



**G.T.N. ARTS COLLEGE (AUTONOMOUS)
DINDIGUL – 5**

**|Affiliated with Madurai Kamaraj University|
|Accredited with 'B' Grade by NAAC|**

DEPARTMENT OF BOTANY

Choice Based Credit System

Allied Botany Syllabi

June 2017-2018 onwards

Department of Botany

(for those joined in June 2017 onwards)

This Allied Botany Programme is designed for B.Sc., Zoology Students to prepare them to understand and appreciate the overall values of various plants groups available in Nature.

CHOICE BASED CREDIT SYSTEM

Course Structure – Overall View

Semester	Part	Course Code	Course Title	No. of Credit	Contact Hours / Cycle	Marks		
						Internal	External	Total
I	III	17UBOA11	Plant Diversity	4	4	25	75	100
II	III	17UBOA21	Plant Ecology & Plant Biotechnology	4	4	25	75	100
II	III	17UBOA2P	Botany Practical – I	1	2	40	60	100
III	III	17UBOA31	Angiosperm Taxonomy, Embryology & Ethnobotany	4	4	25	75	100
IV	III	17UBOA41	Plant Physiology & Horticulture	4	4	25	75	100
IV	III	17UBOA4P	Botany Practical – II	1	2	40	60	100
			Total	18				600

Allied Botany– Theory – 4 Courses / 16 Credits

Practical – 2 Courses / 2 Credits

G.T.N. ARTS COLLEGE (AUTONOMOUS), DINDIGUL – 5

DEPARTMENT OF BOTANY

Part / Course	III / I	Credit:	04
Class:	II B.Sc., Zoology	No. of Hours / Cycle	04
Semester:	I	No. of Hours / Semester	60
Course Title:	Plant Diversity	Max. Marks	100
Course Code:	17UBOA11		

PLANT DIVERSITY

OBJECTIVE

To understand the Biodiversity and Conservation concepts, the Red Data Book, IUCN Red List, the life cycles of Oscillatoria, Aspergillus, Funaria, Selaginella, Pinus and the economic values of the various plant groups.

UNIT- I: Biodiversity and Conservation: Introduction – Levels of Biodiversity a) Genetic b) Species and c) Ecological – Loss of Biodiversity – Extinction of specie; Types – Natural, Mass and Anthropogenic – Red Data Book and IUCN Red List – Causes of Biodiversity Losses – Biodiversity Conservation and Strategies – In Situ and Ex Situ. (12 hours)

UNIT- II: Non-Vascular Plants: General Characters of Algae – structure and life cycle of Oscillatoria – Economic Importance of Algae. General Characters of Fungi – Structure and Life cycle of Aspergillus – Economic Importance of Fungi. (12 hours)

UNIT- III: Non-Vascular Cryptogamic Plants: General Characters of Bryophytes – Structure and life cycle of Funaria. Economic Importance of Bryophytes. (12 hours)

UNIT – IV: Lower Vascular Plants: Non-flowering Plants – General Characters of Pteridophytes – Morphology and Reproduction of Selaginella. Economic Importance of Pteridophytes. (12 hours)

UNIT – V: Naked Seed Plants: General Characters of Gymnosperms – Structure and Life Cycle of Pinus. Economic Importance of Gymnosperms. (12 hours)

TEXT BOOK

1. Annie Ragland, Kumaresan, V. and Arumugam, N., (2015), *A Text Book of Botany Volume-1*, Saras Publication, Tamil Nadu.
2. Annie Ragland, and Kumaresan, V., (2007), *Pteridophytes, Gymnosperms & Palaeobotany*, Saras Publication, Tamil Nadu.
3. Kumaresan, V. and Arumugam, N., (2015), *Plant Ecology and Phytogeography*, Saras Publication, Tamil Nadu.

REFERENCE BOOK

1. Alexopolous, C.J. and Mims, C.W., (2010), *Introductory Mycology*, Wiley Eastern Limited, New Delhi.
2. Pandey, B.P., (2011), *College Botany Vol.-II*, S.Chand & Company Ltd., New Delhi.

