

Ph.D. Course Work Syllabus

Paper-II Botany

Paper Code-(Ph.D.-102)

Contact Hours: 4 Hrs/ week

Continuous Assessment: 40 Marks

Credit: 4

End Term Exam: 60 Marks

Unit – I

1. Microbial Biotechnology
 - Bioremediation
 - Biofertilizers (Cyanobacteria, Bacteria and Mycorrhizae)
 - Phycotoxins and Mycotoxins
 - Role of soil microbes in the degradation of pesticides and polycyclic aromatic hydrocarbons (PAHs)
2. Plant pathology–Principles of plant disease development, disease control (chemical, biological and integrated disease management) and role of biotechnology in plant disease control.
3. Molecular Plant Pathology – Host pathogen interactions; Recognition; defence Elicitors, phytoalexins, Plant Immunization.

Unit - II

4. Signal perception and transduction. Introduction, Receptors, G proteins, Phospholipid signalling, Cyclic nucleotides, Calcium calmodulin, protein kinases
5. Heavy metal stress: Availability, physiological basis for toxicity – water relation, photosynthesis, oxidative damage, membrane perturbations, tolerance mechanism – phytochelatins, phytoremediation – Phytofiltration, phytoextraction, Phytostabilization, prospects and limitations
6. Isolation and characterization of certain enzymes (Rubisco, PEP Carboxylase, GS and GOGAT)
7. Regulation of photorespiration and its significance in crop, productivity
8. In vitro production of secondary metabolites. Significance of Hairy roots.

Unit – III

9. The origin and early evolution of angiosperms, with reference to recent findings on fossil pollen, flowers and leaf remains.
10. Identification of Gymnosperms and Dicot wood based on anatomical characters of wood.
11. Concept of ICBN and salient features of Botanical nomenclature.
 - i). Typification.
 - ii). Rules of priority.
 - iii). Effective and valid publication.
 - iv). Authors citations
12. . Cultivation, harvest, drying, grading, packing, storage and marketing of medicinal plants
13. Pharmacogenetic study of different types of plant drugs with special reference to Aromatic plants–Lemongrass and Palmarosa: Medicinal plants i) Aloe vera ii) Glory lily

14. Indigenous traditional drugs of India and their market Adulteration.

Unit-IV

15. Conventional plant breeding, mutation breeding, QTL mapping and Marker assisted selection for crop improvement.
16. Tissue culture of plants: Callus culture, plantlet regeneration, micro propagation, soma clonal variation and synthetic seeds.
17. Principles of genetic engineering and status of transgenic plants.
18. Molecular characterization of Elite medicinal plants and endangered plants and development of molecular markers (RAPD, SSR and AFLP).
19. Biodiversity-Types, hot spots, threats to Biodiversity and conservation.

Text Books:

1. Molecular cloning A Laboratory Manual 3rd edition Vol. 1, 2, 3- Sambrook and Russell, Churchill press, 2007
2. Principals and Techniques of Biochemistry and Molecular Biology, Edited by Keith Wilson and John Walker, Sixth Edition, Cambridge University Press.
3. Brown. T.A. (1995). Gene Cloning an Introduction. (3rd edition). Chapman Hall, 2-6 Boundary Row, U.K.

References:

1. P.N. Arora and P.K. Malhan (1998). Biostatistics. Himalaya Publishing Bombay.
2. P.S.G. Kumar (2004). Research methods and statistical techniques. B.R. publishing Academy, Udaipur.
3. G.B.N. Chainy, G. Mishra and P.K. Mohanty (2004) Basic Biostatistics. Kalyani Publisher.
4. N. Gurumani (2006). Research Methodology for Biological Sciences. MJP Publishing, Chennai.
5. C.R. Kothari (2004). Research Methodology- Methods and Techniques, New Age Publ. Wiley Eastern, 1985.
6. Dawson, Catherina (2002). Practical Res. Methods. New Delhi. UBS Publ.
7. Kumar Ranjit (2005). Res. Methodology. A step-by-step Guide for Beginners. Singapore, Pearson Education.