

**Paper 3a BRYOLOGY, PTERIDOLOGY AND GYMNOSPERMOLOGY**

B. Sc. va (Candidates admitted from the academic year 2021-2022)

Course Code 211BO2M01

Total Hours 60

Credits 3

**CORE THEORY**

Learning Objective	To enable students to develop a deep understanding of the diversity of Bryophytes, Pteridophytes, Gymnosperms and fossils.  To facilitate the understanding of the external, internal and reproductive characters of Bryophytes, Pteridophytes and Gymnosperms.
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CO No.	Course Outcome	PSO Addressed	CL
	Upon the completion of this course, students will be able to		
CO - 1	Understand the theories concerning the origin of universe and evolution of land plants in relation to the Geological Time Scale with special reference to the microphyll and megaphyll.	PSO- 1	U
CO - 2	Acquire knowledge on the classification of Bryophytes and study their morphology, anatomy and functional adaptations using select specimens with special reference to adaptation to land.	PSO- 1	Ap
CO - 3	Describe the classification of Pteridophytes, their morphology, anatomy and functional adaptations, with special emphasis on stelar system.	PSO-1	An
CO - 4	Discuss the classification, morphology, anatomy and functional adaptations of Gymnosperms.	PSO-1	An
CO - 5	Compare and contrast the different types of fossils, fossilization process and the techniques adopted for the study.	PSO-1	Ap

**UNIT I Origin and Evolution of Land Plants HOURS 12**

Origin, Evolution and Characteristics of Land plants; Geological Time scale; Characteristics, Evolutionary significance as seen in Enation theory and Telome theory.

**UNIT II Bryology HOURS 12**

Characteristic features and classification of Bryophytes. Vegetative structure, Reproductive structure and Life History of *Riccia*, *Marchantia*, *Anthoceros* and *Polytrichum*. Biodiversity, Ecology, Conservation and Economic importance of Bryophytes.

**UNIT III Pteridology HOURS 12**

General characters of Pteridophytes. Homospory and Heterospory, Apospory and Apogamy. Eusporangium and leptosporangium. Classification of Pteridophytes (Reimer, 1954). Characteristic features of classes. Stelar evolution in Pteridophytes. Life cycle of homosporous and heterosporous Pteridophytes. A detailed study on the morphology, anatomy and reproduction in *Psilotum*, *Lycopodium*, *Equisetum* and *Marsilea*. Economic importance of Pteridophytes. Indian contribution to Pteridology.

<b>UNIT IV</b>	<b>Gymnospermology</b> General characters of Gymnosperms. Distribution of Gymnosperms. Classification of Gymnosperms (Bierhorst, 1971). Characteristic features of classes. Differences with other major vascular plant groups. A Detailed Study of the Plant Body, Anatomy and Reproduction of the following of <i>Cycas</i> , <i>Pinus</i> and <i>Gnetum</i> . Economic importance of Gymnosperms. Indian contribution to Gymnosperms.	<b>HOURS 12</b>
<b>UNIT V</b>	Introduction to fossils and fossilization. Theories of fossilization. Types of Fossilization: Altered and unaltered: Compression, Petrification, Impression, mould, cast, coal and embedded fossils. Techniques used to study fossilization. A study on <i>Williamsonia</i> and <i>Calamites</i> . Indian Contribution to Paleobotany.	<b>HOURS 12</b>

**TEXT BOOKS**

- BHATNAGAR, S.P., AND A. MOITRA. 1996. Gymnosperms. New Age International Publishers. New Delhi.
- BIERHORST, D.W. 1971. Morphology of Vascular Plants. Macmillan Publishing Company. New York.
- PANDEY, S.N., MISRA, S.P AND TRIVEDI, P.S. 1970. A Text book of Botany (Vol II). Vikas Publishing House Pvt. Ltd. Delhi.
- PARIHAR, N.S. 1967. Introduction Embryophyta: Bryophyta. Central Book Depot., Allahabad.
- SMITH, G. M. 1955. Cryptogamic Botany. Vol. III. McGraw Hill.
- VASHISTA, P.C. 1971. Botany for degree students: Pteridophyta. S. Chand Publications.

