nutrient composition of vermicompost and Advantages of vermicompost, Application of vermicomposting in Agriculture and Horticultural practices. Economic importance of vermiculture.

**UNIT: II**

Apiculture - Species of honey bees, Formation and Extraction of honey. Chemical composition of honey. Nutritive and medicinal value of honey. Economic importance of honey. Importance and uses of lac. Lac culture: Life cycle of Lac insect - extraction of Lac - Economic importance of Lac.

**UNIT: III**

Sericulture : Biology of silk worm larva-*Bombyx mori*, Types of silk worms -Tasar, Muga, and Eri. Rearing techniques and Reeling appliances. Re-reeling -Silk examination and grading of silk. Moriculture: Optimum conditions for mulberry growth; planting for mulberry cultivation. Economic importance of silk worm and silk.

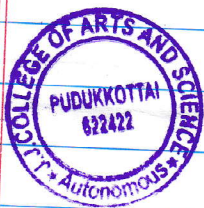
**UNIT: IV**

Aquaculture : Definition - cultivable organisms - classification - various culture systems - types of culture. Fabrication of Aquarium, Economically important of freshwater fishes -Indian Major Carps. Pearl Oyster Culture -methods, types of pearls, composition and formation of pearls.

**UNIT: V**

Poultry farming - Introduction to poultry keeping, Important breeds of Poultry - Desi, Chittagong and Leghorn. Essential nutrients - Ration for Chick and Broiler. Hatchery, Nutritional value of egg. Marketing of egg and By products of poultry.

- of bread, but cakes now cover a wide range of preparations that can be simple or elaborate.
- ii) cakes can also be filled with fruit preserves, nuts or dessert sauces (like custard, jelly, cooked fruit, whipped cream or syrups)
- iii) cakes may be classified according to the occasion for which they are intended. For example, wedding cakes, birthday cakes, cakes for first communion, Christmas cakes, Halloween cakes.
- iv) cakes are traditionally round in shape.



M. Boom 10/5/2

C.D.

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Dr. A. N. SUNDAR.  
 Associate Professor.  
 Department of Botany.

BOEC2

The plants.

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Day order	1	2	3	4	5
I			I M.Sc		I M.Sc
II		I M.Sc		I.M.Sc.	
III	III B.Sc		III B.Sc		III B.Sc
IV		III B.Sc	I M.Sc		
V		III B.Sc	Practical.		
VI	I M.Sc		I M.Sc		III B.Sc.

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**SEMESTER II:  
ETHNOBOTANY AND PHARMACOGNOSY**

**Course Code :P2R1BOEC2**

**Hours/Week :6**

**Credits :3**

**Max Marks : 100**

**Internal Marks : 25**

**External Marks : 75**

**Objective:**

- To understand the uses of the plant resources
- To be aware of values of such resources
- To enlighten the students about economic gain because of plant resources
- To learn traditional health care products
- To know about naturopathy treatment and its effectiveness

**Unit- I Ethnobotany – History and Development**

Introduction, history and scope of Ethnobotany Tribes of India – current cultivation, collection of medicinal plants parts and processing of Herbal drugs. - Traditional Indian system of Medicine – Ayurveda, Siddha, Unani and Naturopathy. Utilization of medicinal and various systems of medicines aromatic plants in India.

**Unit- II – Ethnobotanical method of study**

Ethnobotanical techniques. Anthropological field methods, linguistic and other symbiotic analysis, plant collection and taxonomy. Archaeobotanical methods of information systems. Traditional botanical knowledge and substances of wild plant resources – the documentation and interpretation. Collection of ethnobotanical evidence, the dynamics and distribution of traditional botanical knowledge.

**Unit- III Conservation of Medicinal Plants**

Ethnobotany and conservation of plants with special reference to India - mythology and conservation of ecosystems, conservation of selected plant species: sacred groves, forestry and unique ecosystems and their ethnobiological values, plants and animals in art, tradition and ethnography: Ethnobotanical field methods.

**Unit- IV Pharmacognosy – Introduction and Classification**

History- Definition and scope of Pharmacognosy Definition of drug, classification, natural drugs – Morphological classification, chemical classification and Chemo taxonomical classification.

