St. Xavier's College (Autonomous), Ahmedabad

Syllabus of Semester – I of the following department under Faculty of Sciencebased on Under Graduate Curriculum Framework - 2023 to be implemented from the Academic Year 2023-24.

FACULTY OF SCIENCE

DEPARTMENT OF BOTANY

Course	Title	Content	Hours/ week	Credit
Minor-1 (Theory)	Fundamentals of Botany-I	U-1: Plant Diversity: Study Of Lower Plants U-2: Morphology, Anatomy Of Angiosperms And Micro Technique	2 hrs	2
Minor-1 (Lab)	Fundamentals of Botany-I	Practical based as per Theory syllabus.	4 hrs	2

BSc. (Hons.) Botany

Category – IV

Minor Course – 1: Fundamentals of Botany-I (Theory)

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course Title & Code	Credit Distribution of The Course			Eligibility Criteria	Prequisite(s) of the Course (if any)
	Lecture	Tutorial	Practical / Practice		
Fundamentals of Botany I (BO-1101)	2	0	2	10 + 2 from a recognized board in any stream	Basic Knowledge of Biology, Observation and analytical skills

LEARNING OBJECTIVES (LO)

LO1: To understand the systematic position, distribution, morphology, structural organization and reproduction of Algae, Fungi, Bryophytes and Pteridophytes. They will also increase their awareness and appreciation of human friendly Algae and Fungi and their economic importance.

LO 2: To know the morphology, structure and functions of various parts of plants; learn about various kinds of plant tissues, their general characters and functions, as also know the techniquesof staining them.

COURSE OUTCOME(CO)

On Completion of this course, the student will be able to-

CO1: Describe systematic position, distribution, morphology, structural organization and reproduction of lower plant groups and evaluate economic importance.

CO2: Identify structure and functions of various parts of plants, explain various kinds of plant tissue**s** and apply the technique of staining.

Unit-1: PLANT DIVERSITY: Study of lower plants (15 L)

ALGAE

1. Outline Classification of Algae by G.M. Smith (1955).
2. General characters of Algae.
3. General account of Cyanophyta.
4. General account of Chlorophyta.
5. Type studies: Distribution, life cycle and systematic position of *Spirogyra*.
6. Economic importance of Algae.

FUNGI

1. Outline Classification of Fungi. By G.C. Ainsworth (1753).
2. General characters of Fungi.
3. Type studies: Distribution, life cycle and systematic position of *Mucor*.
4. Economic importance of Fungi.

BRYOPHYTA

1. General characters of Bryophytes.
2. Type studies: Distribution, life cycle and systematic position of *Riccia*.

PTERIDOPHYTA

1. General characters of Pteridophyte**s**.
2. Type studies: Distribution, life cycle and systematic position of *Nephrolepis*

Unit-2: MORPHOLOGY, ANATOMY OF ANGIOSPERMS AND MICRO TECHNIQUE (15 L)

1**.** Leaf
   a. Simple and Compound leaves.
   b. Types of Leaf incisions. Leaf margin. Leaf tip.
   c. Phyllotaxy.
2. Bracts- Scaly, Involucral, Foliaceous, Petaloid and Spathe.
3. Flower- Complete, incomplete, actinomorphic, zygomorphic, irregular.
4. Inflorescence- Racemose, Cymose and special kinds.
5. General characters and functions of various kinds of plant tissues:
   a. Meristematic tissues.
   b. Simple tissues.
   c. Complex tissues.

6. Micro technique: Stains and Staining.

Suggestive Reading:

