

# **YADAVA COLLEGE**

(An Autonomous Co-educational Institution, Affiliated to Madurai Kamaraj University  
Re-accredited with "A" Grade by NAAC)

**Govindarajan Campus, Thiruppalai, Madurai – 625 014**

## **DEPARTMENT OF BOTANY**



## **SYLLABUS**

**C.B.C.S. – 2022 - 2023 onwards**

**DEPARTMENT OF BOTANY – C.B.C.S. – 2018 - 2019 onwards**

Semester	Part	Subject Code	Title of paper	Teaching		Marks Allotted		Duration of Exam
				Hour	Credit	Internal	External	
III	Part III Allied II		<b>Plant Diversity I</b> Algae, fungi, Bryophytes, Plant pathology and Agricultural microbiology	4	3	25	75	3hrs
				2	2	-	-	-
IV			<b>Plant Diversity II</b> Pteridophytes, Gymnosperms, Anatomy and Embryology <b>Lab: Practical I</b>	4	3	25	75	3hrs
				2	2	40	60	3hrs
V			<b>Paper III</b> Taxonomy of Angiosperm, Plant physiology, Forest Ecology	4	3	25	75	3hrs
				2	-	-	-	-
VI			<b><u>Applied Botany</u></b> Plant breeding, Horticulture, Economic Botany, and Herbal medicine, <b>Lab : Practical II</b>	4	4	25	75	3hrs
				2	2	40	60	3hrs
<b>Total Credits</b>				<b>21</b>				

## Allied Botany – Paper I

### ALGAE, FUNGI, BRYOPHYTES, PLANT PATHOLOGY AND AGRICULTURAL MICROBIOLOGY

**Semester III**

**Duration:** 4hrs /Week

#### **OBJECTIVES:**

1. To have a comprehensive knowledge of algae, fungi and bryophytes
2. To gain the knowledge about the economic importance of algae and fungi
3. To understand the symptoms, dissemination and control measures of plant diseases
4. To appreciate the role of microbes in Agriculture

#### **Unit I Algae:**

General characters and classification according to Fritsch - Structure and life history  
Cyanophyceae– *Anabaena*- Chlorophyceae – *Oedogonium*- Phaeophyceae –  
*Sargassum*- Economic importance of algae.

#### **Unit II Fungi:**

General characters and classification according to Alexopoulos and Mims- Structure and life history. Ascomycetes – *Saccharomyces*- Basidiomycetes – *Puccinia graminis* - Lichens – structure and reproduction of *Usnea*- Economic importance of fungi and Lichens. Endophytic fungi.

#### **Unit III Bryophytes:**

General characters of bryophytes & classification by Rothmaler – General character & Structure, reproduction and life history of moss with special reference to *Marchantia*. Economic importance of Bryophytes.

#### **Unit IV Plant Pathology:**

Study of the following plant diseases with reference to causal organism, symptoms, Disease cycle, control and preventive measures- Bacterial disease – Citrus canker - Fungal disease – Red rot of sugar cane- Viral disease – Tobacco Mosaic Virus.

#### **Unit V Agricultural Microbiology:**

Bio – inoculants and its Advantages – Biological Nitrogen fixation (with special reference to symbiotic) - Rhizobium and its application- VAM fungi.

**Text Books:**

1. Stephenson, S.L. 2010. The Kingdom fungi: The Biology of Mushroom, Molds and Lichens, Timber Press Inc., UK.
2. Lynda Ed. West. 2010. Algae, Cambridge University Press, UK.
3. Vashishta, B.R. 1988. Bryophyta, 6<sup>th</sup> Edition, S. Chand and company, (Pvt.) Ltd., New Delhi.
4. Kumar, H.D. 1990. Introductory Phycology Affiliated East West Press (P) Ltd., New Delhi.
5. Rashid, A. 1998. An introduction to Bryophyta, Vikas Publishing House (P) Ltd., New Delhi.