**Unit- V Drug preparation and Marketing**

Collection and preparation of natural drug for market – Macroscopic characters – Therapeutically and Pharmaceutical use of the drugs, *Feronia - Nux-vomica, Vinca, Oscimum* and *Neem*. Phytochemically compounds used in non-medicinal application, phytochemistry and pharmacology of traditional medicine

29.4.22 Scope and importance of pharmacognosy.

II-2hr

Crude drugs obtained from plants, animals and minerals and other substances used by doctors and pharmacists like synthetic sutures and surgical dressings. The technology involving extraction, purification and characterization pharmaceuticals from natural sources is a significant contribution to the advancement of natural and physical sciences.

Pharmacognosy forms an important link between pharmacology and medical chemistry.

As a result of rapid development of phytochemistry and pharmacological testing methods in recent years.

The knowledge of pharmacology through pharmacognosy is very essential understanding the action of drugs on animals and the human systems.

The crude drugs also provide essential intermediates for final synthesis of actual compounds.

Pharmacognosy forms a vital link

between Ayurveda and Allopathic systems medicine.

nutshell, pharmacognosy, botanical basic sciences.



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Dr. A. N. SUNDAR

2021-2022 Add se master.

Day	Hour				
	1	2	3	4	5
I		III B.Sc			II MSc
II	II MSc	III B.Sc	II MSc		
III	II MSc			III B.Sc Pract.	
IV	III B.Sc			II MSc	
V		III B.Sc Pract			II MSc
VI	III B.Sc				III B.Sc

**SEMESTER V**

**BIOPHYSICS, BIOCHEMISTRY AND PLANT PHYSIOLOGY**

**Course Code : U5R1BOCC10**

**Course: Core Course**

**Hours/Week : 6**

**Credit : 5**

**Objectives**

- To gain knowledge about plant bio molecules
- To understand different pathways occurring in a cell
- To provide an advanced integral knowledge and understanding of topics in Biophysics and Biochemistry
- To understanding in the plant cells and functions
- To acquire basic knowledge in physiological process
- To learn the physiological effects of hormones

**UNIT I**

Bioenergetics: Laws of thermodynamics - Concept of Entropy and Enthalpy - Gibb's Free Energy - Energy transduction in Biological systems - High energy compounds - ATP bioenergetics. Photobiology - Electromagnetic Spectrum - Visible range of spectrum. pH - definition and its biological significance. Buffer : definition, some importance of buffers.

**UNIT II**

Carbohydrates: Classification, structure and properties of mono and disaccharides. Lipids: Classification, saturated and unsaturated fatty acids. Properties and synthesis of lipids - Amino acids: basic structure & properties (physical and chemical) and function. Proteins: classification based on shape, solubility and composition. Enzymes: Biocatalysts - definition and characteristics, IUB classification - Mode of action: lock & key and induced fit. Factors affecting the enzyme action.

**UNIT III**

Water, Mineral and Solute: Uptake and Transport of minerals and water -Diffusion and Osmosis - Osmotic pressure, Turgor pressure and wall pressure - Plasmolysis and its importance - Mechanism of absorption of water - Passive and active absorption - Ascent of sap – Theories on absorption. Uptake and transport of Minerals -Translocation of organic solutes - Transpiration: types, mechanism, role of Transpiration factors affecting transpiration.

