

## SEMESTER I

Major: (BOT1011)- Plant Diversity and Evolution

Marks - 40

Credit -3

Hours: 6

### Unit1: Origin of life

Chemical basis of origin of life, concepts of evolution, Tree and classification of life, and classification (up to six kingdoms).

Hours: 4

### Unit2: Bacteria

Characteristic features, cell structure and genetic element, asexual reproduction and modes of gene transfer (conjugation, transformation and transduction), brief introduction to Archaea. Role of bacteria in agriculture, medicine and industry.

Hours: 4

### Unit3: Viruses

Characteristic features, replication, RNA virus (structure of TMV), DNA virus (structure of T-phage), Lytic and Lysogenic life cycle (Lambda phage).

Hours: 6

### Unit4: Algae

Characteristic features, cell structure, range of thallus, methods of reproduction and evolutionary classification (only up to divisions), A brief account of economic significance (brief account) *Nostoc*, *Spirogyra*, *Sargassum*, *Polysiphonia*.

Hours: 8

### Unit5: Fungi

Characteristics features, affinities with plants and animals, structural features, reproduction and life cycle pattern. Broad classification. Myxomycetes- characteristics and their similarities with fungi. General characteristics and life cycles of *Mucor*, *Saccharomyces*, *Ascobolus*, *Neurospora* and *Agaricus*. Fungal symbiosis- lichen and mycorrhizae (characteristics and significance), economic importance of fungi.

### Unit6: Bryophytes

Characteristic features and reproduction, adaptation to land habit, modern classifications, evolutionary trends in Bryophytes. Brief account of *Marchantia*, *Anthoceros* and *Funaria*. Ecological significance.

Hours: 8

### Unit7: Pteridophytes

Characteristic features and reproduction, modern classifications, evolutionary trends in Pteridophytes affinities with Bryophytes. Brief account of *Psilotum*, *Selaginella*, *Equisetum* and *Pteris*.

Hours: 8

### Unit8: Gymnosperms

Characteristic features and reproduction, modern classifications, evolutionary trends in Gymnosperms affinities with Pteridophytes. Brief account of *Cycas*, *Ginkgo* and *Gnetum*. Economic significance.

Hours: 8

### Unit 9: Angiosperms

Gross morphology and reproduction, Concept of natural, artificial and phylogenetic system of classification.

Hours: 8

**Practical**

**Credit 1**

**Marks-20**

1. To study different strains of *Bacillus* and *E. coli* (Gram staining). (01 hr)
2. To study structure of TMV and Bacteriophage (electronmicrographs/models). (01 hr)
3. To study morphology of *Nostoc*, *Spirogyra*, *Sargassum*, *Polysiphonia* etc. from permanent slides. (02)
4. To study *Mucor*, *Saccharomyces*, *Ascobolus*, *Agaricus* and *Fusarium* from permanent slides, dry preserved specimens or museum specimen. Lichens from dry or preserved specimens. (02 hr)
5. To study *Marchantia*, *Anthoceros* and *Funaria* (vegetative and reproductive morphology from permanent slides). (02 hr)
6. To study the vegetative and reproductive morphology of *Psilotum*, *Selaginella*, *Equisetum* and *Pteris* from permanent slides. (03 hr)
7. To study the vegetative and reproductive morphology of *Cycas*, *Ginkgo* and *Gnetum* from permanent slides. (02 hr)
8. To study morphology of angiosperm leaf, stem, flower, inflorescence and fruits from locally available plant species. (05 hr)

Tutorial: Nil

9. Temporary anatomical slide preparation of Pteris, leaflet and Cycas leaflet.

To,

The Principal

Abhedananda Mahavidyalaya

Sainthia, Birbhum

**Subject: Application for praying permission to study tour.**

Sir,

The undersigned like to inform you that the students (Semester-1, 3years & 4years major and minor) and teachers of Botany Department (Kiran Kumar Mondal) and Zoology Department (Md. Nazimuddin, Mampy Dey and Abdus Satter) are going to botanical excursion (Excursion field: Ballavpur wildlife sanctuary, Shantinketan), dated on 19/12/2023, according to NEP 2020 syllabus requisition, which is already known to you.

In this respect kindly give the official permission for excursion to leave the station as on stipulated date with teachers and students. I am also attaching the teachers and students list (with guardian permission form) here with for your approval for this said excursion.

Your kind cooperation and necessary action will be highly solicited by us.

Thanking you.

