

BOTANY COMPONENT - DSE

DISCIPLINE SPECIFIC ELECTIVE COURSE (DSE 04)

Credit distribution, Eligibility and Pre-requisites of the Course

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course
		Lecture	Tutorial	Practical/ Practice		
Plant Systematics ALS BOT DSE 04	4	2	0	2	Class 12 th Pass with Science	NIL

Learning Objectives:

The learning objectives of this course are as follows:

- to gain knowledge about the basics of plant systematics.
- to get an insight into the interrelationships of plant systematics and allied subjects.

Learning Outcomes:

By studying this course, students will be able to:

- understand technical terminology used in plant taxonomy.
- apply the terminologies to describe, identify and classify the flowering plants.
- search and analyze taxonomic information from internet-based scientific databases and other resources.
- comprehend and compare various systems of classification.
- recognize diversity in local/regional flora.

Unit 1: Introduction

(1 Hour)

Plant identification, Classification, Nomenclature, Biosystematics.

Unit 2: Identification

(4 Hours)

Field inventory, Herbarium Techniques, Functions of Herbarium, Important herbaria and botanical gardens of the world and India, Virtual Herbarium, E-flora: Flora, Monographs, Journals.

Unit 3: Systematics-An Interdisciplinary Science

(5 Hours)

Evidence from cytology, phytochemistry [Alkaloids, Phenolics, Glycosides, (in brief)] and molecular data (cp.DNA, mt-DNA, nuclear DNA, PCR amplification, sequence data analysis)

Unit 4: Taxonomic Hierarchy

(2 Hours)

Concept of taxa (family, genus, species); Categories and taxonomic hierarchy; Species concept (taxonomic, biological & evolutionary)

Unit 5: Botanical Nomenclature

(7 Hours)

Principles and rules (ICN); Ranks and names; Typification, Author citation, Valid publication, Rejection of names, Principle of priority and its limitations; Names of hybrids and cultivated plants.

Unit 6: Basic Terms and Concepts of Phylogeny

(4 Hours)

Cladistics: Terms and concepts (primitive and advanced, homology and analogy, parallelism and convergence, monophyly, Paraphyly, polyphyly, clades and grades). Methodology of Cladistics, Methods of illustrating evolutionary relationships (phylogenetic tree, cladogram).

Unit 7: Systems of Classification

(7 Hours)

Major contributions of Parasara, Charaka, Theophrastus, Bauhin, Tournefort, Linnaeus, Adanson, de Candolle, Bessey, Hutchinson, Takhtajan, Cronquist, Bremer and MW Chase; Classifica

tion systems of Bentham and Hooker (up to series) and Engler and Prantl (up to series); Angiosperm Phylogeny Group (APG IV) Classification (major clades).

PRACTICAL

(60 Hours)

1. To prepare at least 2 herbarium specimens and identify them using available resources (Literature, herbaria, e-resources, taxonomic keys) and classify up to family level (according to Bentham and Hooker's classification).
2. Description of taxa using semi-technical terms and identification of the families according to Bentham and Hooker's classification.

Note: Any twelve families from the following list to be studied with at least two specimens (or one where limitations exist).

List of Suggested Families (*mandatory)

Acanthaceae, Rubiaceae, *Apiaceae, Apocynaceae, *Asteraceae, *Brassicaceae, *Euphorbiaceae, *Fabaceae, *Lamiaceae, Liliaceae, *Malvaceae, Moraceae, *Poaceae, *Ranunculaceae, *Solanaceae.

Essential/recommended readings:

1. Simpson, M. G. (2019). *Plant systematics*. 3rd Edition, Academic press.
2. Singh, G. (2019). *Plant Systematics- An Integrated Approach*. 4th edition. CRC Press, Taylor and Francis Group.
3. Pandey, A. K., Kasana, S. (2021). *Plant Systematics*. 2nd Edition. CRC Press Taylor and Francis Group
4. <http://www.mobot.org/MOBOT/research/APweb/>
5. Maheshwari, J. K. (1963). *The flora of Delhi*. Council of Scientific & Industrial Research.
6. Maheshwari, J. K. (1966). *Illustrations to the Flora of Delhi*. Council of Scientific & Industrial Research.
7. Harris, J. G., Harris, M. W. (2001). *Plant Identification Terminology: An Illustrated Glossary*. Spring Lake, Utah: Spring Lake Pub. Spring Lake, Utah.

Suggestive Readings:

1. The Angiosperm Phylogeny Group, Chase, M.W., Christenhusz, M.J.M, Fay M.F., Byng, J.W., Judd, W.S., Soltis, D.E., Mabberley, D.J., Sennikov, A.N., Soltis, P.S., Stevens, P.F. (2016). *An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG IV*. Botanical journal of the Linnean Society 181 (1): 1-20.
2. <https://www.mobot.org/MOBOT/research/APweb/treeapweb2s.gif>
3. <https://www.digitalatlasofancientlife.org>
4. <http://apps.kew.org/herbcat/navigator.do>
5. <https://efloraofindia.com/>
6. <https://powo.science.kew.org/>
7. Page, R.D.M., Holmes, E.C. (1998). *Molecular Evolution: A Phylogenetic Approach*. Blackwell Publishing Ltd.

Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.