



Semester: I- AC-I: Botany – I

Ins. Hours / Week: 3

Course Credit: 3

Course Code: U26ABO101

COURSE OBJECTIVES:

At the end of the course, students will be able to:

1. Understand the diversity, structure, reproduction, life cycles, and economic importance of algae, fungi, bacteria, viruses and lichens.
2. Explain the morphology, reproduction, and life cycles of representative bryophytes, pteridophytes and gymnosperms.
3. Describe the structure and functions of prokaryotic and eukaryotic cells, cell organelles and mechanisms of cell division.
4. Apply the principles of Mendelian genetics to solve problems involving inheritance patterns and genetic crosses.
5. Demonstrate knowledge of horticultural practices including plant propagation, micropropagation, organic farming, bonsai and flower arrangement.
6. Develop practical and analytical skills related to plant sciences, biodiversity conservation and sustainable horticultural techniques.

UNIT –I Algae, Fungi, Bacteria, Virus and Lichens

(9 hours)

General characters of algae - Structure, reproduction and life cycle of the following genera - *Anabaena* and *Sargassum*. Economic importance of algae. General characters of fungi, structure, reproduction and life cycle of the following genera- *Penicillium* and *Agaricus*. Economic importance of fungi. General characters of Bacteria and Virus. General characters of *Lichens* and economic importance.

UNIT –II Bryophytes, Pteridophytes and Gymnosperms

(8 hours)

General characters of Bryophytes, Structure, reproduction and life cycle of *Polytrichum*. General characters of Pteridophytes, Structure, reproduction and life cycle of *Lycopodium*. General characters of Gymnosperms, Structure, reproduction and life cycle of *Cycas*.

UNIT –III Cell Biology

(8 Hours)

Prokaryotic and Eukaryotic cell- structure /organization. Cell organelles –ultra structure

and function of chloroplast, mitochondria and nucleus. Cell division - mitosis and meiosis.

UNIT –IV Genetics (9 hours)

Mendelism - Law of dominance, Law of segregation and Law of independent assortment, Incomplete dominance. Monohybrid and dihybrid cross - Test cross – Back cross

UNIT –V Horticulture (11 hours)

Scope and importance of Horticulture, Propagation methods – Cutting, Layering and grafting techniques. Micro Propagation, Gardening – Medicinal plants garden and Terrace garden. Importance of Organic farming, Bonsai, Flower arrangements - western styles and the eastern or Japanese or Ikebana styles.

Total Lecture Hours - 45

COURSE OUTCOMES

The students will be able to:

1. Increase the awareness and appreciation of human friendly Algae, Fungi, Bacteria, Virus and Lichens and their economic importance
2. Develop critical understanding on morphology, anatomy and reproduction of Bryophytes Pteridophytes and Gymnosperms
3. Compare the structure and function of cells and explain the development of cells.
4. Understand the core concepts and fundamentals of genetics.
5. Raise plant propagules through various horticulture methods and attain entrepreneur skills in horticulture.

TEXT BOOKS

1. Singh, V., Pande, P.C and Jain, D.K. 2021. A Text Book of Botany. Rastogi Publications, Meerut.
2. Bhatnagar, S.P and Alok Moitra. 2020. Gymnosperms, New Age International (P) Ltd., Publishers,
3. Bengaluru. Sharma, O.P. 2017. Bryophyta, MacMillan India Ltd. Delhi.
4. Lee, R.E. 2008. Phycology, IV Edition, Cambridge University Press, New Delhi.
5. Rao, K., Krishnamurthy, K.V and Rao, G.S. 1979. Ancillary Botany, S. Viswanathan Pvt. Ltd., Madras.
6. Rajaneesh Singh (Author), Bijendra Kumar Singh Textbook on Horticulture. September 2020.

REFERENCES

1. Parihar, N.S. 2012. An introduction to Embryophyte – Pteridophytes - Surjeet Publications, Delhi.

- Alexopoulos, C.J. 2013. Introduction to Mycology. Willey Eastern Pvt. Ltd.
- Vashishta, P.C. 2014. Botany for Degree Students Gymnosperms. Chand & Company Ltd, Delhi.
- Coulter, M. Jhon, 2014. Morphology of Gymnosperms. Surjeet Publications, Delhi.
- Vashishta, P.C. 2014. Botany for Degree Students Algae. 2014. Chand & Company Ltd, Delhi.
- Parihar, N.S. 2013. An introduction to Embryophyte –Bryophytes-, Surjeet Publications, Delhi.
- Pandey B.P. 1986, Text Book of Botany (College Botany) Vol I &II, S. Chand and Co. New Delhi.
- Julian Claude Schilletter (Author), H. Wyatt Richey Textbook of General Horticulture. April 2008.