**Reference Books:**

1. West, G.S. 2010. Algae vol. I. Myxophyceae, Peridinieae, Bacillariaceae, Chlorophyceae, Cambridge Botanical hand book series, UK.
2. Tuba, Z., N.G., Sleck and L.R. Stark. 2011. Bryophyte, Cambridge University Press, UK.
3. Dube, H.C. 2009. Introduction to Fungi, Vikas publishing pvt. Ltd., New Delhi.
4. Paracer, S and V.Ahmadjian. 2002. Symbiosis, Oxford University Press, Chennai.

## Allied Botany – Paper II

### PTERIDOPHYTES, GYMNOSPERMS, CELL BIOLOGY ANATOMY AND EMBRYOLOGY

Semester IV

Duration: 4hrs /Week

#### OBJECTIVES:

1. To gain knowledge about Pteridophytes and Gymnosperms
2. To understand the embryology of Angiosperms
3. To understand the interaction and functioning of various cell organelles and cell division
4. To know about the internal structure of various parts of the plant body

#### Unit I Pteridophytes:

General characters and classification of Pteridophytes according to Smith - Structure and life history of *Lycopodium*, and *Marsilea*. Economic importance of Pteridophytes.

#### Unit II Gymnosperms:

General characters and classification of gymnosperms according to Chamberlin- Structure and life history – *Cycas*. Economic importance.

#### Unit III Cell Biology:

Structure & Function of the plant cell wall, plasma membrane – (fluid mosaic model)- Ultra structure of Mitochondria, Chloroplast, and Nucleus -Cell division – mitosis and meiosis and its significance of meiosis.

#### Unit IV Anatomy:

Primary structure of dicot & monocot stem - dicot root - dicot leaf.

#### Unit V Embryology:

Structure of Microsporangium and Megasporangium, Type of Ovule –types of Endosperm and its application. Development of dicot embryo. Polyembryony, Apomixis, Parthenocarpy.

**Text Books:**

1. Parihar, N.S. 1965. An Introduction to Embryophyta, Vol. I., Central Book Depot, Allahabad.
2. Sporne, K.R. 1974. Morphology of Gymnosperms, B.I. Publications, Chennai.
3. Sporne, K.R. 1976. Morphology of Pteridophytes, B.I. Publications, Chennai.
4. Vashishta, P.C.1976. Gymnosperms, S.Chand and Co., New Delhi.
5. Vashishta, P.C.1976. Pteridophytes, S.Chand and Co., New Delhi.
6. Pandey, B.P. 2001. College Botany, Vol.II, S.Chand and Co., New Delhi.

**Reference Books:**

1. Alan Reid Smith. 1981. Pteridophytes, California Academy of Sciences. California.
2. Reddy, S.M. and S.J. Chary. 2003. Gymnosperms, New age international (p) Ltd. Publisher. New Delhi.
3. R. A. Spiler and B.A. Thomas, 1986. Systematics & Taxonomic approaches in Paleobotany, Clarendon Press,UK.

## **Allied Botany – Paper III**

### **TAXONOMY OF ANGIOSPERMS, PLANT PHYSIOLOGY AND FOREST ECOLOGY**

**Semester V**

**Duration:** 4 hrs / week

#### **OBJECTIVES:**

1. To know the salient features of different families of angiosperms
2. To identify the plants with Binominal nomenclature
3. To understand the concept of metabolic activities of plants
4. To understand the importance of forest protection and to have a knowledge about the conservation and management of forests

#### **Unit I: Taxonomy of Angiosperms**

Outlines of Bentham and Hooker's systems of classification- Merits and demerits .  
Floral characters -floral diagram - floral formula and economic importance.

#### **Unit II: Taxonomy of Angiosperms**

Salient features and Economic importance of following families Capparidaceae –  
Rutaceae-Cucurbitaceae-Euphorbiaceae-Poaceae.

#### **Unit III Plant Physiology:**

Ascent of sap, absorption of water- water relationship - diffusion, osmosis, imbibition- Translocation of organic solutes. Transpiration: types & significance. - physiological role of Phytohormones and its application. photoperiodism and vernalisation.

#### **Unit IV Plant Metabolism:**

Photosynthesis –light and dark reaction, factors affecting photosynthesis and Respiration-Co<sub>2</sub>fixation -Glycolysis , Kreb's cycle and TCA.

