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| Programme | BS Botany | Course Code | BOT-413L | Credit Hours | 1 |
| Course Title | Evolutionary Trends in Plants (Lab) | | | | |
| Lab Course Contents | | | | | |
| <ul style="list-style-type: none"> • Free hand section cutting, staining and permanent / temporary mounting of the representative specimens mentioned in the theory portion. • Study of Different types of Rocks (Igneous, Sedimentary, Metamorphic). • Different techniques involved in studying fossils and age determination. • Isolation of Palynomorphs through Maceration from samples of Mesozoic and Paleozoic Rocks of Pakistan. • Study of different types of Placentation in different flowers. • Study of different types of Embryo Sacs in Angiosperms. • Field Study Tour (mandatory) to the Lesser / Higher Himalayas to collect and identify specimens as given in the syllabus. Rock samples from various stratigraphically measured geological Formations shall be collected to isolate Palynomorphs of Seed Ferns, Gymnosperms and Angiosperms mentioned in the theory section. Detailed Field Report will be submitted by pupils at the time of practical examination carrying separate marks apart from Practical Note Book. • Free hand drawings (or Camera Lucida) of isolated and properly identified Palynomorphs along with the brief morphological description. | | | | | |
| Textbooks and Reading Material | | | | | |
| <ol style="list-style-type: none"> 1. Wang, X. (2018). The Dawn Angiosperms: Uncovering the Origin of Flowering Plants, Second Edition, Springer, p. 407. 2. Beck. C.B. Origin and Evolution of Gymnosperms. Columbia University Press, New York. 3. Beck. C.B. Origin and Evolution of Angiosperms. Columbia University Press, New York 4. Chamberlain, C.J. (Latest Edition). Gymnosperms structure and Evolution. Dover Publications Inc. 480 pp. 5. Foster, S. and Gifford, E.M. (1971). Comparative Morphology of Vascular Plants, W.H. Freeman, New York. 751 pp. 6. Niklas, K. J. (2016). Plant Evolution: an introduction to the history of life. Chicago; London: The University of Chicago Press, 2016. 566 pp. 7. Sporne, K.R. (Latest Edition). The morphology of Gymnosperms. Hutchinson University Library. 8. Taylor, E. L., Taylor T. N. and Krings, M. (2009). Biology and Evolution of Fossil plants. Princeten Hall, New York. 1252 pp. 9. Traverse (2007). Paleopalynology. Unwin Hyman Ltd. 813 pp. 10. Stussey, T.F. (2009) Plant Taxonomy: The Systematic Evolution of Comparative Data. Columbia University Press, New York 11. Simpson, M.G. (2019) Plant Systematics. Elsevier Pub Simpson, M. (2010). Evolution and Diversity of Vascular Plants. 10.1016/B978-0-12-374380-0.50004-X. 12. Steeves TA, Sussex IM. (1989). Patterns in Plant Development. 2nd ed. Cambridge University Press. 13. National Academy of Sciences. 2000. <i>Variation and Evolution in Plants and Microorganisms: Toward a New Synthesis 50 Years After Stebbins</i>. Washington, DC: The National Academies Press. https://doi.org/10.17226/9766. Francisco J. Ayala, Walter M. Fitch, and Michael T. Clegg, Editors | | | | | |
| Teaching Learning Strategies | | | | | |
| <ul style="list-style-type: none"> • Lectures • Seminar/ Workshop • Group Discussion • Laboratory work | | | | | |
| Assignments: Types and Number with Calendar | | | | | |
| <ul style="list-style-type: none"> • Lecture Based Examination (Objective and Subjective) • Quiz • Assignments • Tests • Class discussion | | | | | |