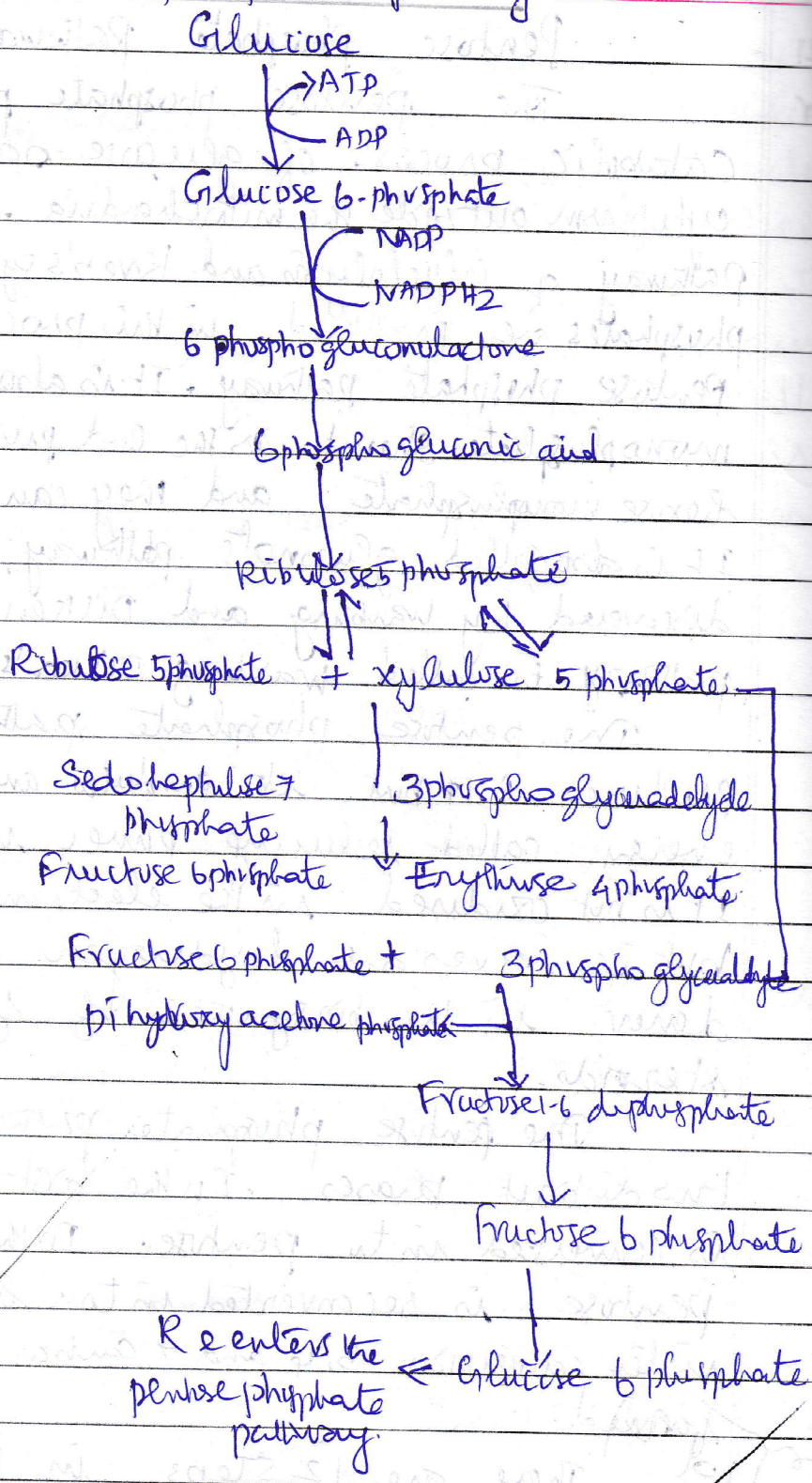
**UNIT IV**

Photosynthesis and Nitrogen Metabolism: Photosynthetic apparatus and pigment systems - Emerson enhancement Effect and two pigment systems - Hill reaction - Oxygen evolving complex - mechanism of electron transport, cyclic and noncyclic photo phosphorylations - synthesis of ATP by photophosphorylation - mechanism of CO<sub>2</sub> fixation in C<sub>3</sub>, C<sub>4</sub> and CAM plants. Importance of nitrogen to plants - sources of nitrogen - nitrogen cycle.

**UNIT V**

Respiration: Aerobic and Anaerobic Respiration - Glycolysis - TCA cycle - Mitochondrial Electron Transport System and its components- Oxidative phosphorylation, Pentose Phosphate Pathway.

# Pentose phosphate pathway



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# INDEX

Name : ..... Std : ..... Sec : ..... Roll No : .....

School / College : .....