Date: 18/12/2023

*Allowed excursion involving  
three teachers and forty-nine  
students.*

*Kandam 2.  
18/12/23*

Principal  
Abhedananda Mahavidyalaya  
Sainthia, Birbhum

Yours faithfully,

*Kiran Kumar Mondal*

(Kiran Kumar Mondal)

Head, Department of Botany &

*Md. Nazim uddin*

(Md. Nazimuddin)

Head, department of Zoology

List of students going to Excursion(Study Tour)

Abhedananda Mahavidyalaya

Department of Botany

SL. NO.	Students Name	Father's Name	Mobile no.
1. ✓	Habiza Khatun	MD. Shabikul Alam	8617365640
2. ✓	Shrabani Mondal	Utpal Mondal	7872407088
3.	Riya Saha	Rabindranath Saha	7810847296
4. ✓	piu Mondal	Santoy Mondal	9339660621
5. ✓	Umroli Saha	Tufan Saha	7063280702
6. ✓	Kiran Chandrai	Benukar Bhandari	7585860967
7.	Annab Dhara	Gauri Sankar Dhara	8436285178
8. ✓	Krushankur Mondal	Debray Mondal	9883627952
9. ✓	Shuvo Pramanik	Dinabandhu Pramanik	7586982476
10. ✓	Monami Majumder	Tridip Majumder	9735441021
11. ✓	Binita Das	Srikanta Das	8918030564
12. -	Prati Pal	Partha Pal	9775960097
13.	Shilpi Mondal	Palash Mondal	9339956672
14. -	Riya Mondal	Prabir Kumar Mondal	9635189324
15. -	Sudipa Mondal	Siddhartha Mondal	9609739064
16.	Smita Mondal	Dhananjay Mondal	8597636102
17.	Arpita Das	Manju Das	9775436204
18.	Tsha Ghosh	Raghunath Ghosh	7029872995
19.	Saswati Saha	Bafan Saha	6295943475
20.	Sathi Rakshit	Biswanath Rakshit	6297073422
21.	Ranit Murreu	Rabi Pada Murreu	7029551534
22.	Bidisha Ray	Biman Ray	9339797008
23.	Prifi Mondal	Biswanath Mondal	<del>9802272055</del> <del>9564270588</del>
24.	Subham Das	Ranjit Das	8391840357
25. ✗	Atif seikh	Hafiz seikh	7908769893
26.	Sajamal Molliek	Samod Molliek	8145937896
27.	Ajanta Mondal	Brabir Mondal	7810848571
28.	Ekita Mondal	Jibankrishna Mondal	7602193851
29.	priyanka keshri	Amit Kumar keshri	9907070121

Sanjona  
Principal  
Abhedananda Mahavidyalaya  
Sainthia, Birbhum



# ABHEDANANDA MAHAVIDYALAYA

SAINTHIA, BIRBHUM, WEST BENGAL, PIN-731234

Founder : Srimat Satyananda Dev (1965) .

(Affiliated to the University of Burdwan and Accredited by NAAC)

Phone : 03462-263449, Email : abhedanandamahavidyalaya@gmail.com, Website : www.abhedanandamahavidyalaya.ac.in

Ref. No. ....

Date : 02 / 01 / 2024

## PROJECT COMPLETION CERTIFICATE

This is certify that the following students have successfully completed their field project (under Department of Botany) relating to the paper BOTN 1011 (Plant Diversity and Evolution) in the academic Year 2023-2024.

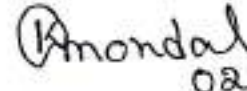
**Title of the Project:** Studies on the Plant Diversity in Birbhum District.

**Name of the Supervisor:** Kiran Kumar Mondal, Department of Botany, Abhedananda Mahavidyalaya, Sainthia.

### List of Students:

Sl. No.	Roll No.	Course	Paper	Year	Name of the Student
1.	230330140014	MAJOR (4-Yr.)	BOTN 1011	2023-24	HAFIZA KHATUN
2.	230330140021	MAJOR (4-Yr.)	BOTN 1011	2023-24	PRITI PAL
3.	230330140036	MAJOR (4-Yr.)	BOTN 1011	2023-24	SHRABANI MONDAL
4.	230330140040	MAJOR (4-Yr.)	BOTN 1011	2023-24	SUDIPA MONDAL
5.	230630130040	MAJOR (3-Yr.)	BOTN 1011	2023-24	RIYA SAHA

  
Principal  
Abhedananda Mahavidyalaya  
Sainthia, Birbhum

  
02/01/2024  
H.O.D.  
DEPARTMENT OF BOTANY  
ABHEDANANDA MAHAVIDYALAYA



**ABHEDANANDA MAHAVIDYALAYA**

**SAINTHIA, BIRBHUM**

**ESTD. -1965**

**CERTIFICATE OF PERFORMANCE**

Certificate No. -AM/BOT/FE/23/003.....

This is to certify that Sri/Smt. Riya Saha.....of  
Abhedananda Mahavidyalaya, Sainthia, West Bengal (bearing University Roll Number-  
230630139040.....) has successfully completed his/her field Trip/field excursion  
at Ballaalpur Sanctuary..... on 21/2/2023.....as per the requirement of the  
syllabus.