E- RESOURCES

- <https://www.kobo.com/us/en/ebook/the-algae-world>
- [http://www.freebookcentre.net/biology-books-download/Fungi-\(PDF-15P\).html](http://www.freebookcentre.net/biology-books-download/Fungi-(PDF-15P).html)
- <http://scitec.uwichill.edu.bb/bcs/bl14apl/bryo1.htm>
- <https://www.toppr.com/guides/biology/plant-kingdom/pteridophytes/>
- <https://www.us.elsevierhealth.com/medicine/cell-biology>
- <https://www.us.elsevierhealth.com/medicine/genetics>

MAPPING WITH PROGRAM OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

CO	Pos										PSOs			
	1	2	3	4	5	6	7	8	9	10	1	2	3	4
CO1	1		2	3				2	2	3			3	3
CO2	1	2	2	3					2	3			3	3
CO3	1	2	2	3									3	
CO4	1	2	2	3					2	3			3	3
CO5		2	2	3						3		3	3	

Strong -3; Medium -2; Low - 1



Semester: I- AP-I : Botany - I Practical

Ins. Hours / Week: 3

Course Credit: 3

Course Code: U26MBO102P

COURSE OBJECTIVES

1. To provide basic knowledge of plant diversity from algae to gymnosperms.
2. To develop skills in identifying important plant groups and microorganisms.
3. To understand the structure and functions of plant cells and cell organelles.
4. To introduce the fundamental principles of genetics through practical exercises.
5. To impart basic horticultural techniques and sustainable gardening practices.

EXPERIMENTS

1. Identification and observation of: *Anabaena* and *Sargassum*.
2. Identification and observation of: *Penicillium* and *Agaricus*.
3. Observation of bacterial forms using prepared slides/charts.
4. Identification of vegetative and reproductive structures of Bryophytes – *Polytrichum* and Pteridophytes - *Lycopodium*. Gymnosperms - *Cycas*.
5. Micro photographs of the cell organelle's ultra-structure.
6. Simple genetic problems.

COURSE OUTCOMES

Upon successful completion of the course, students will be able to:

1. Identify and classify representative algae, fungi, bryophytes, pteridophytes and gymnosperms.
2. Describe the structure and functions of major cell organelles and stages of cell division.
3. Analyze simple Mendelian inheritance patterns using genetic problems.
4. Demonstrate basic horticultural propagation techniques and gardening practices.
5. Appreciate the economic importance of plants and microorganisms in daily life.

REFERENCES

1. Pandey, B. P. (2020). *College botany* (Vol. 1). S. Chand Publishing.
2. Pandey, B. P. (2020). *College botany* (Vol. 2). S. Chand Publishing.
3. Pandey, B. P. (2019). *Practical botany*. S. Chand Publishing.

4. Sharma, O. P. (2017). *Textbook of thallophyta*. McGraw Hill Education.
5. Singh, G. (2019). *Plant systematics: Theory and practice* (4th ed.). CRC Press.
6. Karp, G. (2019). *Cell and molecular biology: Concepts and experiments* (9th ed.). Wiley.
7. Klug, W. S., Cummings, M. R., Spencer, C. A., Palladino, M. A., & Killian, D. J. (2018). *Concepts of genetics* (12th ed.). Pearson.
8. Hartmann, H. T., Kester, D. E., Davies, F. T., & Geneve, R. L. (2018). *Hartmann and Kester's plant propagation: Principles and practices* (9th ed.). Pearson.
9. Kochhar, S. L. (2016). *Economic botany in the tropics* (4th ed.). Macmillan Publishers India.
10. Raven, P. H., Evert, R. F., & Eichhorn, S. E. (2013). *Biology of plants* (8th ed.). W. H. Freeman and Company.

E-RESOURCES

- [National Digital Library of India](#)
- *e-PG Pathshala*. [e-PG Pathshala](#)
- National Programme on Technology Enhanced Learning. (n.d.). *NPTEL online courses*. [NPTEL](#)
- Government of India. (n.d.). *SWAYAM*. [SWAYAM](#)
- [Botanical Survey of India](#). (n.d.). *Flora and plant diversity resources*.
- [Indian Council of Agricultural Research \(ICAR\)](#). (n.d.). *Agricultural and horticultural resources*.