S.No.	Date	Title	Page No.	Teacher's Sign / Remarks																																										
		<p>ANATOMY AND EMBRYOLOGY OF ANGIOSPERMS ODD SEMESTER 2021-2022 DR. P. RAJA</p>																																												
		<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Do/H</th> <th style="width: 10%;">1</th> <th style="width: 10%;">2</th> <th style="width: 10%;">3</th> <th style="width: 10%;">4</th> <th style="width: 10%;">5</th> </tr> </thead> <tbody> <tr> <td>I</td> <td colspan="2" style="text-align: center;">← II. B.Sc. Practical</td> <td></td> <td colspan="2" style="text-align: center;">II. M.Sc.</td> </tr> <tr> <td>II</td> <td></td> <td></td> <td></td> <td colspan="2" style="text-align: center;">II. B.Sc.</td> </tr> <tr> <td>III</td> <td></td> <td></td> <td colspan="2" style="text-align: center;">II. B.Sc.</td> <td></td> </tr> <tr> <td>IV</td> <td></td> <td></td> <td colspan="2" style="text-align: center;">II. M.Sc.</td> <td></td> </tr> <tr> <td>V</td> <td style="text-align: center;">II. B.Sc.</td> <td colspan="2" style="text-align: center;">II. M.Sc.</td> <td colspan="2" style="text-align: center;">← II. B.Sc. Practical</td> </tr> <tr> <td>VI</td> <td colspan="2" style="text-align: center;">II. M.Sc.</td> <td></td> <td colspan="2" style="text-align: center;">II. B.Sc.</td> </tr> </tbody> </table>	Do/H	1	2	3	4	5	I	← II. B.Sc. Practical			II. M.Sc.		II				II. B.Sc.		III			II. B.Sc.			IV			II. M.Sc.			V	II. B.Sc.	II. M.Sc.		← II. B.Sc. Practical		VI	II. M.Sc.			II. B.Sc.			
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### SEMESTER III

#### ANATOMY AND EMBRYOLOGY OF ANGIOSPERMS

Course Code : U3R1BOCC5

Course : Core Course

Hours/Week : 6

Credit : 5

#### Objectives

- To inculcate the primary tissues and anatomical features of plants
- To accrue knowledge about the embryology of Angiosperms
- To understand the primary, secondary and anomalous, anatomical structure of plants
- To know the various types of pollination mechanism
- To study the fertilization and development of embryo in plants

#### UNIT I

General Account – classification and theories of Meristem. Concept of totipotency, differentiation, dedifferentiation and redifferentiation. Structure and Function of Simple tissue (Parenchyma, collenchyma, sclerenchyma; fibres and sclereids) and Complex tissues (xylem and phloem)

#### UNIT II

Primary and secondary structure of stem in dicotyledons and Monocotyledons. Nodal Anatomy - unilacunar, trilacunar and multilacunar. Leaf Anatomy of monocot and dicot. The root - primary and secondary structure of dicotyledonous and monocotyledonous roots. Anomalous secondary growth – *Boerhaavia*, *Dracaena*.

#### UNIT III

Wood anatomy - secondary xylem. Physical and chemical properties of wood. Classification of wood. General account an Commercial wood species of South India (teak wood, rose wood, sandal wood, red sandal wood and silver oak).

#### UNIT IV

Microsporangium, Microsporogenesis - Development of male gametophyte. Megasporangium, Megasporogenesis. Development of female gametophyte (Polygonum). Type and Structure of monosporic (Polygonum), bisporic (Allium) and tetrasporic (Peperomia) embryo sacs.

#### UNIT V

Fertilization - Double fertilization. Triple fusion. Development of dicot embryo – Polygonum: type, Development of monocot embryo – *Luzula*: type. Endosperm - Definition. Apomixis - types and significance, Polyembryony, Parthenogenesis and its significance.

Diploid - eggs develop into a diploid embryo without fertilization.

Significance:-

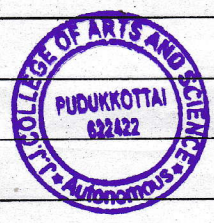
- Genetic variability is nil.
- meiotic parthenogenesis the parthenotes become homozygous.

Parthenocarpy:-

Seedless fruit are called parthenocarpy fruits.