Prondal  
Head

Department of Botany

DEPARTMENT OF BOTANY  
ABHEDANANDA MAHAVIDYALAYA  
SAINTHIA \* BIRBHUM

Principa  
Principal

Abhedananda Mahavidyalaya

Principal  
Abhedananda Mahavidyalaya  
Sainthia, Birbhum



# FIELD REPORT

PROJECT TITLE- (STUDIES ON THE PLANT  
DIVERSITY IN BIRBHUM DISTRICT)

SUBJECT-BOTANY

PAPER-MAJOR (BOTN1011)

PAPER TITLE-PLANT DIVERSITY AND EVOLUTION

-: Submitted By:-

Roll Number: - 230330140014

Semester: - I

Session: -2023-2024

EXAMINED

# Report

On

Field Study at Sonajhuri, Shantiniketan

**Date of Excursion- 19/12/2023**

**Study area- Sonajhuri, Shantiniketan**

**Teacher guide – Kiran Kumar Mondal**

The local excursion to Sonajhuri, Shantiniketan was held on 19/12/2023 under the guidance of our teacher Prof. Kiran Kumar Mondal , in collaboration with Department of Zoology.

We the students of Botany, Abhedananda Mahavidyalaya, Sainthia gathered at Sainthia rail station where from our journey started at 7:30 am . The day we availed was sunny and suitable for journey. We reached at the Prantik station at 9 am and took there toto vehical for our comfortable journey. We enjoyed the whole day by observation and collection of different plant in diverse ecological habitats. In addition to following plants, we also collected different type of algae, fungi, ferns etc. Then we took some light refreshment by acquiring an area near the deer park and also enjoyed to see beautiful ;chital' deer on the park. Then we visited the Tagore Museum where we witnessed a large number of antiques of RabindranathTagore, collected from different country of the world. During the time of visiting from one place to other, we collected different flowering plants species from road side.

Our teacher discussed with us about the plant habitats, associated plant species with their interaction to surrounding climates and the commercial importance of the species. We came to learn the name of the dominated species among the plant community of that particular area. We also wrote down the necessary information which will not retain after drying the species.

**EXAMINED**



At about 2:30 pm , we gathered at Bolpur station and came back home by train at about 4pm. I engaged myself in preserving the collected specimens at night.

**Name of the dominant species: -**

**Flowering Plant:**

*Tridax procumbens* (Asteraceae), *Sida acuta* (Malvaceae), *Lantana camara* (Verbenaceae), *Cassia sophera* (Fabaceae). *Croton bonplandianum* (Euphorbiaceae), *Ruellia tuberosa* (Amaryllidaceae).

**Fern:**

*Pteris* sp

*Marsilea* sp

**Algae:**

*Spirogyra* sp (Chlorophyceae)

**The plant specimen collected from Shantiniketan and its adjacent area-**

Sl. No.	Local name	Botanical name	Family
1.	Note shak	<i>Amaranthus viridis</i> L.	Amaranthaceae
2.	Sial kanta	<i>Argemone mexicana</i> L.	Papaveraceae
3.	Kukur suka	<i>Blumea lacera</i> (Burm.f.) DC	Asteraceae
4.	Punarnoba	<i>Boerhaavia diffusa</i> L.	Nyctaginaceae
5.	Akanda	<i>Calotropis gigantea</i> (L.) R.br. ex.Ait.	Asclepiadaceae
6.	Kalkasunda	<i>Cassia occidentalis</i> L.	Fabaceae
7.	kalkasunda	<i>Cassia sophera</i> L.	Fabaceae
8.	Thankuni	<i>Centella asiatica</i> (L.) Urb.	Apiaceae
9.	Botha shak	<i>Chenopodium album</i> L.	Chenopodiaceae
10.	Ghentu shak	<i>Clerodendrum viscosum</i> Vent.	Verbenacea

EXAMINED

11.	Atasi	<i>Crotalaria pallida</i> Aiton	Fabaceae
12.	Bon Jhutki	<i>Croton bonplandianum</i> Baill.	<i>Euphorbiaceae</i>
13.	.....	<i>Lantana camara</i> L.	Verbenaceae
14.	Swet drone	<i>Leucas aspera</i> (Willd.) Link.	Lamiaceae
15.	Chatpati	<i>Ruellia tuberosa</i> L.	Acanthaceae
16.	Berala	<i>Sida acuta</i> Burm.f.	Malvaceae
17.	Tridaxa	<i>Tridax procumbens</i> L.	Asteracea

ALGAE	FUNGI
1. <i>Chara</i> sp	2. <i>Agaricus</i> sp
3. <i>Spirogyra</i> sp	4. <i>Polyporus</i> sp

Pteridophyta	
<i>Pteris</i> sp	<i>Adiantum</i> sp
<i>Dryopteris</i> sp	<i>Dicranopteris</i> sp
<i>Marsilea</i> sp	<i>Cheilanthes</i> sp
<i>Lycopodium</i> sp	

EXAMINED

*Habize Khatun* 2/01/24  
 (Signature of Student)

*Kiran Kumar Mondal* 2/01/24  
 (Signature of Supervisor)

*Kiran Kumar Mondal* 2/01/24  
 (Signature of HOD)

DEPARTMENT OF BOTANY  
 ABHEDANANDA MAHAVIDYALAYA  
 SAINTHIA \* BIRBHUM

DEPARTMENT OF BOTANY  
 ABHEDANANDA MAHAVIDYALAYA  
 SAINTHIA \* BIRBHUM



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Ref. No. ....