MAPPING WITH PROGRAM OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

CO	POs										PSOs			
	1	2	3	4	5	6	7	8	9	10	1	2	3	4
CO1					2	2	2	2		3		3		3
CO2		2	2	3				2		3		3	3	
CO3	1	2	2	3			2	2	2	3		3	3	3
CO4	1	2	2					2	2	3		3	3	3
CO5	1					2	2		2	3		3	3	

Strong -3; Medium -2; Low - 1



SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)
SUNDARAKKOTTAI, MANNARGUDI-614016.
(For the Candidates admitted in the academic year 2026-2027)
DEPARTMENT OF MICROBIOLOGY
B.Sc., CHEMISTRY

Semester: II- AC-II: Botany- II

Ins. Hours / Week: 3

Course Credit: 3

Course Code: U26ABO203

COURSE OBJECTIVES:

1. Understand the morphology and functions of various vegetative and reproductive parts of flowering plants.
2. Explain the principles of plant taxonomy and identify important plant families based on diagnostic characters and economic importance.
3. Describe the structure, organization, and functions of plant tissues and tissue systems, including primary and secondary growth.
4. Understand the development of male and female gametophytes, pollination, fertilization, and seed formation in angiosperms.
5. Explain major physiological processes such as water absorption, photosynthesis, respiration, and the role of plant growth regulators.
6. Apply botanical knowledge for plant identification, classification, and understanding plant growth and development.

UNIT –I Morphology of Flowering Plants

(9 hours)

Plant and its parts. Structure and function of root and stem. Leaf and its parts. Leaf types- simple and compound. Types of Phyllotaxy Inflorescence - Racemose, Cymose and Special types.

UNIT –II Taxonomy

(13 hours)

General outline of Bentham and Hooker's system of classification with merits and demerits. Study of the range of plants characters economic importance in the following families: Polypetalae-*Annonaceae*, *Rutaceae* Gamopetalae - *Rubiaceae*, *Solanaceae*, Monochlamydeae-*Euphorbiaceae*, Monocots - *Arecaceae* and *Poaceae*.

UNIT –III Plant Anatomy

(9 hours)

Tissue and tissue systems: Simple and complex tissues. Anatomy of monocot and dicot roots anatomy of monocot and dicot stems - anatomy of dicot and monocot leaves. *Secondary thickening of Dicot stem*

UNIT –IV Embryology

(7 Hours)

Structure of mature anther, Pollen grain and development of male Gametophyte. Structure of ovule - Types of ovules, development of female gametophyte, Pollination -double fertilization, structure of dicotyledonous seeds.

UNIT –V Plant Physiology

(10 hours)

Absorption of water, photosynthesis - light reaction - Calvin cycle; respiration -Glycolysis – Krebs cycle - electron transport system. Growth hormones – auxins, cytokinins and their applications.

Total Hours – 45

COURSE OUTCOMES:

The students will be able to:

1. Understand the fundamental concepts of Morphology in flowering plants.
2. Understand and appreciate the Plant systematics role in daily life and their economic importance in global scenario.
3. Analyze and recognize the different organs of plants and secondary growth.
4. Understand the fascinating structure of reproduction in green plants and also the process of pollination and fertilization changes.
5. Understand the water relation of plants with respect to various physiological processes.

TEXT BOOKS

1. Sharma, O.P. 2017. Plant Taxonomy. (II Edition). The McGraw Hill Companies.
2. Bhojwani, S.S. Bhatnagar, S.P and Dantu, P.K. 2015. The Embryology of Angiosperms (6th revised and enlarged edition). Vikas Publishing House, New Delhi.
3. Maheshwari, P. 1963. Recent Advances in Embryology of Angiosperms. Intl. Soc. Plant Morphologists, New Delhi.
4. Salisbury, F. B.C.W. Ross. 1991. Plant Physiology. Wadsworth Pub. Co. Belmont.
5. Ting, I.P. 1982. Plant Physiology. Addison Wesley Pb. Philippines.

