SYLLABUS FOR THE SUBJECT OF BOTANY
PAPER-I

Marks : 100

1. **Algae:** Origin, evolution, distribution and classification with reference to range, structure, life-history, ecology and economic importance of Cyanophyta, Bacillariophyta, Phaeophyta and Rhodophyta, Chlorophyta.

2. **Fungi:** Structure of plant body; development of ascus, basidium and conidium; reproduction; classification; phylogeny, physiology and economic importance of the main groups of fungi. Diseases of economically important plants and their control.

3. **Bryophytes:** Evolution of gametophytes and sporophytes, structure, reproduction, classification and economic importance of various members of Liverworts, Mosses and Hornworts.

4. **Pteridophytes:** Introduction, characteristic features, alternation of generation and evolutionary tendencies of various divisions: Psilophyta, Lycophyta, Sphenophyta and Pterophyta. Evolution of seed.

5. **Gymnosperms:** General characters, life history and evolutionary tendencies of Cycadophyta, Coniferophyta and Ginkgophyta. Structure of seed.

6. **Angiosperms:**

    a. **Taxonomy:** Introduction to systematic botany; historical background of classification systems, Post evolutionary era and recent developments in classification systems. Plant Nomenclature, Rules of Nomenclature, International Code of Botanical Nomenclature, Concept of taxa, Plant collection and Preparation of herbarium; Botanic Gardens. Modern trends in taxonomy, Biosystematics, Chemotaxonomy and Numerical taxonomy.

    b. **Anatomy:** Cell wall; Tissues and Tissue systems: Meristematic tissue; Epidermal tissue system; Fundamental or ground tissue system; Mechanical tissue system; Xylem and Phloem as Vascular tissue, Collenchyma, Sclerenchyma; Primary and secondary growth; Cambium, Periderm. Anatomy of leaf, stem and root. Abnormal/Anomalous secondary growth, Ecological anatomy.

    c. Embryology: Introduction; alternation of generation; the flower and its parts; stamen or microsporophyll; carpel or megasporophyll; male gametophyte or microgametophyte, pollination and fertilization; endosperm; embryo and its development (embryogenesis); seed and fruit formation; apomixis; polyembryony.

RECOMMENDED BOOKS

1. *Harold C. Bold and Micheals, J. Wynne, 1985. Introduction to the Algae. Prentice Hall, Inc, New Jersey.*
2. *Alexopolous, ClJ., Mims, C.W. and Blackwell, C. 1996. Introductory Mycology (4th Edition). Wiley & Sons, New York.*
3. *Webster, J. 1980. Introduction to fungi (2nd Ed.), Cambridge University Press, London.*
4. *George N. Agriose 1978. Plant Pathology. 4th Edition. Academic Press, London.*
5. *Scholfield, B.W. Introduction to Bryology. MacMillan, New York.*
6. *Sporne, K.R. (1967). The Morphology of Gymnosperms. Hutchinson Univ. Library, London.*
7. *Smith G.M. 1956. Cryptogamic Botany vol. I & II 2nd edit. McGraw Hill.*
8. *Stuessy, T. F. 1990. Plant Taxonomy. Columbia University Press, USA.*
9. *Lawrence, G. H. M. 1951. Taxonomy of Vascular Plants. Macmillan, New York.*
10. *Jones, S.B. and Luchsinger, A.E. 1987. Plant Systematics. Mcgraw-Hill Book company, Singapore.*
11. *Stace, C.A. 1962. Plant Taxonomy and Biosystematics. National Book Foundation Islamabad.*
12. *Fahn, A. 1990. Plant Anatomy. Pergamon Press. Oxford.*
13. *Esau, K. 1960. Anatomy of Seed Plants. John Wiley, New York.*
14. *Pandey, B.P. 2001. Plant Anatomy. S. Chand and company Ltd. New Dehli.*
15. *Maheshwari, P. 1988. An introduction to the Embryology of Angiosperms, 9th Reprint. McGraw-Hill, Inc. New York.*

PAPER-II

Total Marks: 100

1. **Plant Physiology:** Plant water relations, osmotic quantities, absorptions, transpiration, role of essential mineral elements, their uptake and distribution. Growth and development, Plant hormones, Photoperiodism, Vernalization, Dormancy and seed germination. Biochemistry of Carbohydrates, Proteins and Fats with reference to plants. Enzymes. Plant pigments. Photophosphorylation; Path of carbon in photosynthesis; Oxidative phosphorylation (respiration), Nitrogen and Fat metabolism.

2. **Ecology:** Influence of climatic, edaphic and biotic factors on plant growth. Sampling techniques. Major formations in relation to climatic zones. Concepts of ecosystems and their productivity, Ecological energetics, pyramids, food chains and trophic levels. Salinity and Waterlogging in Pakistan: Causes and reclamation of salinity, soil erosion, methods of control and conservation. Pollution and conservation of natural resources. Vegetation of Pakistan.

3. **Cytology:** Detailed study of ultra-structure of cell and its components; Chromosomes, Mitosis and meiosis, significance, Cancer and apoptosis.

4. **Genetics:**
    a. **Mendelian Genetics:** Linkage, Crossing over, Sex-linked inheritance, Mutation, Polyploidy.
    b. **Biochemical Genetics:** Biochemical nature of hereditary material, fine structure of genes: Transduction and Transformation.
    c. **Molecular Genetics:** Replication, Transcription, Genetic codes and Translation.

5. **Evolution:** Theories of Evolution, Lamarckism, Darwinism, Neo-Darwinism. Hardy-Weinberg's Law, Gene frequency, Adaptive mtations.

RECOMMENDED BOOKS

1. *Taiz, L. and E. Zeiger 2002. Plant Physiology. Third Edition sinauers Pub. Co. Inc. California.*
2. *Salisbury, F.B. and C.W. Ross 1992. Plant Phsiology. Wadsworth publishing company, Bemont, California.*
3. *Odum, E.P. 1985. Basic Ecology. W.B. Saunders.*
4. *Smith, R.L. 1998. Elements of Ecology. Harper & Row Publishers, New York.*
5. *Waisel, Y. 1972. Biology of Halophytes.*