- Alexopoulos, Constantine J.; Mims, Charles W; *Introductory Mycology*; 3rd edition; New Delhi: Wiley Eastern Limited, 1983.
- Dutta, A.C.; *A Class-book of Botany*; 15th edition; Calcutta: Oxford University Press, 1976.
- Gangulee, H.C., Das, K.S., Dutta C.T.; *College Botany* Vol I.; Kolkatta: New Central Book Agency, 2002.
- Kar, Ashok Kumar; Gangulee, Hirendra Chandra; *College botany*: Volume II; 2nd edition; Kolkata: New Central Book Agency (P) Ltd, 1989, 2006.
- Parihar, N.S.; Pteridophytes: *An Introduction to Embryophyta*, Vol. II; 4th edition; Allahabad: Central Book Depot, 1962.
- Singh V., Pande P.C., Jain D.K.; *A Textbook of Botany*, 4th Edition; Rastogi publications, 2013.
- Smith, Gilbert M; *Cryptogamic Botany Algae & Fungi* Volume 1; 2nd edition; McGraw-Hill Book Comp. Tokyo, 1955.
- Smith, Gilbert M; *Cryptogamic Botany Bryophyta & Pteridophyta* Volume 2; 2nd edition; McGraw-Hill book Comp. Tokyo, 1955.
- Sporne, K.K. 1991. *The Morphology of Pteridophytes.* B.I. Publishing Pvt. Ltd. Bombay.
- Vasishtha B.R. and Sinha A. K. - *Botany for Degree Students* Part 1 ALGAE; S. Chand & Company Ltd, 1st edition, revised 2005.
- Vasishtha B.R. and Sinha A. K.- *Botany for Degree Students* Part 2 FUNGI; S. Chand & Company Ltd, 1st edition, revised 2005.
- Webster, J.1985. *Introduction to Fungi;* Cambridge University Press. Publishing Co., 1967.
- Lawrence, George H.M.; *Taxonomy of Vascular Plants*; 1st edition; New Delhi: Oxford & IBH.
- Naik, V.N. 1984. *Taxonomy of Angiosperms;* New Delhi: Tata McGraw - Hill Publishing Co. Ltd., 1984.
- Sharma, O.P.; *Plant Taxonomy*; 1st edition, reprint; New Delhi: Tata McGraw-Hill Publishing Co. Ltd., 1993(2002).
- Sivarajan, V.V.; *Introduction to the Principles of Plant Taxonomy*; 2nd edition; Cambridge: Cambridge University Press, 1991.
- Subramanian, N.S.; *Modern Plant Taxonomy*; New Delhi: 1st edition; Vikas Publishing House Pvt. Ltd., 1995.
- Eames, Arthur J.; Mc Daniels, Laurence H.; *An Introduction to Plant Anatomy*; 2nd edition. Reprint; New Delhi: Tata McGraw-Hill Publishing Company Limited, (1978, 2004).
- Esau, Katherine; *Anatomy of Seed Plants*; 2nd edition; New York: John Wiley & Sons, 1977.
- Fahn, A; *Plant Anatomy*; 4th edition. Indian reprint; New Delhi: Aditya Books (P) Ltd., 1990(1997).
- Tayal M.S.; *Plant Anatomy*; Rastogi publications, 1983.

Suggested Online Links/Readings:

https://swayam.gov.in
https://www.iscnagpur.ac.in/knowledge_learning_files/5.7_General_Open_Access_e-Resources.pdf
https://www.tkdl.res.in/tkdl/langdefault/common/Home.asp?GL=Eng
https://ndl.iitkgp.ac.in
https://nptel.ac.in/course.html
www.ncert.in
https://books.google.co.in

Pedagogy:

1. Lecture method with teaching aids.
2. Audio-Visual Teaching mode with Projector Method.
3. Dialogue and context-based class.
4. Assignments, Learning seminar, Class Test
5. Open Online Sources and Tutorials.

MODE OF EVALUATION FOR THEORY PAPER

Evaluation will be divided in two parts.

ASSESSMENT	MARKS
INTERNAL	
Attendance	05
Assignments	05
Continuous Internal Assessment I and II	15
TOTAL	25 marks
EXTERNAL	
End Semester Exam	25 marks

Students will prepare and present (in pairs) a Submission related to the topic of Assignment on assigned topics. These Submission will be presented in form of PPT/ Activity/ Hand written notes etc. Points for evaluation: Presentation (20%) + Content (20%) + explanation (20%) +Creativity (20%) + Overall impression (20%).

BSc. (Hons.) Botany

Category – IV

Minor Course – 1: Fundamentals of Botany- I (LAB)

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course Title & Code	Credit Distribution of The Course			Eligibility Criteria	Prequisite(s) of the Course (if any)
	Lecture	Tutorial	Practical / Practice		
Fundamentals of Botany - I (BO-1101)	2	0	2	10 + 2 from a recognized board in any stream	Basic Knowledge of Biology, Observation and Analytic skills

LEARNING OBJECTIVE (LO)

LO1: To demonstrate proficiency in the experimental techniques and methods of appropriate analysis of Algae, Fungi, Bryophytes and Pteridophytes.

LO2: To get familiarized with the basic skills and techniques related to plant morphology, herbarium preparation and anatomy.

LO 3: To gain knowledge on Microscopy and types of stains.

COURSE OUTCOMES(CO):

On Completion of this course, the student will be able to-

CO1: Identify selected lower plants, their vegetative and reproductive structures.

CO2: Identify plant morphology using observation skills and evaluate internal characters using anatomical skills.

CO3: Explain the functioning of Microscopy and will be able to prepare stains.

Unit-1 PLANT DIVERSITY: Study of lower plants

1. Study of Microscopes:
   a. Structure of dissecting microscope.
   b. Structure of compound microscope.

2. Study of Algae-
   I) **Chlorophyta:**
      i). ***Spirogyra***
         a. Mounting- Thallus, conjugation types
         b. Permanent slides - Thallus and conjugations
      ii) Ulva
         a. Mounting- Thallus organization
         b. Permanent slides - Thallus and reproductive structures.