Date : 09 / 04 / 2024

## PROJECT COMPLETION CERTIFICATE

This is certify that the following students have successfully completed their field project (under Department of Botany) relating to the paper –DSE 4 (Horticultural Practices and Post-Harvest Technology) in the academic Year 2023-2024.

**Title of the Project:** Survey of horticultural fields in our locality.

**Name of the Supervisor:** Priya Mukherjee, Department of Botany, Abhedananda Mahavidyalaya, Sainthia.

### List of Students:

Sl. No.	Roll No.	Course	Paper	Year	Name of the Student
1.	210330100016	Discipline Specific Electives	DSE-4	2023-24	DEVLINA CHAKRABORTY
2.	210330100019	Discipline Specific Electives	DSE-4	2023-24	GOPINATH MONDAL
3.	210330100025	Discipline Specific Electives	DSE-4	2023-24	NEHA ROY SURANA
4.	210330100029	Discipline Specific	DSE-4	2023-24	PRIYANKA DAS

  
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		Electives			
5.	210330100041	Discipline Specific Electives	DSE-4	2023-24	SAMBO SADHU
6.	210330100051	Discipline Specific Electives	DSE-4	2023-24	SOUMITA NANDI
7.	210330100055	Discipline Specific Electives	DSE-4	2023-24	SUDEEP SAHA

*R Mondal*  
09/04/2024

**H.O.D.**  
**DEPARTMENT OF BOTANY**  
**ABHEDANANDA MAHAVIDYALAYA**



**ABHEDANANDA MAHAVIDYALAYA**

**SAINTHIA, BIRBHUM**

**ESTD. -1965**

**CERTIFICATE OF PERFORMANCE**

Certificate No. -AM/BOT/FP/.....*22/1002*.....*Gopinath Mondal*.....of  
This is to certify that Sri/Smt.....*Gopinath Mondal*.....of  
Abhedananda Mahavidyalaya, Sainthia, west Bengal (bearing University Roll Number-  
.....*210330100019*.....) has successfully completed his/her field project, title  
as.....*Survey of horticultural fields in our locality*.....on *08/09/2024* as per the  
requirement of the syllabus.

*Rmondal 08/04/2024*

Head

Department of Botany

ABHEDANANDA MAHAVIDYALAYA  
SAINTHIA \* BIRBHUM

Principal

Abhedananda Mahavidyalaya

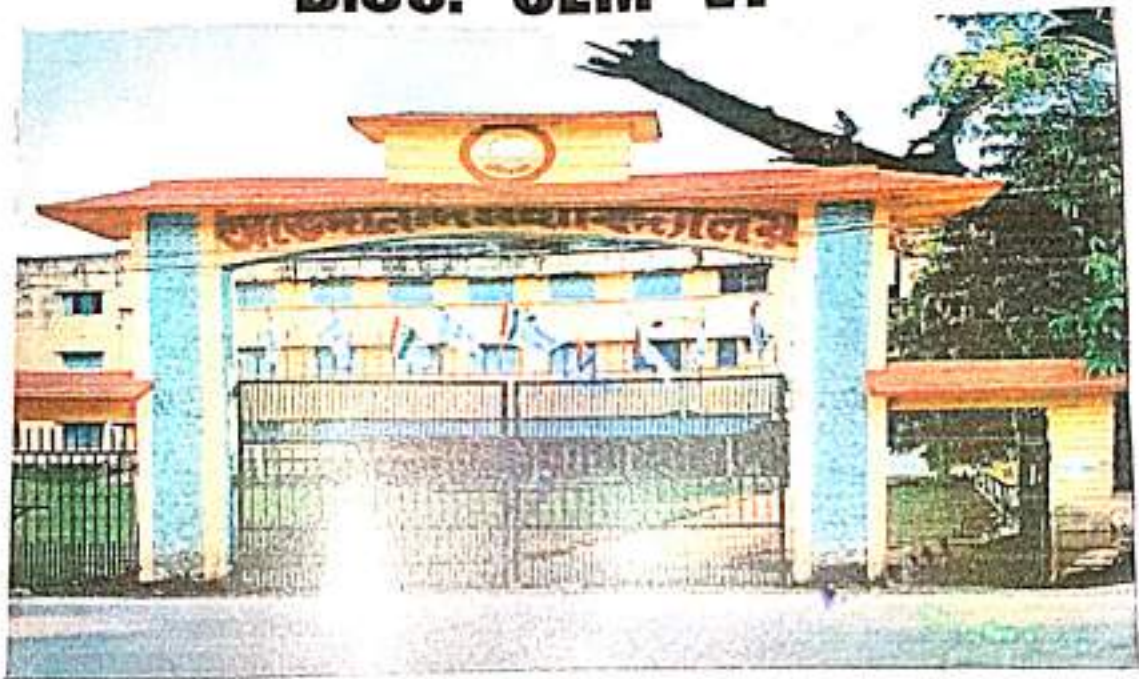
*G. Gopinath*  
Principal  
Abhedananda Mahavidyalaya  
Sainthia, Birbhumi



# THE UNIVERSITY OF BURDWAN

ABHEDANANDA MAHAVIDYALAYA

B.Sc. SEM- VI



Subject :- Botany (Hons.)