- Banana, Guava, Pine apple, Papaya, Grapes, Apples.

*[Handwritten signature]*  
29/12/21



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DA

Dr. S. Vinothchandran  
Dept of Botany  
J J College of Arts & Science.  
Pudukkottai.  
Biochemistry & plant physiology

Day

Hour

I

Bio-che

II

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V

**SEMESTER III**  
**PLANT PHYSIOLOGY AND BIOCHEMISTRY**

**Course Code :P3R1BOCC11**

**Hours/Week :5**

**Credits :5**

**Max Marks : 100**

**Internal Marks : 25**

**External Marks : 75**

**Objectives**

- To gain knowledge about plant bio molecules
- To understand different pathways occurring in a cell
- To get an advanced integral knowledge and understanding of topics in Biophysics and Biochemistry
- To acquire basic knowledge about physiological process

**Unit-I – Biochemistry General aspects and Carbohydrates**

Structure and properties of atoms and molecules – types of bonds – Electrolyte – pH and buffers – Ionization of weak acids and bases – determining pKa value. Carbohydrate: Classification, Stereo isomerism – optical isomerism - structure of mono, di and oligo polysaccharides. Lipids; Classification – simple lipids – compound, structural, derived and lipids.

**Unit- II- Biochemistry- Protein and Enzymology**

Amino acids; structure – classification – function – chemistry and biosynthesis of amino acids. Protein; classification – importance - Primary structure of protein–protein biosynthesis, Enzymes; General characters – nomenclature – classification – isolation and purification – enzyme action – coenzymes and isoenzymes. Nucleic acids; physical and chemical properties of nucleic acids and synthesis.

**Unit- III Plant Physiology - Transport**

Plant water relations –water transport process, diffusion, osmosis, water potential, chemical potential, absorption of water – Ascent of sap. Transpiration and its significance – factors affecting, mechanism of stomatal movement. Mineral Nutrition: Nutrient uptake and role of cell membrane, ion pump and carrier, salt stress on crop production.

**Unit- IV Plant Physiology – Photosynthesis and Respiration**

Photosynthesis: Ultra structure of photosynthetic apparatus , photochemical reactions, electron transport pathway in chloroplast membrane, photophosphorylations, C<sub>4</sub> carbon cycle, crassulacean acid metabolism, photorespiration. Respiration: Glycolysis, TCA cycle and electron transport in mitochondria, oxidative phosphorylation, pentose phosphate pathway – cyanide resistant respiration

*Carb by  
Protein  
Lipid*



Dr. S. Vinothchandran.

Dept of Botany

JJ college of arts & Science.

Pudukkottai.

Day/Order	HOURS			
I	PL-DIV-II			
II		PL-DIV-II		PL-DIV-II
III			PL-DIV-II	
IV		Practical		
V	Practical		PL-DIV-II	

## SEMESTER I

### Plant Diversity – II (Pteridophytes, Gymnosperm and Paleobotany)

Course Code : P1RBOCC2

Hours/Week : 6

Credits : 5

Max Marks : 100

Internal Marks :

External Marks :

#### Objectives:

To impart the knowledge about

- The occurrence, distribution, structure and life history of Pteridophytes  
Gymnosperms
- Evolutionary trends in Pteridophytes
- Geological time scale and types of fossil preservation
- Land plants of the past.

#### Unit I – Pteridophytes – General aspects

General features and distribution of Pteridophytes – classification by Reimers 19  
Pteridophytes Range of variation in sporophytes – brief account of anatomy of sporophyte  
stelar structure and evolution.

#### Unit II – Pteridophytes and their evolution

Reproduction and life history, sporangial evolution, heterospory and seed habit, evolution  
of gametophytes and sex organs within pteridophytes – Apospory and Apogamy. general  
character and life cycle of major groups: Psilopsida, Lycopsidea, Sphenopsida and Pteropsida.

#### Unit III - Gymnosperms – General aspects

Concept of pro-gymnosperms, classification of gymnosperms (K.R. Sporne, 1967)  
general account on the morphology, distribution, anatomy and reproduction of the major groups  
of gymnosperms: Pteridospermales, Bennettitales Pentoxylales and Cordaitales.