II) Cyanophyta:

i) **Nostoc**

a. Mounting-Thallus structure

b. Permanent slides- Thallus and cell structures.

ii) **Microcystis**

a. Mounting-Thallus structure

b. Permanent slides- Thallus and reproductive structures.

3. Study of Fungi-

i) Mucor

a. Specimen- Bread/ Roti with *Mucor*

b. Mounting- Reproductive structure- spores, sporangia

c. Permanent slides- Mucor sporangia, Zygospores

ii) Study of Fungi- **Plasmopora**

a. Mounting- Reproductive structure- spores, sporangia

b. Permanent slide: Sporangia, Zoospores.

4. Study of Bryophytes-***Riccia***

a. Specimen - Thallus with Sporophyte

b. Permanent slides – Thallus v.t.s., thallus with Antheridia and Archegonia

5. Study of Pteridophytes ***Nephrolepis***

a. Specimen- Sporophytic plant

b. Mounting- Ramenta, Hydathode, Sporangia

c. Permanent slides- Prothallus with Antheridia and Archegonia; T.S. leaflet passing through sorus

6. Study of well-known Indian algologist, mycologist, bryologist and pteridologist their contributions through charts and photographs.

Unit 2: MORPHOLOGY, ANATOMY OF ANGIOSPERMS AND MICRO TECHNIQUE

1. Study of plant morphological characters of leaf and bracts (as per theory syllabus).

2. Study of plant morphological characters of flower and inflorescence (as per theory syllabus)

3. Study of types of stains through charts/ppt.

4. Study of meristematic, simple and complex tissue through Charts.

5. Study of various types of Simple tissues from *Nerium* leaf and *Nymphaea* Petiole through Transverse section of fresh material and permanent slides.

6. Study of Xylar elements from of *Cycas* through fresh material/maceration and permanent slides.

7. Study of Complex tissue using Maize (T.S) through fresh material and permanent slides.

PROJECT:

The PROJECT will be on **Plant Morphology**. Students will study the morphological characters present in living plant specimens from the field. These are to be presented as an individual project which may contain pressed plant materials/original photographs/ original drawings presented in a creative manner

Suggested Reading:

- Practical Botany vol. I & II By Bendre and Kumar, Rastogi Publication.
- Practical Botany by S. C. Santra, Chettarjee and Das, New Central Book Agency.

MODE OF EVALUATION:

Sr. No.	Exam Pattern	Internal Exam	External Exam
1	Practical/Performance	20	25
2	Attendance	5	00
	Total	**25 marks**	**25 marks**

ST. XAVIER'S COLLEGE, (Autonomous) AHMEDABAD

FUNDAMENTALS OF BOTANY (LAB)- I (BO- L)
BOTANY INTERNAL PRACTICAL PAPER
SEMESTER I
(Effective from June-2023)

Date:_____ **Total Marks: 20** **Time: 2 hours**

Q.1 Identify whether **Specimen A** is an Algae/Fungi/Bryophyte/Pteridophyte, giving general characters. (04)

Q.2 Take T.S. / L.S. of the given **Specimen B**, draw a labeled diagram and make a temporary preparation.Stain if needed and show it to the Examiner. (04)

Q.3 Identify and describe the specimens: (08)
Specimen C: Algae/Fungi/Bryophyte/Pteridophyte
Specimen D: Morphology
Specimen E: Morphology
Specimen F: Anatomy/Micro techniques

Q.4 Project and Viva (02)

Q.5 Journal (02)

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ST. XAVIER'S COLLEGE, (Autonomous) AHMEDABAD

FUNDAMENTALS OF BOTANY (LAB) - I (BO-_____L)

BOTANY EXTERNAL PRACTICAL PAPER
SEMESTER I
(Effective from June-2023)

Date:_____ _____ **Total Marks: 25** **Time: 3 hours**

Q.1 Identify whether **Specimen A** is an Algae/Fungi/Bryophyte/Pteridophyte, giving general characters. (04)

Q.2. Expose the reproductive structure from the given **Specimen B.** Make a sketch and show your preparation to the Examiner. (04)

Q.3 Take T.S. / L.S. of the given **Specimen C**, draw a labeled diagram and make a temporary preparation.Stain if needed and show it to the Examiner. (03)

Q.4 Identify and describe the specimens: (10)
Specimen D: Algae/Fungi
Specimen E: Bryophyte/Pteridophyte
Specimen F: Morphology
Specimen G: Morphology
Specimen H: Anatomy/Micro techniques

Q.5 Project and Viva (02)

Q.6 Journal (02)

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