Course Code :- DSE-4

Course Title :- Horticultural Practices and Post-Harvest Technology

Roll No :- 210330100029

Reg. No :- 202101026514. of 2021-22

Session :- 2023-24

## Rose

Scientific name :- Rosa rubiginosa (Rosaceae).

### Characters :-

- > The flowers are 1.8 to 3 centimeters in diameter.
- > The flowers have five petals that are pink with white base the stamens are yellow.
- > The flowers are produced in clusters of two to seven.
- > The flowers appear at the ends of the branches.
- > The flowers are fragrant and sweetly scented.

### Uses :-

- > Valued for its fragrant flowers and attractive foliage, used in gardens and landscapes.
- > The flowers are used to extract rose oil, used in perfumes and fragrances.
- > Used to treat various ailments such as digestive issues, menstrual cramps and skin conditions.
- > Rose oil and rosewater are used in skincare products for their antioxidant and anti-inflammatory properties.
- > The essential oil is used in aromatherapy to promote relaxation and reduce stress.



Marigold



# Marigold

Scientific name :- Tagetes erecta (Asteraceae).

Character :-

- i) Marigold flowers are typically small to medium-sized, with a diameter ranging from 1 to 4 inches.
- ii) They have a daisy like appearance with multiple layers of petals arranged in a circular fashion.
- iii) Marigold flowers come in vibrant shades of yellow, orange and gold, adding a bright pop of colour to gardens and floral displays.
- iv) The petals of marigold flowers are smooth and slightly waxy to the touch.

Uses :-

- > Marigold petals can be used to brew teas or herbal teas.
- > Marigold petals can also be used in skin care products such as lotions, creams and lip balms.
- > They can also be used to make infusions and decoctions to relieve menstrual pain and symptoms of inflammation.
- > Marigold is used for ~~ornamentation~~ purposes in functions like the Lumeric ceremony, weddings, Pohela Falgun and other functions.



Orchids

# Orchids

Scientific Name :- Dendrobium bigibbum (Orchidaceae)

Characters :-

Orchids flowers have three sepals, three petals and a three-chambered ovary.

The orchid flower has the feminine and masculine organ of reproduction fusing in only one body called a column or gynostemium.

The median petal is modified and is called labellum or lip.

One of the most telling characteristics of orchids is their unmistakable symmetry.

Uses :-

Orchids can use it for treating skin problems like wrinkles, blemishes and more.

A great source of vitamin A and antioxidants orchids will replenish and rejuvenate your skin.

Orchids have been used a source of medicine for millennia to treat different disease.

Flowers mainly used in decoration, floral arrangement and gardening.

# Banana

Scientific name :- Musa Paradisiaca Linn. (Musaceae)

## Characters :-

- The fruits is variable in size, colour, and firmness but is usually elongated and curved with soft flesh rich in starch covered with a peel.
- It grows upward in clusters near the top of the plant.
- A ripe fruit contains as much as 22 Percent of Carbohydrate and is high in dietary fibre, Potassium, manganese and vitamins B6 and C.
- Banana is a drupe type of fruit.

## Uses :-

- The leaves of banana used as natural food wrappers, eco-friendly plates and serving vessels in many cultures.
- Banana may be helpful in many diseases as well, like diabetes and inflammation.
- Banyan tree parts such as fruits leaves, roots, and barks may be used as herbal medicine.
- Banana contain Vitamin E, a known antioxidant which help to protect cells from free radical damage caused by natural and man-made elements like environment toxin, ultraviolet ray and chemicals produced by the body during metabolism.

# Citrus

Scientific name :- Citrus sp. (Rutaceae)

## Characters :-

- > The fruit is spherical or oblate and size varies by species from 2-12 inches (5-30 cm) in diameter and colour like orange, yellow, green, red or purple depending on the species.
- > The peel thick, easy to peel and fragrant and pulp is juicy, segmented and sweet or sour.
- > Seeds are small, numerous and usually undeveloped.
- > Flavour Acidic, sweet or a combination of both and aroma characteristic citrus scent.
- > Juice high water content rich in vitamins and minerals.

## Uses :-

- > Enjoyed as juice, slices or whole fruit.
- > Marmalades and Preserves are made from peel and pulp.
- > Used in recipes for flavour, moisture and acidity.
- > Peel and pulp used in skin care products for their antioxidant and antiseptic properties.

## Chilli

Scientific name :- Capsicum annum L. (Solanaceae)

Characters :-

The chilli fruit is hollow with many seeds.

They are found in different colours like green, orange, white, yellow and red.

When fruits ripe Pericarp begins to dry.

Fruits vary in shape, colour and pungency.

Red chillies get their colour from a colouring compound called Capsanthin and have a hot, pungent taste due to a chemical called Capsaicin.

Uses :-

Chilli is primarily used as a spice and can be cooked or dried and powdered.

Green chillies contain a chemical called capsaicin which is responsible for numerous health benefits.

