

Course Code	Course Name	Credits
26BY002	PLANT DIVERSITY- II	04

Course Objectives

- To understand the diversity, life cycle patterns and major evolutionary trend of Pteridophytes and Gymnosperms.
- To understand the diversity and classification of higher plants, especially Gymnosperms and Angiosperms, based on morphological features.
- To know the richness of Pteridophytes and Gymnosperms of India.
- To understand the geological time scale, fossils and various methods of fossilization
- To highlight the contributions of Birbal Sahni in the development of paleobotany in India.

Learning Outcomes

Upon successful completion of this course it is intended that a student will be able to:

- Explain about the general characters and classification about Pteridophyte and Gymnosperm.
- Gain an understanding about the Stelar evolution in Pteridophytes and heterospory and origin of seed.
- Understand about the morphology and life history of Pteridophyte and Gymnosperm.
- Expand the knowledge about Paleobotany and about the various method of fossilization.
- Explain and evaluate the contributions of Birbal Sahni and describe the significance of Gondwana flora in understanding plant evolution and continental drift.

Unit 1- Pteridophytes (12 Hrs).

General characters of Pteridophytes, Classification (Smith), Stelar evolution, Apospory, Apogamy, Heterospory and Seed habit. Reproductive Biology: Sorus development, types of sporangia (Eusporangiate and Leptosporangiate). Economic importance of Pteridophytes.

Unit 2- Morphology, Reproduction and life cycle (12 Hrs).

Morphological studies and life cycle of the following families- Psilotaceae- *Psilotum*, Lycopodiaceae- *Lycopodium*, Equisetaceae- *Equisetum* and Selaginellaceae- *Selaginella*. (Anatomy and Developments not required).

Unit 3- Gymnosperms (12 Hrs).

General characters of Gymnosperms, Classification (Sporne, 1966), Economic Importance of Gymnosperms. Relationship of gymnosperm with pteridophytes and angiosperms. Distribution of gymnosperms in India

Unit 4- Morphology, reproduction and life cycle (12 Hrs).

External morphology and life of the following families , Cycadaceae- *Cycas*, Pinaceae -*Pinus* and Gnetaceae- *Gnetum Auracariaceae- Auracaria* (Anatomy and Developments not required).

Unit 5- Paleobotany (12Hrs).

Geological Time Scale, Radiocarbon dating. Contribution of Birbal Sahni to Paleobotany. Gondwana flora of India. Fossils and Methods of fossilization. Brief study of the following fossil forms - *Rhynia*, *Lepidodendron*, *Lyginopteris*, *Heterangium*, and *Lagenostoma*.

Reference Books:

1. A Text Book of Botany: Plant Biodiversity – II by Dr. Pratima Vishwakarma (2023/2024) – Designed for B.Sc. Semester-II under NEP 2020 and common syllabus.
2. A Text book of Plant Diversity: Algae, Fungi, Bacteria, Bryophytes, Pteridophytes, Gymnosperm, Paleobotany, Angiosperm by Dr. Swati Sambhaji Kharade (Shashwat Publication, 2025).
3. Textbook of Bryophytes, Pteridophytes, Gymnosperm & Paleobotany - Published in 2023 by Manik Khandare.
4. Textbook of Bryophytes, Pteridophytes, Gymnosperm & Paleobotany" by Manik Khandare (2023) – A comprehensive textbook covering the life cycles, morphology, and classification of ferns
5. Vashishta, P.C. Sinha, A.K and Anil Kumar. 2016. Botany for Degree students. Gymnosperms. S. Chand and Company Ltd., New Delhi.