Programme	BS Botany	Course Code	BOT-309L	Credit Hours	1
Course Title	**Pteridophytes and Gymnosperms (Lab)**				

Lab Course Contents

- Study of the Microscope and detailed functioning of its various parts.
- Different Types of Microscopes and their functioning.
- Free hand section cutting, staining and permanent / temporary mounting of the representative specimens mentioned in the theory portion
- Study of Stelar system and Xylem maturation pattern in different plants through fresh specimens and prepared slides.
- Examination of representative plants mentioned in the syllabus through live and preserved specimens (including prepared slides).

- Microscopic study of Palynomorphs of various groups of Pteridophytes and Gymnosperms collected in the field including their Free hand drawings (or Camera Lucida) with brief morphological description.
- Field Study Tour (mandatory) to the Lesser / Higher Himalayas to collect and identify Pteridophytes and Gymnosperms as given in the syllabus. Detailed Field Report will be submitted by pupils at the time of practical examination carrying separate marks apart from Practical Note Book.

Textbooks and Reading Material

1. Andrews, H.W. (Latest Edition). Studies in Palaeobotany. John Wiley and Sons.
2. Bierhorst, D.W. (Latest Edition). Morphology of Vascular Plants. Macmillan, Inc. Insurance, New York.
3. Beck. C.B. Origin and Evolution of Gymnosperms. Columbia University Press, New York.
4. Eames, A.J. (Latest Edition). Morphology of Vascular Plants (Lower Groups). McGraw Hill and Co.
5. Foster and Gifford, (Latest Edition). Comparative Morphology of Vascular Plants, W.H. Freeman, New York.
6. Jeryme, A.C., Ciabbe, T. A. and Thomas, B. A. (Latest Edition). The phylogeny and classification of Ferns, Academic Press, London.
7. Niklas, K. J. (2016). Plant Evolution: an introduction to the history of life. Chicago; London: The University of Chicago Press, 2016. 566 pp.
8. Niklas, K. J. (1981). Paleobotany, Paleoecology and Evolution. Praeger Press, New York.
9. Sporne, K.R. (Latest Edition). The morphology of Pteridophytes. Hutchinson University Library.
10. Taylor, E. L., Taylor T. N. and Krings, M. (2009). Biology and Evolution of Fossil plants. Princeten Hall, New York. 1252 pp.
11. Traverse, A. (2007). Paleopalynology. Unwin Hyman Ltd. 813 pp.
12. Stussey, T.F. (2009) Plant Taxonomy: The Systematic Evolution of Comparative Data. Columbia University Press, New York
13. Simpson, M.G. (2019) Plant Systematics. Elsevier Pub.
14. Simpson, M. (2010). Evolution and Diversity of Vascular Plants. 10.1016/B978-0-12-374380-0.50004-X.
15. Steeves TA, Sussex IM. (1989). Patterns in Plant Development. 2nd ed. Cambridge University Press.
16. National Academy of Sciences. (2000). Variation and Evolution in Plants and Microorganisms: Toward a New Synthesis 50 Years After Stebbins. Washington, DC: The National Academies Press. https://doi.org/10.17226/9766. Francisco J. Ayala, Walter M. Fitch, and Michael T. Clegg, Editor

Teaching Learning Strategies

- Lectures
- Group Discussion
- Laboratory work
- Seminar/ Workshop

Assignments: Types and Number with Calendar

- Lecture Based Examination (Objective and Subjective)
- Assignments
- Class discussion
- Quiz
- Tests