#### **Unit V Forest Ecology:**

Deforestation, land misuse, indiscriminate tree felling effect afforestation.Conservation of forests fire, diseases, insects-Crazing, by domestic animals, landslide, flood and shifting sands -chipko movement –forest Act,1972 .Sylviculture, social forestry and agro forestry.

**Text Books:**

1. Vasishtha, P.C.1992. Taxonomy of Angiosperms, R.Chand and Co., New Delhi.
2. Lawrence, G.H.M. 1951. Taxonomy of vascular plants. The Macmillan Co., New York.
3. Heywood, V.K. 1967. Plant Taxonomy Edward Arnold Pub.. Ltd. London.
4. Rendle, A.B. 1925. The classification of flowering plants. Vol II Dicotyledons. Cambridge University Press. London. Pandey, S. N and B. K. Sinha. 1989. Plant Physiology, Vikas Pub. House, New Delhi.
2. Noggle, G. R. and G. J. Fritz. Introductory Plant Physiology, Second Edition, Prentice-Hall of India Ltd., New Delhi.
3. Gupta, N. K. and S. Gupta. 2005. Plant Physiology, Oxford & IBH publishing Co. Ltd., New Delhi
4. Sundararajan, S. 2000. Plant Physiology, Anmol Publication Ltd., New Delhi
5. Mukherji. S. and Ghosh, A. K. 2005. Plant Physiology,. New Central Book Agency Ltd.,  
a. New Delhi
6. Verma, S. K. A Text Book of Plant Physiology and Biochemistry, Fourth Edition, ISBN: 81-219-0627-X

**Reference Books:**

1. Salisbury, F. B. and Rose, C. W. 1992. Plant Physiology, Asia Ltd., Singapore.
2. Devlin, R. M. and Witham, F.H.1986. Plant Physiology, Fourth Edition, CBS Pub., Delhi.
3. Simpson, M.G. 2006. Plant Systematics, Academic Press, UK.
4. Pulliah, T. 2007. Taxonomy of Angiosperms, Third Edition, Regency Publication, New Delhi
5. Johri, R.M. 2005. Taxonomy, Vol. I to V, Sonali Publication, New Delhi.
6. Battacharyya, B. 2005. Systematic Botany, Narosa Publishing House, New Delhi
7. Dwividi, A.P. 2009. Agroforestry – Principles & Practices, Oxford & IBH publications, New Delhi.



**Allied Botany – Paper IV**  
**APPLIED BOTANY -HORTICULTURE, PLANT BREEDING**  
**ECONOMIC BOTANY & MEDICINAL BOTANY**

**Semester VI**

**Duration: 4 hrs / week**

**OBJECTIVES:**

1. Appreciate nutritive value and use of food products with relevant applied
2. Aspects suited to problems of regional and national needs.
3. To know about different types of plant yielding drugs.
4. To acquire knowledge about the various methods of propagation of plants.
5. To have a knowledge of commercial crop improvement methods.

**Unit I: Horticultural:**

Definition, scope and importance and division of horticulture- Vegetative propagation – cutting, layerage and graftage and its advantages- Planning and layout of kitchen garden- Indoor gardening – hanging pots, miniature-rockeries.

**Unit II: Plant Breeding:**

Objective of plant breeding and methods - introduction- Acclimatization - Selection and hybridization ,Heterosis-Role of polyploidy - plant breeding in crop improvement.

**Unit III: Economic Botany**

Economic important - Edible plants- Brief study on Botanical name, family, morphology use of commercial application. Cereal – Ragi (*Eleusine coracana* Gaertn.)- Pulse –Red gram (*Cajanus cajan* L.) - Fruit – Grapes (*Vitis vinifera* L.) - Beverage – Coffee (*Coffea arabica* L.) - Spice – Cardamomum (*Ellettaria cardemomum* Maton).