According to an animal study green chilli extract could help manage stomach ulcers.

Green chillies are also made into pickles in many Indian homes.

P. Munnjee 15/9/24.

EXAMINED

P. Mondal 29/7/24

KKM

**Discipline Specific Elective-DSE IV (any one)**  
**(1) Horticultural Practices and Post-Harvest Technology**  
**(Credits: Theory-4, Practical-2)**  
**THEORY**

**Lectures: 60**

**Unit 1: Introduction**

Scope and importance, Branches of horticulture; Role in rural economy and employment generation; Importance in food and nutritional security; Urban horticulture and ecotourism. (4 lectures)

**Unit 2: Ornamental plants**

Types, classification (annuals, perennials, climbers and trees); Identification and salient features of some ornamental plants [rose, marigold, gladiolus, carnations, orchids, poppies, gerberas, tuberose, sages, cacti and succulents (opuntia, agave and spurges)] Ornamental flowering trees (Indian laburnum, gulmohar, Jacaranda, Lagerstroemia, fishtail and areca palms, semul, coral tree). (4 lectures)

**Unit 3: Fruit and vegetable crops**

Production, origin and distribution; Description of plants and their economic products; Management and marketing of vegetable and fruit crops; Identification of some fruits and vegetable varieties (citrus, banana, mango, chillies and cucurbits). (4 lectures)

**Unit 4: Horticultural techniques**

Application of manure, fertilizers, nutrients and PGRs; Weed control; Biofertilizers, biopesticides; Irrigation methods (drip irrigation, surface irrigation, furrow and border irrigation); Hydroponics; Propagation Methods: asexual (grafting, cutting, layering, budding), sexual (seed propagation), Scope and limitations. (8 lectures)

**Unit 5: Landscaping and garden design**

Planning and layout (parks and avenues); gardening traditions - Ancient Indian, European, Mughal and Japanese Gardens; Urban forestry; policies and practices. (6 lectures)

**Unit 6: Floriculture**

Cut flowers, bonsai, commerce (market demand and supply); Importance of flower shows and exhibitions. (6 lectures)

**Unit 7: Post-harvest technology**

Importance of post-harvest technology in horticultural crops; Evaluation of quality traits; Harvesting and handling of fruits, vegetables and cut flowers; Principles, methods of preservation and processing; Methods of minimizing losses during storage and transportation; Food irradiation - advantages and disadvantages; food safety. (10 lectures)

**Unit 8: Disease control and management** (8 lectures)  
Field and post-harvest diseases; Identification of deficiency symptoms; remedial measures and nutritional management practices; Crop sanitation; IPM strategies (genetic, biological and chemical methods for pest control); Quarantine practices; Identification of common diseases and pests of ornamentals, fruits and vegetable crops.

**Unit 9: Horticultural crops - conservation and management...** (10 lectures)  
Documentation and conservation of germplasm; Role of micropropagation and tissue culture techniques; Varieties and cultivars of various horticultural crops; IPR issues; National, international and professional societies and sources of information on horticulture.

### **Field trip and Practical**

Field visits to gardens, standing crop sites, nurseries, vegetable gardens and horticultural fields at IARI or other suitable locations (like Horticulture Society of India, Alipore Kolkata) and preparation of Detailed report with suitable photographs.

### **Suggested Readings**

1. Singh, D. & Manivannan, S. (2009). Genetic Resources of Horticultural Crops. Ridhi International, Delhi, India.
2. Swaminathan, M.S. and Kochhar, S.L. (2007). Groves of Beauty and Plenty: An Atlas of Major Flowering Trees in India. Macmillan Publishers, India.
3. NIIR Board (2005). Cultivation of Fruits, Vegetables and Floriculture. National Institute of Industrial Research Board, Delhi.
4. Kader, A.A. (2002). Post-Harvest Technology of Horticultural Crops. UCANR Publications, USA.
5. Capon, B. (2010). Botany for Gardeners. 3<sup>rd</sup> Edition. Timber Press, Portland, Oregon.



**Minor: (BOT1021) Plant Diversity and Evolution**

PM

**Credit: 3**

**Marks: 40**

**Unit1: Origin of life**

**Hours: 6**

Chemical basis of origin of life, concepts of evolution, Tree and classification of life, and classification (up to six kingdoms).

**Unit2: Bacteria**

**Hours: 4**

Characteristic features, cell structure and genetic element, asexual reproduction and modes of gene transfer (conjugation, transformation and transduction), brief introduction to Archaea. Role of bacteria in agriculture, medicine and industry.

**Unit3: Viruses**

**Hours: 4**

Characteristic features, replication, RNA virus (structure of TMV), DNA virus (structure of T-phage), Lytic and Lysogenic life cycle (Lambda phage).

Hours: 6

#### Unit4: Algae

Characteristic features, cell structure, range of thallus, methods of reproduction and evolutionary classification (only up to divisions). A brief account of *Nostoc*, *Spirogyra*, *Sargassum*, *Polysiphonia* economic significance (brief account)

Hours: 8

#### Unit5: Fungi

Characteristics features, affinities with plants and animals, structural features, reproduction and life cycle pattern. Broad classification. Myxomycetes- characteristics and their similarities with fungi. Genera characteristics and life cycles of *Mucor*, *Saccharomyces*, *Ascobolus*, *Neurospora* and *Agaricus*. Fungi symbiosis- lichen and mycorrhizae (characteristics and significance), economic importance of fungi.

