

SEMESTER IV

Core course 4**Code: BO4CRT04****PTERIDOLOGY, GYMNOSPERMS AND PALEOBOTANY****(Theory 54 hrs; Practical 36 hrs; Credits 3 + 1)****Objectives:**

- Understand the diversity in habits, habitats and organization of various groups of plants.
- To impart an insight into the modern classifications in lower forms of plants.
- Understand the evolutionary trends in Pteridophytes and Gymnosperms.
- Study the anatomical variations in vascular plants.
- Understand the significance of Paleobotany and its applications.

PTERIDOLOGY (Theory 27 hrs; Practical 27 hrs)**Module 1: General introduction and classification of Pteridophytes (5 hrs)**

Introduction, general characters and classification of Pteridophytes up to classes by Smith (1955) and a very brief account of the classification by Christenhusz *et al.*, 2011.

Module 2: Type study (18 hrs)

Study the distribution, morphology, anatomy, reproduction, life cycle and affinities of the following types (Developmental details are not required): Psilophyta - *Psilotum*; Lycopphyta - *Lycopodium*, *Selaginella*; Sphenophyta - *Equisetum*; Pterophyta - *Pteris*, *Marsilea*. Stelar evolution in Pteridophytes; Heterospory and seed habit.

Module 3: Economic importance (4 hrs)

Importance of Pteridophytes: medicinal, ornamental, as biofertilizer.

PRACTICAL (27 hrs)

1. Habit, TS of stem, LS of strobilus and sections of special structures of the following types: *Psilotum*, *Lycopodium*, *Selaginella*, *Equisetum*, *Pteris*, *Marsilea*.

GYMNOSPERMS (Theory 18 hrs; Practical 9 hrs)**Module 4: General introduction and classification of Gymnosperms (5 hrs)**

Introduction, General characters, classification of Gymnosperms by Sporne (1965) and a very brief account of the classification by Christenhusz *et al* (2011).

Module 5: Type study (11 hrs)

Distribution, morphology, anatomy, reproduction, life cycle and affinities of the following types (Developmental details are not required): Cycadopsida – *Cycas*; Coniferopsida – *Pinus*; Gnetopsidae – *Gnetum*. Affinities of Gymnosperms with Pteridophytes and Angiosperms.

Module 6: Economic importance of Gymnosperms (2 hrs)

Uses of Gymnosperms: as food, medicine, in industry and as ornamental plants.

PRACTICAL (9 hrs)

1. Study of the habit, TS of leaf and stem, morphology of reproductive structures of *Cycas*, *Pinus* and *Gnetum*.

PALEOBOTANY (Theory 9 hrs)**Module 6: Fossils (6 hrs)**

Introduction to paleobotany and its significance. Fossil formation, types of fossils. Study of fossil Bryophyte - *Naiadita lanceolata*; fossil Pteridophytes – *Rhynia*, *Calamites*; fossil Gymnosperm – *Williamsonia*. Applied aspects of Paleobotany - exploration of fossil fuels.

Module 7: Paleobotany in India (3 hrs)

Brief study of the fossil deposits in India. Important Indian Paleobotanical Institutes, contributions of Indian Paleobotanists - Birbal Sahni.

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