G.T.N. ARTS COLLEGE (AUTONOMOUS), DINDIGUL – 5

DEPARTMENT OF BOTANY

Part / Course	III / II	Credit:	04
Class:	II B.Sc., Zoology	No. of Hours / Cycle	04
Semester:	II	No. of Hours / Semester	60
Course Title:	Plant Ecology & Plant Biotechnology	Max. Marks	100
Course Code:	17UBOA21		

PLANT ECOLOGY & PLANT BIOTECHNOLOGY

OBJECTIVE

To understand the ecological groups of plant communities, knowing the biotechnological developments, agree that no living creature is an isolated organism in the nature.

UNIT – I: Introduction to Ecology – Concepts of Ecology – Ecological Groups of Plants – Hydrophytes – Xerophytes – Halophytes – Classification and their Morphological Adaptations. (12 hours)

UNIT – II: Phytogeography of Tamil Nadu – Concepts of Threatened Species – Modes of Wild Life Conservation. (12 hours)

UNIT – III: Plant Tissue Culture – Introduction – Concepts - Techniques in Tissue Culture – Basic Requirements for Tissue Culture - Applications of Tissue Culture. (12 hours)

UNIT – IV: Mushroom Cultivation – Nutritional Values – Spawn Preparation – Cultivation Methods of White Button Mushroom – Preservation of Mushrooms. (12 hours)

UNIT – V: Organic Farming – Broad Outline of Nitrogen Fixation – Biofertilizers (N₂ Fixers, Phosphate Solubilizers and VAM Fungi) – Vermicompost - Biodiesel Production. (12 hours)

TEXT BOOK

1. Annie Ragland, and Kumaresan, V., (2006), *Plant Ecology & Applied Botany*, Saras Publication, Tamil Nadu.
2. Arumugam, N. and Kumaresan, V., (2016), *Applied Plant Biotechnology*, Saras Publication, Tamil Nadu.
3. Kumaresan, V. and Arumugam, N., (2015), *Plant Ecology and Phytogeography*, Saras Publication, Tamil Nadu.

REFERENCE BOOK

1. Dubey, R.C., (2007), *Textbook of Biotechnology*, S.Chand and Company Limited, New Delhi.
2. Shukla, R.S. and Chandel, R.S., (2003), *Plant Ecology*, S.Chand and Company Limited, New Delhi.

G.T.N. ARTS COLLEGE (AUTONOMOUS), DINDIGUL – 5

DEPARTMENT OF BOTANY

Part / Course	III / III	Credit:	04
Class:	III B.Sc., Zoology	No. of Hours / Cycle	04
Semester:	III	No. of Hours / Semester	60
Course Title:	Angiosperm Taxonomy, Embryology & Ethnobotany	Max. Marks	100
Course Code:	17UBOA31		

**ANGIOSPERM TAXONOMY, EMBRYOLOGY &
ETHNOBOTANY**

OBJECTIVE

Understand the Natural System of Angiosperm Classification; appreciate the values of the selective Medicinal plants and the concepts of embryology.

UNIT – I: Angiosperm Taxonomy – Introduction, Objectives and Scope; Binomial Nomenclature; Taxonomical Hierarchies; Systems of Classification - Outline of Bentham & Hookers' System of Classification with Merits & Demerits; Distinguishing Characters of the following families including their economic importance.

1. Rutaceae (Dicotyledons - Polypetalae)
2. Asclepiadaceae (Dicotyledons - Gamopetalae) (12 Hours)

UNIT – II: Distinguishing Characters of the following families including the economic importance.

3. Euphorbiaceae (Dicotyledons - Monochlamydeae)
4. Caesalpinioideae (Dicotyledons – Polypetalae)
5. Poaceae (Monocotyledons) (12 Hours)

UNIT- III: Embryology of Angiosperms - Flower and its Parts – Stamen – Microsporogenesis – Male Gametophyte – Carpel – Ovule – Megasporogenesis – Female

Gametophyte – Pollination and its Kinds - Fertilization – Double Fertilization – Triple Fusion. (12 Hours)

UNIT – IV: Ethnobotany – Introduction; Concepts of Pharmacology; Morphology and Medicinal Values of the following plants:

a. *Aegle marmelos* (L.) Correa

b. *Phyllanthus amarus* Schum. & Thonn.

c. *Azadirachta indica* A. Juss. (12 Hours)

UNIT – V: Morphology and Medicinal Values of the following plants:

a. *Ocimum sanctum* Linn.

b. *Allium sativum* Linn.

c. *Zingiber officinale* Rosc. (12 Hours)

TEXT BOOK

1. Annie Ragland, and Kumaresan, V., (2004), *Taxonomy of Angiosperms*, Saras Publication, Tamil Nadu.
2. Kumaresan, V., (2015), *Herbal Biotechnology And Pharmacognosy*. Saras Publication, Tamil Nadu.