REFERENCE BOOKS

1. Lawrence, G.H.M. 1985. An Introduction to Plant Taxonomy, Central Book Depot, Allahabad.
2. Bhojwani, S.S and Bhatnagar, S.P. 2000. The Embryology of Angiosperms (4th revised and enlarged edition). Vikas Publishing House, New Delhi.
3. Pandey, B.P. 2012. Plant Anatomy. S Chand Publishing.
4. Jain, V.K. 2006. Fundamentals of Plant Physiology, S. Chand and Company Ltd.
5. Rajni Gupta. 2012. Plant Taxonomy: Past, Present and Future. Vedams (P) Ltd. New Delhi.
6. Jain, V.K. 2006. Fundamentals of Plant Physiology, S. Chand and Company Ltd., New Delhi.

7. Verma, S.K. 2006. A Textbook of Plant Physiology, S.K. Chand & Co., New Delhi

E-RESOURCES

1. https://books.google.co.in/books/about/Plant_Taxonomy.html?id=0bYs8F0Mb9gC&redir_esc=y
2. https://books.google.co.in/books/about/PLANT_TAXONOMY_2E.html?id=Roi0lwSXFuUC&redir_esc=y
3. <https://archive.org/EXPERIMENTS/plantanatomy031773mbp>
4. <https://www.amazon.in/Embryology-Angiosperms-6th-S-P-Bhatnagar-ebook/dp/B00UN5KPQG>
5. <https://www.crcpress.com/Plant-Physiology/Stewart-Globig/p/book/9781926692692>

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**DEPARTMENT OF MICROBIOLOGY
B.Sc., CHEMISTRY**

Semester: II- MP-II: Botany- II Practical

Ins. Hours / Week: 3

Course Credit: 3

Course Code: U26ABO204

COURSE OBJECTIVES

1. To develop practical skills in floral dissection, floral formulae, and floral diagram construction for angiosperm identification.
2. To enable students to identify plant families and describe their distinguishing morphological characteristics.
3. To impart knowledge of plant anatomy through microscopic preparation and identification of dicot stem, root, and leaf tissues.
4. To understand the structure and function of reproductive organs through the study of anther and ovule preparations.
5. To provide hands-on training in plant propagation methods, horticultural tools, organic fertilizers, and basic floral arrangement (Ikebana).

EXPERIMENTS

1. To dissect the flower and to construct the floral diagram
2. Description of the plants and salient features of the families included in the syllabus
3. Micro preparations of stem, root and leaf of dicot and their identification.
4. Micro preparation of anther and observation of ovules (permanent slides).
5. Propagation techniques, Horticultural implements/tools /Organic fertilizers / Ikebana
6. Gardening Practices - Establishment of: Medicinal plant garden

COURSE OUTCOMES

Upon successful completion of the course, students will be able to:

1. Dissect flowers and prepare floral diagrams and floral formulae accurately.
2. Identify important angiosperm families based on diagnostic morphological features.
3. Prepare and recognize anatomical sections of dicot stem, root, and leaf under a microscope.
4. Examine reproductive structures such as anthers and ovules and explain their significance in plant reproduction.
5. Demonstrate basic horticultural skills, including plant propagation, use of horticultural implements, preparation of organic fertilizers, and floral arrangement techniques.

REFERENCES

1. Pandey, B. P. (2020). *Botany for degree students: Taxonomy of angiosperms*. S. Chand Publishing.
2. Pandey, B. P. (2019). *Practical botany*. S. Chand Publishing.
3. Singh, G. (2019). *Plant systematics: Theory and practice* (4th ed.). CRC Press.

- Eames, A. J., & MacDaniels, L. H. (2018). *An introduction to plant anatomy*. McGraw-Hill Education.
- Mauseth, J. D. (2019). *Botany: An introduction to plant biology* (6th ed.). Jones & Bartlett Learning.
- Hartmann, H. T., Kester, D. E., Davies, F. T., & Geneve, R. L. (2018). *Hartmann and Kester's plant propagation: Principles and practices* (9th ed.). Pearson.
- Bhojwani, S. S., & Bhatnagar, S. P. (2018). *The embryology of angiosperms* (5th ed.). Vikas Publishing House.
- Kumar, N. (2017). *Introduction to horticulture*. Rajalakshmi Publications.

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- [Royal Horticultural Society \(RHS\)](#). (n.d.). *Plant propagation and gardening resources*.
- Missouri Botanical Garden Plant Finder. (n.d.). *Plant identification and horticultural information*.

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