**SUGGESTED READING**

- EAMES. J.A. 1964. Morphology of vascular plants (Lower groups). Mc Graw-Hill Book Company, New York.
- JONES, D.L. 1993. Cycads of the World - Ancient Plants in Today's Landscape. Smithsonian Institution Press. Washington. D.C.
- KAUFMAN, P.B., T.F. CARLSON, P. DAYANANDAN, M.L. EVANS, J.B. FISHER, C. PARKS, AND J. WELLS. 1989. Plants: Their Biology and Importance. Harper & Row, Publishers. Inc., New York.
- MANICKAM, V.S. AND V. IRUDAYARAJ. 1992. Pteridophyte Flora of the Western Ghats, South India. B.I. Publications. New Delhi.
- MEYEN, S.V. 1987. Fundamentals of Palaeobotany. Chapman and Hall. London.
- MOORE, R., W.D. CLARK, K.R. STERN, AND D. VODOPICH. 1995. Botany: Plant Diversity. Wm.C. Brown Publishers. Dubuque. IA.
- RAVEN, P.H., R.F. EVERT, AND S.E. EICHHORN. 1992. Biology of Plants. Fifth Edition. Worth Publishers. New York.

**REFERENCES**

- ARNOLD CHESTER A. 1947. An Introduction to Paleobotany. Mc Graw-Hill Book Company. Inc. USA.
- SPORNE, K. R. 1976. The Morphology of Pteridophytes. B.I. Publications. New Delhi.
- SPORNE, K.R. 1967. The morphology of gymnosperms. Hutchinson & Co. London.
- PANDEY, B.P. 1998. College Botany Vol II S. Chand and Company Ltd. New Delhi.
- VASHISHTA, P.C. 1999. Pteridophytes. S. Chand and Company Ltd. New Delhi.
- VASHISHTA, P.C. 1999. Gymnosperms. S. Chand and Company Ltd. New Delhi.

**Paper 4a - BRYOLOGY, PTERIDOLOGY AND GYMNOSPERMOLOGY**

B. Sc. va (Candidates admitted from the academic year 2021-2022)

Course Code 211BO2M02

Total Hours 45

Credits 2

**CORE PRACTICAL**

Learning Objective	To gain knowledge on distinguishing Bryophyte, Pteridophyte and Gymnosperm based on various characters and its inevitable role in mankind.
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CO No.	Course Outcome	PSO Addressed	CL
	Upon the completion of this course, students will be able to		
CO - 1	Appreciate and understand the morphological and reproductive structures of Bryophytes.	PSO-1	U
CO - 2	Describe and illustrate the morphological and reproductive structures of Pteridophytes.	PSO-1	Ap
CO - 3	Observe the anatomical features with special reference to variations in the stele.	PSO-1	U
CO - 4	Compare the morphological and reproductive structures of Gymnosperms.	PSO-1	An
CO - 5	Observe and illustrate anatomical characters with special emphasis on wood anatomy.	PSO-1	Ap

**BRYOLOGY****HOURS 14**

Comparative study of morphology and anatomy of *Riccia*, *Marchantia*, *Anthoceros* and *Polytrichum*.

**PTERIDOLOGY****HOURS 12**

Comparative study of morphology and anatomy of *Psilotum*, *Lycopodium*, *Equisetum* and *Marsilea*.

**GYMNOSPERMOLOGY****HOURS 19**

Morphological and anatomical studies of *Cycas*, *Pinus* and *Gnetum*.

Comparative study of wood anatomy of *Cycas*, *Pinus* and *Gnetum*.

Study of fossil forms: *Williamsonia* and *Calamites*.

Study of economically important Pteridophytes and Gymnosperms and their products