REFERENCE BOOK

1. Bhojwani, S.S., Bhatnagar, S.P., (1988), *The Embryology of Angiosperms*, Vikas Publishing House Private Limited, New Delhi.
2. Gamble *et. al.*, 3 Volumes. *Flora of the Presidency of Madras*.
3. Sharma, O.P.,(2006), *Plant Taxonomy*, Tata McGraw-Hill Publishing Company Limited, New Delhi.

DEPARTMENT OF BOTANY

Part / Course	III / IV	Credit:	04
Class:	III B.Sc., Zoology	No. of Hours / Cycle	04
Semester:	IV	No. of Hours / Semester	60
Course Title:	Plant Physiology & Horticulture	Max. Marks	100
Course Code:	17UBOA41		

PLANT PHYSIOLOGY & HORTICULTURE

OBJECTIVE

To understand the physical processes in absorption of water by plants, Photosynthesis, Respiration and the practices involve in the methods of vegetative propagation.

UNIT – I: Water Relations - Water Potential; Types of Solutions – hypotonic, hypertonic and isotonic; Physical processes- imbibition, diffusion and osmosis; Xylem, Phloem and their Physiology; Mechanism of water absorption - Active Transport and Passive Transport; Factors affecting Water absorption; Aquaporins. (12 Hours)

UNIT – II: Transpiration- Introduction; Kinds of Transpiration – stomatal, cuticular and lenticular; Mechanism of stomatal transpiration [ATP driven Proton (H⁺) / K⁺ Exchange Pump in Guard cells]; **Photosynthesis** – Introduction; advantages; pigment systems; Mechanism – Light Reaction and Dark Reaction (C₃ Cycle only); brief introduction about C₄ and CAM plants. (12 Hours)

UNIT – III: Plant Growth – Introduction; Sigmoid Growth Curve; Growth Hormones – Introduction; Physiological roles of Auxin – Gibberellin – Cytokinin – Ethylene in plants. (12 Hours)

UNIT – IV: Horticulture – Introduction; Vegetative Propagation – Cuttage – Root Cutting; Stem Cutting; Leaf and Leaf Bud Cutting, Layerage – Ground Layering and Air Layering and Graftage – Approach, Clef, Whip and Top Grafting. (12 Hours)

UNIT – V: Kitchen Garden – Introduction; Layout of kitchen garden; Storage of Fruits; Indoor Gardening – Hanging Pot; Bonsai – Introduction and types. (12 Hours)

TEXT BOOK

1. Annie Ragland, Jayakumar, M., Rajkumar, K. and Rajaratnam, K. (2014), *Plant Physiology*, Saras Publication, Tamil Nadu.
2. Kumaresan, V. and Arumugam, N. (2015), *Fundamentals of Horticulture and Plant Breeding*, Saras Publication, Tamil Nadu.

REFERENCE BOOK

1. Hartmann, H.T. and Kester, D.E. (1989), *Plant Propagation – Principles and Practices*, Prentice-Hall of India Private Limited, New Delhi.
2. Jain, V.K., (2011), *Fundamentals of Plant Physiology*, S.Chand & Company Limited, New Delhi.
3. Ray Noggle, G. and George J. Fritz., (1986), *Introductory Plant Physiology*, Prentice-Hall of India Private Limited, New Delhi.