#### Unit IV – Gymnosperms- type study

A general account on the morphology, distribution, anatomy and reproduction of  
major groups of gymnosperms: Cycadales, Coniferales, Ginkgoales, and Gnetales – economic  
importance of gymnosperms.

#### Unit V – Paleobotany

A general account of geological time scale, Fossils: types, methods of fossilization  
brief account on fossils of Algae, Fungi, Pteridophytes and Gymnosperms. Role of fossils in  
exploration. Morphology Anatomy and Embryology of Paleobotany.

# Gynoecium :-

- \* Each ovule was about 1mm in length.
- \* The integument of the ovule was fused with the nucellus except at the apex.
- \* Each ovules has a pollen chamber and an external nuclear peak.
- \* The fused tips of the interaxillary scales form a type of external protective covering (or) pericarp surrounding the seeds.

## Classification of Gymnosperms :-

- > gymnosperms are non-flowering plant.
- > They have naked seeds
- > K R Sporne classified gymnosperms on 1967
- > He classified it into 8 classes of order and 31 Families

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12/10/21

Dr. J. Mohammed Hussain

I. M.Sc Botany  
Plant Diversity - I

I	II	III	IV	V	VI
I		I MSc		I MSc	
II					
III		I MSc			II MSc
IV					I MSc
V				I MSc	
VI	I MSc	I MSc		II MSc	

**SEMESTER I**

**PLANT DIVERSITY I (PHYCOLOGY, LICHENOLOGY AND BRYOLOGY)**

**Course Code: PIR1BOCCI**

**Marks: 25+75=100**

**Hours/Week: 6**

**Total Hrs: 72**

**Credit: 5**

**Objectives:**

- To have comprehensive knowledge on lower plants
- To understand the diversity, reproduction and economic importance of lower plants
- To understand the evolutionary significance of lower plants
- To understand the structure of the microbes and their economic values in day to day life
- To know about the diversification in micro-plants

**Unit - I: Phycology -General aspect**

**(14 Hours)**

Light and electron microscopic structure of prokaryotic and eukaryotic algae, pigments, reserve foods, cell wall, flagella, chloroplast, pyrenoid and their biological importance. Detailed study about thallus organization, cell structure, reproduction (asexual and sexual) and life cycle.

**Unit - II: Phycology - General aspect**

**(14 Hours)**

Classification of algae by Fritsch (1935) - Brief study on Chlorophyceae, Xanthophyceae, Chrysophyceae, Bacillariophyceae, Cryptophyceae, Dinophyceae, Chloromonadineae, Euglenineae, Phaeophyceae, Rhodophyceae, Myxophyceae.

**Unit - III: Phycology - Lab Technology and Economic importance**

**(14 Hours)**

Ecological significance of algae - Isolation and culture of algae from different fresh water algae (Chu-10 medium and Pringsheims) and marine algae (Guillard's F/2 Medium) - SCP- Economic importance of algae.

**Unit - IV: Lichenology**

**(14 Hours)**

General features, distribution, thallus organization and reproduction; classifications of lichens by Miller (1984) - Structure and life cycle of *Parmelia* and *Usnea* - Economic importance of Lichens.

