PLANT TAXONOMY & BIOSYSTEMATICS (BPS 521)

S. No.	Topics
1.	**Biosystematics:** History of developments in taxonomy: Linnaean to post-Linnaean era; Systematics - concepts and components; Botanical Nomenclature; Taxonomic literature - Floras, Monographs, Indices, Keys and Journals. Field & Herbarium Methods. Importance of Botanical gardens, Plant nomenclature: ICBN, Typification, Principles of priority and their limitations - Effective and valid publication – Authors, Citations Retention, choice and rejection of names.
2.	Diversity and classification of flowering plants; Bentham & Hooker; Engler & Prantl; Hutchinson, and Takhtajan. Phylogenetic systematics; classification based on Angiosperm Phylogeny Group (APG I-V) and recent updates; Taxonomic evidence - structural and biochemical; Molecular systematics.
3.	**Angiosperm Taxonomy:** Salient features and economic importance of the following families; 1. Ranunculaceae 2. Magnoliaceae 3. Guttiferae (Clusiaceae) 4. Tiliaceae 5. Fabaceae 6. Caesalpiniaceae 7. Mimosaceae 8. Lythraceae 9. Melastomaceae 10. Cucurbitaceae 11. Apiaceae 12. Rubiaceae 13. Compositae (Asteraceae) 14. Loganiaceae 15. Apocynaceae 16. Asclepiadaceae 17. Boraginaceae 18. Convolvulaceae 19. Scrophulariaceae 20. Acanthaceae 21. Verbenaceae 22. Lamiaceae 23. Euphorbiaceae 24. Orchidaceae 25. Araceae
4.	**Taxonomic evidence:** Biochemistry, Anatomy, Embryology, Cytology, Polyploidy, Serology and Cytogeography in relation to taxonomy.
5.	**Molecules and genomes in plant systematics:** Techniques used in molecular taxonomy, Chloroplast DNA and the study of plant phylogeny - present status and future prospects, Use of chloroplast DNA rearrangements in reconstructing plant phylogeny, Mitochondrial DNA in plant systematics, Applications and limitations, Ribosomal RNA as a phylogenetic tool in plant systematics. Eg. Saxifragaceae, Asteraceae, Onagraceae, Brassica, Nymphales. Molecular approaches to plant evolution, Intraspecific cp DNA variation in systematic and phylogenetic implications. Molecular evidence and plant introgression, molecular data and polyploid evolution in plants. Molecular systematics and crop evolution.
6.	**Practical:** Live plants/ Herbarium specimens of the following families will be provided in the class for description and identification (classification based on APG II, 2003): Construction of floral diagrams, Technical descriptions of the family, Preparation of dichotomous keys, Identification of economically important plants and plant products mentioned in the theory syllabus. Techniques in molecular systematics. Phylogenetic analyses using PAUP. Study of the local flora.

Suggested Readings:

1. Angiosperm Phylogeny Group (2003): An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG II. Botanical Journal of the Linnaean Society 141: 399-436.
2. Cracknell AP, Hayes L (2009) Introduction to Remote Sensing. CRC Press, Boca Raton, USA (Special Indian Edition).
3. Crawford DJ (2003) Plant Molecular Systematics. Cambridge University Press, Cambridge, UK.

4. Cronquist A (1981). An integrated system of classification of flowering plants. Columbia University Press, New York.
5. Hollingsworth PM, Bateman RM and Gornall RJ (1999). Molecular systematics and Plant Evolution. Taylor and Francis, London.
6. Judd WS, Campbell CS, Kellogg EA, Stevens PA and Donoghue MJ (2002) Plant Systematics: A Phylogenetic Approach. Sinauer Associaes, Inc., Massachusetts.
7. Nei M and Kumar S (2000) Molecular Evolution and Phylogenetics. Oxford University Press, New York.
8. Raven PH, Begr LR, Hassenzahl DM (2008) Environment. 6th edition. John Wiley & Sons, Inc., New York.
9. Semple C and Steel MA (2003) Phylogenetics. Oxford University Press, Oxford.
10. Simpson MG (2006) Plant Systematics. Elsevier, Amsterdam.
11. Stuessy TF (2008) Plant Taxonomy: The systematic Evaluation of Comparative Data. Columbia University Press, New York.
12. Swafford DL (2001) PAUP*. Phylogenetic analysis using parsimony (* and other methods), version 4. Sinauer Associates, Sunderland.