G.T.N. ARTS COLLEGE (AUTONOMOUS), DINDIGUL – 5

DEPARTMENT OF BOTANY

Part / Practical Course	III / I	Credit:	01
Class:	II B.Sc., Zoology	No. of Hours / Cycle	02
Semester:	II	No. of Hours / Semester	30
Course Title:	Plant Diversity , Plant Ecology & Plant Biotechnology	Max. Marks	100
Course Code:	17UBOA2P		

PLANT DIVERSITY, PLANT ECOLOGY & PLANT BIOTECHNOLOGY

OBJECTIVE

To learn the mounting techniques of various parts of the specified plant species and understand the internal structures.

1. Micro Preparation and identification of the specimens mentioned below:

Algae: Oscillatoria

Fungi: Aspergillus

Bryophytes: Funaria

Pteridophytes: Selaginella

Gymnosperms: Pinus

- 2. To observe and identify the permanent slides / the macroscopic jar specimens / photos of species mentioned above.**
- 3. Make dissection and submission of stem / leaves of Selaginella / Pinus, using dissection microscope.**
- 4. Spotters – Identification of Specimens or Slides from Algae, Fungi, Bryophytes, Pteridophytes and Gymnosperms included in the Syllabus.**
- 5. Section Cutting and Mounting Plant Materials of Ecological Importance (such as Leaves of Nerium, Bryophyllum, Nymphaea and other available materials)**
- 6. Maintenance of Observation Note Book and Submission of the same during Practical Examination.**

DEPARTMENT OF BOTANY

Part / Practical Course	III / II	Credit:	01
Class:	III B.Sc., Zoology	No. of Hours / Cycle	02
Semester:	IV	No. of Hours / Semester	30
Course Title:	Angiosperm Taxonomy, Embryology, Medicinal Botany, Plant Physiology & Horticulture	Max. Marks	100
Course Code:	17UBOA4P		

Angiosperm Taxonomy, Embryology, Medicinal Botany, Plant Physiology & Horticulture

OBJECTIVE

To learn the plant classification methods, identify the embryological permanent slides, understand the simple setups in physiological studies and practice some horticulture techniques

1. To make dissections of the floral parts of Angiosperm plants and to make drawing to bring out the salient features (floral diagram also expected).
2. To assign the given plants to its natural order giving reasons.
3. To describe plants in Technical Terms.
4. Identification of Medicinal Plants and report their medicinal uses..
5. Identification of sections of anther and ovule of angiosperm plants.
6. Identification and Demonstration of Propagation methods in Horticulture– Cuttage, Layerage and Graftage.
7. To describe simple setups in plants physiology (Osmosis using Potato Osmoscope, Light Screen Experiment, Mohl's Half Leaf Experiment).
8. To maintain Record Notebook and to submit it for external valuation.

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DEPARTMENT OF BOTANY – THEORY COURSES

Marks Allotted

Internal Test - 25 Marks

Summative Examination - 75 Marks

Total - 100 Marks

Internal Test - Maximum 25 Marks

Components

1. Assignment -Two - Each carrying 5 marks – Finally averaged to 5 Marks.

2. Quiz -Two - Each carrying 5 marks – Finally averaged to 5 Marks.

3. Internal Test -Two - Each carrying 30 marks – Finally averaged to 15 Marks.

1st Internal Test - between 30th and 40th Working Days

2nd Internal Test - between 70th and 80th Working Days

Passing Mark - No minimum marks for Internal Test

Internal Test Question Pattern

Section A – Choose the Best Answer, Four Options (One Mark) $6 \times 1 = 6$

**Section B – Answer two questions, one question from each choice (Seven Marks)
 $2 \times 7 = 14$**

**Section C – Answer any one question out of two questions, open choice (Ten Marks)
 $1 \times 10 = 10$**

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DEPARTMENT OF BOTANY – PRACTICAL COURSES

Marks Allotted

Internal Test - 40 Marks

Summative Examination - 60 Marks

Total - 100 Marks

Internal Test – 40 marks

Components

1. Attendance – Not less than 70% (21 days out of 30 days for 2 Semesters)-10 marks

2. Internal Test – Two Tests – each carrying 10 marks - 20 marks

3. Observation Note Book -10 marks

Summative Examination – 60 marks

1. Summative Examination – 50 marks

2. Record Note Book – 10 marks

Passing Mark - Minimum 24 (out of 60 marks) for External Examination

Eligibility for the Degree - Passing Minimum is 40% (both Internal & External)