**Unit - V: Bryology**

**(14 Hours)**

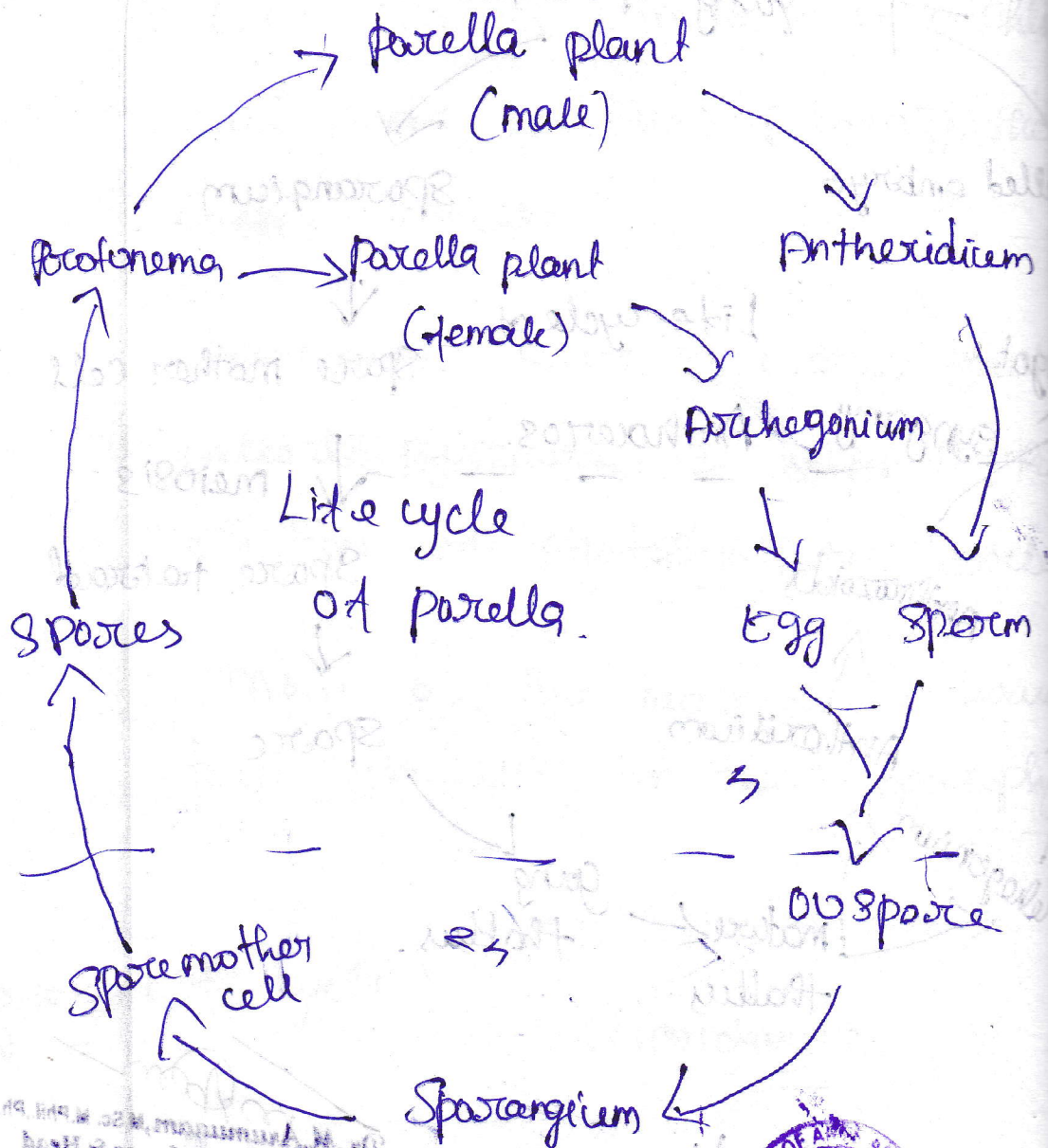
General features, range of vegetative structure, evolution of gametophytes and sporophytes, reproduction (excluding developmental stages); classification (Watson, 1964) economic and ecological importance. Diagnostic characters of Liverworts, Hornworts - Life histories of *Marchantia*, *Porella*, *Anthoceros* and *Polytrichum*.

