

THEORY:**Introduction of the Course:**

The course is organized to study the taxonomy and nomenclature of plants from different families of Angiosperms and their phylogenetic relationships and basis of classification of these plants under various systems of classification. This course also focusses on study of variations and its types, concept of species and speciation.

Course Objectives:

The course is designed:

1. To provide an adequate knowledge about basic concepts of different plant groups and their morphological/anatomical characteristics.
2. To give an insight into plant cell structure with an emphasis on their Biochemistry, Genetics and Evolution.

Contents:

1. Introduction: Importance and relationship of Plant systematics with other sciences, Phases of plant taxonomy.
2. Concept of Species, Speciation: Mechanism of speciation.
3. Variation: Types of variation, Continuous and discontinuous variation, Clinal variation.
4. Biosystematics: Introduction and importance, Methodology of conducting biosystematics studies, various biosystematics categories such as ecophene, ecotype, ecospecies, coenospecies and comparium.
5. Taxonomic Evidence: Importance and types of taxonomic evidences: anatomical, cytological, chemical, molecular, palynological, geographical and embryological.
6. Nomenclature: Principles and important rules of botanical nomenclature.
7. Classification: Why classification is necessary? Importance of predictive value. Brief history, Different systems of classification with at least one example of each (Linnaeus, Bentham and Hooker, Engler and Prantl, Bessey, Cronquist, Takhtajan and Dahlgren).
8. Brief introduction of Numerical taxonomy.

Practicals:

1. Technical description of plants of the local flora and their identification up to species level with the help of a regional/Flora of Pakistan.
2. Preparation of indented and bracketed types of keys.
3. Submission of properly mounted and fully identified hundred herbarium specimens at the time of examination.
4. Field trips shall be undertaken to study and collect plants from different ecological zones of Pakistan.
5. Description of important families of angiosperms: Apiaceae (Umbelliferae), Arecaceae (Palmae), Asclepiadaceae, Asteraceae (Compositae), Boraginaceae, Brassicaceae (Cruciferae), Cannaceae, Capparidaceae, Caryophyllaceae, Casuarinaceae, Chenopodiaceae, Convolvulaceae, Cucurbitaceae, Cyperaceae, Euphorbiaceae, Fabaceae (Leguminosae), Juncaceae, Lamiaceae (Labiatae), Liliaceae, Magnoliaceae, Malvaceae, Myrtaceae, Orchidaceae, Papaveraceae, Poaceae (Graminae), Ranunculaceae, Rosaceae, Salicaceae, Scrophulariaceae, Solanaceae, Trochodendraceae, Winteraceae.

Teaching-learning Strategies

1. Lectures
2. Group Discussion
3. Laboratory work
4. Seminar/ Workshop

Learning Outcome:

1. Students are expected to get familiarized with the morphological and systematic knowledge about different plant groups.
2. They will be able to learn about the history of Plant Systematics and its role in classification.
3. The obtained knowledge shall also enable the students to make use of this knowledge for the identification and grouping of different plants based on the anatomy.

Assessment Strategies:

1. Lecture Based Examination (Objective and Subjective)
2. Assignments
3. Class discussion
4. Quiz
5. Tests

Recommended Readings:

1. Ali, S. I. and Nasir, Y. (1995-to date). *Flora of Pakistan*. Karachi Univ. Press, Karachi.
2. Davis, P.H. and Heywood, V. H. (1963). *Principles of Angiosperm Taxonomy*. Oliver & Boyd, London.
3. Greuter, W., McNeill, J. Barrie, F.R., Burdet, H. M., Demoulin, V., Filguerras, T.S., Nicolson, D.H., Silva, P.C., Skog, J.E., Trehane, P., Turland, N. J. and Hawksworth, D. L. (2000). *International code of botanical nomenclature (Saint Louis Code) adopted by the Sixteenth International botanical congress St. Louis Missouri, July –August 1999*. Koeltz, Konigstein. (Regnum Veg.138.)
4. Judd, W.S., Campbell, C.S., Kellogg, E.A., Stevens, P.F. and Donoghue, M. J. (2015). *Plant Systematics; A phylogenetic Approach*, Sinauer, USA.
5. Levine, D. A. (2000). *The Origin, Expansion and Demise of Plant Species*. Oxford University Press.
6. Naik, V. N. (1988). *Taxonomy of Angiosperms*. Tata McGraw Hill Publishing Company, New Delhi.
7. Simpson, M. G. (2018). *Plant Systematics* (3rd edition). Elsevier Academic Press, UK.
8. Singh, G. (2016). *Plant Systematics; An Integrated Approach* (3rd edition), University of Dehli, India.
9. Stace, C. (1992). *Plant Taxonomy and Biosystematics*, Edward Arnold.
10. Takhtajan, A. (1986). *Flowering Plant: Origin and Dispersal*, Oliver and Boyd, Edinburgh.
