SYLLABUS FOR

Ph.D./M.Phil

ELIGIBILITY ENTRANCE TEST 2013-2014

BOTANY

RKDF UNIVERSITY, BHOPAL

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Ph.D./M.Phil

BOTANY

Microbiology, Phycology & Mycology

1. Ultra structure of bacterial cell.
2. Reproduction and genetics of bacteria., transformation, conjugation, transduction.
3. Structure and nature of plant viruses with emphasis on TMV and bacteriophages.
4. Thallus organisation in algae.
5. Algal blooms and Algal biofertilizers,
6. Heterothallism, Hetrokaryosis, Parasexuality,
7. Fungi in industry, medicine and as food, Mycotoxins,
8. Mushroom cultivation
9. Mycorrhizae; General account, their role and applications in agriculture and forestry

Cell biology, Molecular biology & Cytology

10. Chromosome structure and packaging of DNA, Euchromatin and hetrochromatin banding patterns, Specialized types of chromosomes: - B-chromosomes, sex chromosomes, polytene and lamp brush chromosomes
11. Structural alterations in chromosomes : Origin, meiosis and breeding behavior of duplication, deficieny, inversion. And translocation heterozygotes.
12. Numerical alterations in chromosomes : Origin, occurrence, production and meiosis of haploids, euploids and aneuploids; origin and production of autopolyploids types, genome constitution and analysis of allopolyploids, induction and characterization of trisomics and monosomics, effect of aneuploidy on phenotype in plants.
13. Mutations : Spontaneous and induced mutations, physical and chemical mutagens; molecular basis of gene mutations ; mutations induced by

transposons ; site directed mutagenesis.

14. DNA structure : A, B and Z forms of DNA; replication, damage and repair mechanism.

Plant physiology & Biochemistry

15. Enzymes : Nomenclature and classification; nature and properties Coenzymes and Prosthetic groups : Enzyme kinetics, Mechanism and mode of enzyme action; Active site, Activator and inhibitory, Isoenzymes; Allosteric enzymes; Ribozyme; Factors affecting enzyme activity; Enzyme immobilization.
16. Photosynthesis : Photosynthetic apparatus and pigments, Electron transport and photophosphorylation ; C , C , and CAM pathway, Photorespiration, Glycolyte metabolism.
17. Respiration: Glycolysis; Tricarboxylic acid cycle; Pentose phosphate pathway; Electron transport system and oxidative phosphoryration.
18. Phytohormones : Chemical nature, biosynthesis, mode of action and role of Auxins, Gibberellins, Cytokinins, ABA and Ethylene.

Ecology and Environmental Biology

19. Modern concept, structural components trophic structure, Food chain, food web and ecological pyramids
20. Dynamics : Succession –Hydrosere and Xerosere
21. Water pollution : sources, effect and control with emphasis on Eutrophication.
22. Forest : Forest types found in India, Importance of forest, strategies for conservation and management of forest with special reference to deforestation , chipko movement, Social forestry, Biosphere reserve and Gene Bank; National Forest Policy.
23. Soil : Soil erosion and soil conservation
24. (a) Biosphere (b) Endemism
    (c) Bioindicators (d) Wasteland Reclamation
    (e) Environmental impact assessment (f) Damodar basin

Plant Biotechnology

25. Plant cell and tissue culture : General introduction, history, scope, concept of cellular differentiation, totipotency; principles and techniques of cell and tissue culture.
26. Protoplast culture and Somatic hybridization; Cybrids
27. Anther and pollen cultue ; haploidy.
28. Tools of genetic engineering with special reference to Restriction

endonucleases; Vectors: Plasmids, cosmids and phages
29. Construction of genomic and c DNA libraries and their uses
30. Polymerase chain reaction (PCR) ; DNA fingerprinting.
31. Gene transfer in plants : Vectors mediated transformation ; *grobacterium*h The natural genetic engineer; Methods of direct gene transfer
32. Molecular markers (RFLP, VNTR)

Bryophta, Pteridophyta, and Gymnosperm

33. Evolution of gametophytes and sporophytes in bryophytes
34. Fossil bryophytes
35. Stelar organization and its evolution in pteridophytes
36. Telome concept ; its merits and demerits
37. Heterospory and seed habit in pteridophytes
38. Distribution of living and fossil gymnosperms in India
39. Ginkgoales
40. Gentales (with emphasis on angiospermic features)
41. Apogamy, apospory & parthenogenesis

Systematic Botany, Anatomy and Embryology

42. Taxomomic evidence : Morphology, anatomy, Palynology, embryology, cytology, Phytochemistry, genome analysis and nucleic acid hybridization.
43. System of angiosperm classification : Phenetic verses phylogenetic system Cladistics in taxonomy; relative merits and demerits of major system of classification: relevance of taxonomy to conservation
44. Apical meristem : shoot apex and root apex organistion
45. Periderm : formation and functions, Lenticles: Abscission and wound healing
46. Vascular cambium (Structure and functions)
47. Endosperm : development, types, functions, cytology, morphogenetic studies
48. Polyembryony – Causes, experimental induction, classification, practical value.
49. Apomixis, Diplospory, Apospory; parthenogenetic development of embryos.

Resource Biology

50. (A) Origin, evolution, botany, cultivation and uses of the following with special reference to M.P

(i) Food, forage and fodder crops. (ii) Fibre crops
(iii) Medicinal plants (iv) Aromatic plants
(v) Vegetable oil yielding crops

51. Role and impact of following

(i) Remote sensing. (ii) Floriculture
(iii) Dry-land farming (iv) Agro forestry
(iv) Organic farming