**Unit - VI: Latest Learning**

**(2 Hours)**

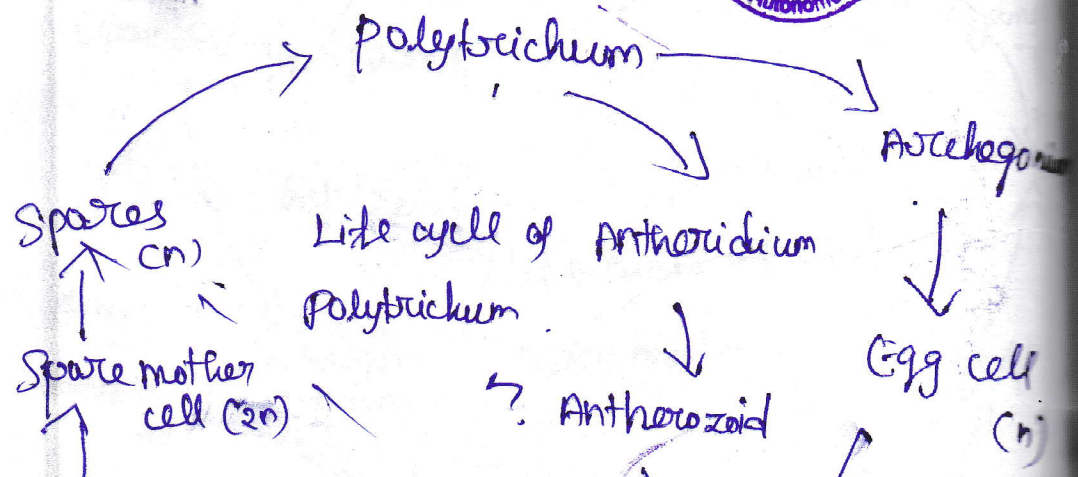
Latest development related to the Course during the semester concerned (CIA purpose only not for question setting)

Porcella:



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Polytrichum:



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III Bsc Botany

Bio-fertilizers production and Applications

DO/HR	1	2	3	4	5
I					
II	III BSC				
III			III BSC		
IV					
V					
VI			III BSC		

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**SEMESTER V**

**BIO-FERTILIZER PRODUCTION AND APPLICATIONS**

**Course Code : U5R1BOSBE2**

**Course: Skill-based Elective**

**Hours/Week : 4**

**Credit : 2**

**Objective**

- To understand the microorganisms can be used as bio fertilizers
- To learn the technology of inoculum to the bio fertilizers production
- The acquire knowledge to produce the some bio fertilizers in large scale
- They acquire knowledge on symbiotic association in plants
- To motivate the students to become as entrepreneurs

**UNIT I**

An introduction to Biofertilizers – Microbes used as bio-fertilizer – Classification. Symbiotic N<sub>2</sub> Fixers: Rhizobium – Isolation, Identification and characterization - large scale production and field application.

**UNIT II**

Symbiotic N<sub>2</sub> fixers: Isolation, Identification large scale production, crop response, and field application of *Cyanobacteria* and *Azolla*. Isolation and characterization of Frankia – Actinorhizal nodules – non-leguminous crop symbiosis.

**UNIT III**

Non symbiotic N<sub>2</sub> fixers: Isolation, Identification large scale production, crop response, and field application of *Azospirillum* and *Azotobacter*.

**UNIT IV**

Phosphate solubilizers: Isolation, characterization, mass inoculums production, field application of *Bacillus firmus* and *Pseudomonas* - Phosphate solubilization mechanism.

**UNIT V**

Mycorrhizal Biofertilizers: Classification, Isolation, Identification, Mass inoculum production, field application of Ecto and Endo mycorrhizae

**Course Outcome**

- The students could understand bio fertilizers are only source for recovery the soil fertility.
- They could know the organism identity and their applications.
- Graduate world learn the methods for large scale production of bio fertilizers.
- The students get knowledge in Mycorrhizal biofertilizers
- After completing this course the students could get employment in bio fertilizers companies and they could become as entrepreneurs.

⇒ Ectomycorrhiza includes arbuscular  
ericoid, and orchid mycorrhiza, while arbutus  
mycorrhizas can be classified as  
ectomycor' endomycorrhizas. monotropoid  
mycorrhizas from a special category.

⇒ mycorrhizal association obligatory for  
germinating orchid seeds. Ex. Rhizoctonia  
repense and orchis militaris.

⇒ mycorrhizae play a very importance role  
in agricultural and forestry.

⇒ Root colonization provides protection from  
parasitic fungi and nematodes.

⇒ can be cultured on maize and  
gram for mass inoculum multiplication,

⇒ Ectomycorrhizae have mostly studied one  
only microscopically visible and associated  
cultural crops like tea and maize

Dr. M. Aggarwal  
26/10/20

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