Hours: 8

#### Unit6: Bryophytes

Characteristic features and reproduction, adaptation to land habit, modern classifications, evolutionary trends in Bryophytes. Brief account of *Marchantia*, *Anthoceros* and *Funaria*. Ecological significance.

Hours: 8

#### Unit7: Pteridophytes

Characteristic features and reproduction, modern classifications, evolutionary trends in Pteridophytes, affinities with Bryophytes. Brief account of *Psilotum*, *Selaginella*, *Equisetum* and *Pteris*.

Hours: 8

#### Unit8: Gymnosperms

Characteristic features and reproduction, modern classifications, evolutionary trends in Gymnosperms, affinities with Pteridophytes. Brief account of *Cycas*, *Ginkgo* and *Gnetum*. Economic significance.

Hours: 8

#### Unit 9: Angiosperms

Gross morphology and reproduction, Concept of natural, artificial and phylogenetic system of classification.

#### Practical

Credit: 01

Marks:20

1. To study different strains of *Bacillus* and *E. coli* (Gram staining). (01)
2. To study structure of TMV and Bacteriophage (electronmicrographs/models). (01)
3. To study morphology of *Nostoc*, *Spirogyra*, *Sargassum*, *Polysiphonia* etc. from permanent slides (02)
4. To study *Mucor*, *Saccharomyces*, *Ascobolus*, *Agaricus* from permanent slides, dry preserved specimens or museum specimen. Lichens from dry or preserved specimens. (02)
5. To study *Marchantia*, *Anthoceros* and *Funaria* (vegetative and reproductive morphology from permanent slides). (02)
6. To study the vegetative and reproductive morphology of *Psilotum*, *Selaginella*, *Equisetum* and *Pteris* from permanent slides. (03)

7. To study the vegetative and reproductive morphology of Cycas, Ginkgo and Gnetum from permanent slides. (02)

✓ 8. To study morphology of angiosperm leaf, stem, flower, inflorescence and fruits from locally available plant species. (05)

Tutorial: Nil



# ABHEDANANDA MAHAVIDYALAYA

SAINTHIA, BIRBHUM, WEST BENGAL, PIN-731234

Founder : Srimat Satyananda Dev (1965)

(Affiliated to the University of Burdwan and Accredited by NAAC)

Phone : 03462-263449, Email : abhedanandamahavidyalaya@gmail.com, Website : www.abhedanandamahavidyalaya.ac.in

Ref. No. ....

Date : 21/06/2024

## PROJECT COMPLETION CERTIFICATE

This is certify that the following students have successfully completed their field project (under Department of Botany) relating to the paper BOTN 1021 (Plant Diversity and Evolution) in the academic Year 2023-2024.

**Title of the Project:** "Diversity of shapes of leaf lamina in Angiosperm".

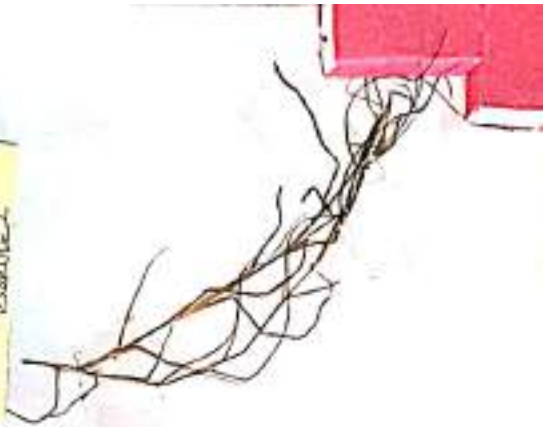
**Name of the Supervisor:** Kiran Kumar Mondal, Department of Botany, Abhedananda Mahavidyalaya, Sainthia.

### List of Students:

Sl. No.	Roll No.	Course	Paper	Year	Name of the Student
1.	230330140007	Minor	BOTN 1021	2023-24	ARNAB DHARA
2.	230630130010	Minor	BOTN 1021	2023-24	ARPITA DE
3.	230630130015	Minor	BOTN 1021	2023-24	EKITA MONDAL
4.	230630130027	Minor	BOTN 1021	2023-24	KRISHNALAL ROY
5.	230630130028	Minor	BOTN 1021	2023-24	KUSHANKUR MONDAL
6.	230630130034	Minor	BOTN 1021	2023-24	PIU MONDAL
7.	230630130053	Minor	BOTN 1021	2023-24	SUBHAM DAS
8.	230630130045	Minor	BOTN 1021	2023-24	SATHI RAKSHIT
09.	230330140039	Minor	BOTN 1021	2023-24	SUBHA MONDAL
10.	230630130021	Minor	BOTN 1021	2023-24	ISHA GHOSH
11.	230330140037	Minor	BOTN 1021	2023-24	SHUVO PRAMANIK
12.	230330140022	Minor	BOTN 1021	2023-24	PRIYANKA KESHRI

