PLANT DIVERSITY I (ALGAE, FUNGI, LICHENS AND BRYOPHYTES)
(BPS 511)

S. No.	Topics
1.	**Algae:** Basic characteristics of the algae; Habitat and range of thallus structure in algae; Classification of Algae by Lee, 2009; Life cycle pattern; Pigmentation; Endosymbiosis and evolution of chloroplast in algae; Origin and evolution of sex in algae; Fossil algae. Salient Features of Various algal Phyla:
2.	**Salient features of various algal phyla:** A general account with emphasis on cell structure and reproduction of Prokaryotic algae (cyanobacteria) and Eukaryotic algae (Rhodophyta, Chlorophyta, Euglenophyta, Dinophyta, Apicomplexa, Cryptophyta, Heterokontophyta (Chrysophyceae, Eustigmatophyceae, Bacillariophyceae, Xanthophyceae, Phaeophyceae, Prymnesiophyta). Commercial application of marine algae polysaccharides. Algae for biofuel, agriculture, nutraceautical, pharmaceuticals and biomedical applications. Algal bloom, Red tide and Algal toxins. Algae as an indicator of water pollution.
3.	**Fungi:** General characters of Fungi and its economic importance. Principles of classification of fungi, Classifications by C. J. Alexopoulos. Mycelial structure; Aggregation of hyphae, hyphal growth, fungal wall and septa; and reproduction of fungi, Types of fruiting bodies in fungi, Spores and spore dispersal in fungi, process of spore germination. Fungal associations and their significance, (a) Symbionts - Lichens, Mycorrhiza, Fungus-insect mutualism. (b) Parasites - Common fungal parasites of plants, humans, insects and nematodes. (c) Saprophytes - Fungal decomposition of organic matter, coprophilous fungi, cellulolytic fungi, lignolytic fungi.
4.	**Lichens:** Nature of the relationship between algae and fungi in Lichens - Habit and habitat – Classificationof Lichens. Fine structure of lichen thallus – Internal structure – Special structures: Clyphellae, Cephalodia, Soredia, Isidia and Rhizinae. Reproduction: Asexual reproduction- Fragmentation, Isidia and Soredia, Sexual reproduction – Apothecia of lichen. Economic importance of lichens. Lichen as pollution indicators.
5.	**Bryophytes:** Schuter's classification of Liverworts and Reimer's classification of mosses [In brief, general characters up to class level only]. Origin of Bryophytes including fossil evidence - Morphological variations, Anatomical and Cytological studies of Gametophytes and Sporophytes, Dehiscence of capsule and dispersal of spores. Evolution of gametophytes and sporophytes. Affinities of Bryophytes. Progressive sterilization of the sporogenous tissue. Ecology of bryophytes (Pollution indicators and monitoring). Economic importance of Bryophytes.
6.	**Practical:** **Algae:** Study of the morphology and internal structure of the algae with particular reference to the following forms. Cyanophyta: Microcystis, Oscillatoria, Lyngbya, Rivularia, Gloeotrichia, Nostoc, Stigonema, Rhodophyta: Polysiphonia, Gracilaria, Amphiroa, Chlorophyta: Scenedesmus, Chlamydomonas, Zygnema, Oedogonium, Desmids, Cladophora, Draparnadiopsis. Coleochaete, Bulbochaete, Neomeris, Ulva, Enteromorpha, Codium, Helimeda, Caulerpa, Charophyceae: Chara/Nitella, Xanthophyceae: Vaucheria/ Botrydium, Bacillariophyceae: Pennate diatoms, Phaeophyceae: Ectocarpus, Dictyota, Padina, Turbinaria, Sargassum. **Fungi:** Study the morphological and anatomical details of vegetative/reproductive structure for identification of the following; Mucor, Pythium, Phytophthora, Rhizopus,

	Albugo, Pilobolus, Aspergillus, Penicillium, Saccharomyces, Penicillium, Neurospora, Xylaria, Peziza, Morchella, Agaricus, Polyporus, Lycoperdon, Cyathus, Fuserium, Alternaria, Puccinia. **Lichens:** Usnea, Parmelia thallus and Lichen Apothecium for sectioning. **Bryophytes:** Study of Morphology and anatomy of the following: 1) Riccia; 2) Lunularia; 3) Dumortiera; 4) Asterella; 5) Porella; 6) Pallavicinia; 7) Riccardia; 8) Anthoceros; 9) Sphagnum; 10) Funaria 11) Polytrichum 12) Plagiochasma; 13)Targionia.

Suggested Readings:

Algae & Bryophytes:

1. H C Dube (1983). An introduction to fungi. Vikas Publ. New Delhi.
2. M E Hale. The biology of lichens.
3. A Misra, P R Agarwal. Lichens.
4. M C Nair, S Balakrishnan. Beneficial fungi and their utilization. Sci. publ. Jodhpur.
5. V Ahamjian, M E Hale. The Lichens.
6. R Dayal. Predaceous Fungi. Commonwealth Publishers.
7. Phycology by Robert Lee, Colorado State University. Cambridge University Press.
8. Algae: Anatomy, Biochemistry, and Biotechnology by Laura Barsanti and Paolo Gualtieri Published in 2006 by CRC Press Taylor & Francis Group.
9. Textbook of Algae by O.P. Sharma Published by Tata McGraw Hill
10. Green Plants: Their Origin and Diversity, Second edition by Peter R. Bell and Alan R. Hemsley, Cambridge University press, 2000.
11. Introduction to Fungi by John Webster and Roland Weber, Cambridge University press.
12. Kumar, H.D. 1988. Introductory Phycology. Affiliated East-West Press Ltd, New Delhi
13. Round, F.E. 1986. The Biology of Algae. Cambridge University Press, Cambridge.
14. Rashid. A. 1998. An Introduction of Bryophytes. Vikas publishing house Pvt. Led.
15. Cavers, F. 1964. Inter-relationships of Bryophytes. Chopra, R.N. and Kumar, P.K. 1988. Biology of bryophytes. New Age International Publishers, New Delhi.
16. Parihar, N.S. 1970. An introduction to Embryophyta. Vol. I Bryophyta.
17. Sharma, P.D. 1978. Introduction to Bryophytes.
18. Smith, G.M. 19. Cryptogamic Botany. Vol. II. McGraw-Hill Book Company, New York.
19. Watson, E.V. 1971. The structure and life of Bryophytes. Hutchinson and Co., London.

20. Lichen Biology by by Thomas H. Nash, III Publisher: Cambridge University Press.

Fungi & Lchens:

21. C J Alexopoulos, M Blackwell, C W Mims. Introductory Mycology (IV Edn).
22. Jim Deacon (2006). Fungal Biology (IV Edn). Blackwell Publishing.
23. L N Nair (2010). Methods of microbial and plant biotechnology.
24. Kanika Sharma. Manual of microbiology: Tools and techniques.
25. G C Ainsworth, K F Sparrow, A S Sussman. The fungi: An advanced treatise.