**Unit IV: Economic importance of Non Edible plants:**

Brief study on Botanical name, family, morphology and use of commercial product- Narcotics- Tobacco (*Nicotiana tabacum* L.) - Dye – Indigo (*Indigofera tinctoria* L.) - Fibre – Jute (*Corchorus capsularis* L.) - Latex – Rubber (*Hevea brasiliensis* Muell. Arg.) - Wood- Teak (*Tectona grandis* L.f.) – Turpentine – Pinus (*Pinus radiata* D. Don). Bio diesel- *Jatropha curcus*

### **Unit V: Medicinal Botany:**

Botanical name, family of useful parts and medicinal values- Seed - castor oil (*Ricinus communis* L.) -Roots – *Asparagus racemosus* Willd. - Rhizome – *Curcuma longa* linn. - Bark – *Cinchona officinalis* L.-Leaves – *Aloe vera* (L.) Burm.f. - Flowers – *Syzygium aromaticum* (L.) Merrill & Perry.

### **Text Books:**

1. Kumar, H.D.2017. Text Book of Horticulture, Vikas Publishing Company, Sahibabad.
2. Sinha and Punitha 1976. Cytogenetics, Plant Breeding and Evolution, Vikas publishing Company, Sahibabad.
3. Bent Hill, A.F. 2006. Economic Botany, Tata Mc Graw Hill Publishers, New Delhi.
4. Sambamoorthy, A.F., and Subramaniam, N.S., 2000. A Text Book of Economic Botany, Willey Eastern Limited, New Delhi.
5. Manibhushan Rao, K.2005. Text Book of Horticulture, 2<sup>nd</sup> Edition, Mac Millan India.

### **Reference Books:**

1. Edmond, J.B., Sen., T.L., Andrews, F.S and. Halfacre R.G. 1963. Fundamentals of Horticulture, Tata Mc Graw Hill Publishers, New Delhi.
2. Pandey, B.P. 2007. Economic Botany, 5<sup>th</sup> Edition, S. Chand and company, New Delhi.
3. Sadhu, M.K. 2005. Plant Propagation, New Age International Publishers (Formerly Wiley Eastern Limited), New Delhi.
4. Sukla, R.S. and Chandel P.S. 2009. 5th Edition, Cytogenetics, Evolution and Plant Breeding, S. Chand and company, New Delhi.

**Allied Botany – Practical Paper I**  
**ALGAE, FUNGI, BRYOPHYTES, PTERIDOPHYTES,**  
**GYMNOSPERMS,**  
**CELL BIOLOGY, ANATOMY, EMBRYOLOGY, PLANT**  
**PATHOLOGY**  
**& AGRICULTURAL MICROBIOLOGY**

**Semester IV**

**Duration : 2 hrs / week**

1. Microscopic observation Identification of cell inclusions cell division (mitosis).
2. Sectioning, mounting and identify a T.S. of stem and root of Dicot
3. Sectioning, mounting and identifying T.S. of leaf .
4. Identification of Algal mixture.
5. Sectioning, mounting of following Gymnosperms- cycas.
6. Sectioning of Dicot anther (*Datura*)
7. To observe *and* Identify the disease symptom in plants.
8. Identification of permanent slides of capsule of *marchantia*  
and *Cycas*.
9. To maintain an observation note and record note book. Submit the record for external evaluation.
10. Anabana ,Nostoc and Azolla cultivation.

## **Allied Botany – Practical Paper II**

### **ANGIOSPERM TAXONOMY, PLANT PHYSIOLOGY, HORTICULTURE PLANT BREEDING, ECONOMIC BOTANY & MEDICINAL BOTANY**

**Semester VI**

**Duration: 2hrs / week**

1. To dissect and mount the T.S of floral parts of the plants of the families by technical terms syllabus.
2. To identify respective family giving reasons by elimination .
3. To identify the economic products specified in the syllabus and point out the Botanical name, family, morphology of useful part uses.
4. Assign the Propagation method of horticulture –layerage ,cuttage,graftage.
5. Lay out of kitchen garden.
6. To describe simple setups in plant physiology.
7. To observe and identify at sight and point out the Botanical name, family and morphology of useful part of the medicinal plants.
8. To maintain an observation note and record note book submit it for external evaluation
9. Plant breeding programme selection-(mass,clonal) emasculation ,tagging.