*A. 21/6/24*  
Principal  
Abhedananda Mahavidyalaya,  
Sainthia, Birbhum

*Kmondal*  
21.06.24  
H.O.D.  
DEPARTMENT OF BOTANY  
ABHEDANANDA MAHAVIDYALAYA



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(ಕನ್ನಡ)  
ಸ್ಯಾಂಡಲ್‌ವುಡ್



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(ಕನ್ನಡ)  
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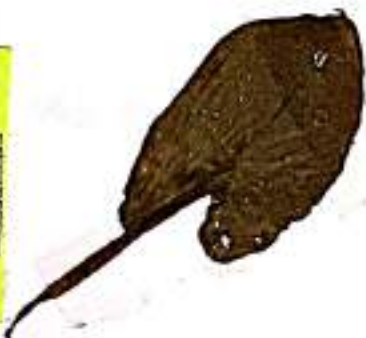
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ಮಂಜುಳಿ

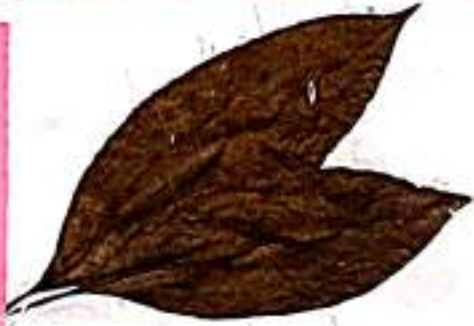
ಕ್ರಿಸ್ತಮಾಲಿ ರಾಜ  
Roll- 1559  
BSC 2nd sem

# पौधों की आकृति

NAME : → ARPIITA DE  
 Roll : → 1649  
 CLASS : → B. SC (BIO) 1st SEM.  
 SUBJECT : → BOTANY (PRACTICE)



पौधों (वृक्ष) *Millettia pita-Singhala*



पौधों (वृक्ष) *Mangifera indica*



पौधों (वृक्ष) *Adiantum roseum*



पौधों (वृक्ष) *Bombax variegata*



पौधों (वृक्ष) *Salween scandens*



पौधों (वृक्ष) *Lythrum salicaria*



पौधों (वृक्ष) *Albizia leucodermis*



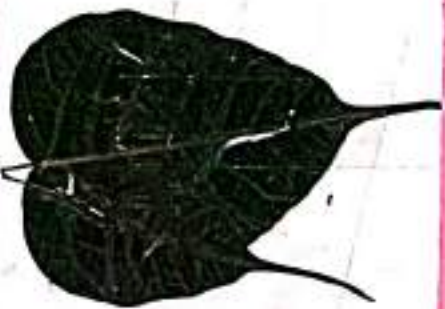
पौधों (वृक्ष) *Styphelia odor*



पौधों (वृक्ष) *Bombax compacta*



पौधों (वृक्ष) *Ficus religiosa*



पौधों (वृक्ष) *Ficus religiosa*



पौधों (वृक्ष) *Convolvulus*

વૃક્ષવિજ્ઞાનના વિભાગ

DEPARTMENT OF BOTANY  
NAME - UNNATI SAHA

પાંદોળાકાર

ગાંધુલીકાર

ઘોંટાળાકાર

ફિંગર

પાંદોળાકાર

ગાંધુલીકાર

સીંગાકાર

ટાંબોળાકાર

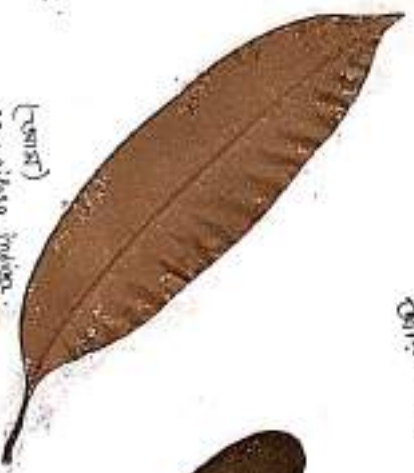
સૂત્રાકાર



(કોર્ફોસ)  
*Pinus longifolia*



(સૂત્રાકાર)  
*Agaveon douglasii*



(વચન)  
*Mangifera indica*



(મણવચન)  
*Dalmanella zosteris*



(મુર)  
*Hibiscus rosa-sinensis*



(કોર્ફોસ)  
*Asplenium latifolium*



(વચન)  
*Ficus religiosa*

સૂત્રાકાર

સમઘાંટાકાર

વૃક્ષાકાર

પાંદોળાકાર

ગાંધુલી

ચુરકાર



(ચુરકાર)  
*Calceolaria aculeata*



(સમઘાંટાકાર)  
*Ipomoea aquatica*



(કોર્ફોસ)  
*Cedrela odorata*



(વચન)  
*Bauhinia variegata*



(ચુરકાર)  
*Passiflora ampelalis*



(વચન)  
*Nymphaea alba*