

B.Sc I (SEM I)
1S – BOTANY

Diversity & Applications of Microbes and Cryptogams

UNIT-I: Plant Diversity (15)

- 1.1 Cyanobacteria and its impact on origin of life
- 1.2 Introduction to Plant Kingdom: Cryptogams
- 1.3 Diversity of plants with respect to habitat, form, nutrition and ecological status
- 1.4 General Account of Viruses and structure of TMV and HIV
- 1.5 Bacteria: structure, Nutrition and reproduction
- 1.6 Role of microbes in Agriculture, Medicine and Industries

UNIT-II: Algae (15)

- 2.1. Classification according to F. E. Fritsch and G. M. Smith up to classes
- 2.2. General characters of algae with reference to Habitat, Thallus organization, Pigmentation, Reserve food and Reproduction
- 2.3. General characters of following classes with special reference to examples mentioned –
 - 2.3.1. Chlorophyta - Oedogonium
 - 2.3.2. Charophyta – Chara (Thallus structure and reproduction)
 - 2.3.3. Phaeophyta – Sargassum (Thallus structure and reproduction)
 - 2.3.4. Rhodophyta – Batrachospermum

UNIT-III : Fungi (15)

- 3.1. Classification according to Ainsworth (1973)
- 3.2. General characteristics of following classes with special reference to examples mentioned –
 - 3.2.1. Mastigomycotina : Albugo (Cystopus)
 - 3.2.2. Ascomycotina : Aspergillus
 - 3.2.3. Basidiomycotina : Puccinia graminis-tritici
 - 3.2.4. Deuteromycotina : General characters
- 3.3 Lichen-Types & Economic importance

Unit-IV : Bryophyte (15)

- 4.1. Classification according to G. M. Smith
- 4.2. General characters, thallus organization and life cycle of–

- 1.2.1. Hepaticopsida – Marchantia
- 1.2.2. Bryopsida – Funaria
- 4.3. Evolution of sporophyte in bryophytes
- 4.4. Affinities of bryophytes with algae and pteridophytes
- 4.5. Brief Account on some Indian Bryologist.

Unit-V : Pteridophyte (15)

- 5.1. Pteridophytes as First Vascular Plants.
- 5.2. Classification according to G. M. Smith
- 5.3. General characters of the following classes with special reference to examples mentioned –
 - 5.3.1. Sphenopsida – Equisetum
 - 5.3.2. Filicopsida – Marsilea
- 5.4. Stele types in pteridophytes
- 5.5 Heterospory and Seed Habit in Pteridophytes

Unit-VI : Application of Microbes Cryptogams (15)

- 6.1. Economic Importance of Algae with special reference to Food, Industries, Agriculture and Harmful aspects
- 6.2. Mycorrhiza – Types and Application
- 6.3. Role of Fungi in Industries, Medicine, Food & Agriculture
- 6.4. Plant Diseases –
 - 6.4.1. Viral – TMV
 - 6.4.2. Bacteria – Black arm of cotton
(*Xanthomonos malvacearum*)
 - 6.4.3. Fungal – Tikka disease of groundnut
(*Cercospora* sps.)
- 6.5. Economical and Ecological Importance of Bryophytes

LABORATORY EXERCISE:

I. ALGAE

Preparation of temporary mount, identification with reason of following algal materials edogonium,
Hydrodictyon, *Chara*, *Vaucheria*, *Ectocarpus*, *Sargassum*,
Batrachospermum

II. FUNGI AND PLANT PATHOLOGY

- (1) Study of following genera
Albugo, *Uncinula*, *Penicillium*, *Agaricus*, *Puccinia*,
Cercospora
- (2) Study of Crustose, Fruticose & Foliose Lichen

(3) Study of symptoms of fungal, viral, bacterial and Mycoplasma diseases

(4) Collection of fungal specimen & infected plant part from local region

(6) Demonstration of Mushroom Cultivation Technology

III. BRYOPHYTES

Study of external and anatomy features of vegetative and reproductive parts of following genera – Marchantia, Anthoceros, Funaria, Polytrichum and Sphagnum

IV. PTERIDOPHYTES

Study of Pteridophyte external and anatomy features of vegetative and reproductive parts of following genera –Lycopodium, Equisetum, Osmunda, Selaginella, Adiantum, Marsilea and any one fossil Specimen

Note: 1. Omit the details of development of sex organs and sporophyte.
2. Botanical excursion (Two local and one outside the state is compulsory)
3. Common algal, fungal, pathological, bryophytic and pteridophytic collection and excursion report must be submitted at the time of practical examination.

BOOKS RECOMMENDED

1. Dube, H. C. (1990). An Introduction to Fungi. Vikas Pub. House Ltd. New Delhi.
2. Gangulee, H. C. and Kar, A.K. (2001). College Botany Vol. II. Books and Allied Press Ltd. Kolkata.
3. Krushnamurthy, K. V. (2007). An advanced Text Book on Biodiversity: Principles and Practice. Oxford and IBH Publishing Kumar, H.D. (1988). Introductory Phycology. Affiliated East-West Pres Ltd. New Delhi.
4. Kumar, H. D. and Singh, H.N. (1976). A Text Book of Algae. Affiliated East-West Pres Ltd. New Delhi.
5. Mehrotra, R. S. and Aneja, C.R. (1990). An Introduction To Mycology, Wiley Eastern Ltd. NewDelhi.
6. Pandey, B.P. (1994). A Text Book of Botany-Algae. S.Chand and Co. Ltd. New Delhi.
7. Pandey, S.N. and Trivedi, P.S. (1997). A Text Book of Botany Vol. II , Vikas Publishing House (P.) Ltd. New Delhi.
8. Pandey, S.N. and Trivedi, P.S. (1997). A Text Book of Botany Vol. I ,

Vikas Publishing House (P.) Ltd. New Delhi.

9. Pandey, S.N., Trivedi, P.S. and Mishra, S.P. (1995). A Text Book of Algae, Vikas Publishing House (P.) Ltd. New Delhi.
10. Parihar, N.S. (1977). Biology and Morphology of Pteridophytes. Central Book Depot, Allahabad.
11. Parihar, N.S. (1984). An Introduction To Embryophyta Vol. I Bryophyta. Central Book Depot, Allahabad
12. Rashid, A. (1996). An Introduction To Bryophyta. Vikas Publishing House Ltd. New Delhi.
13. Saxena, A.K. and Sarbhai, R.M.(1992). A Text Book of Botany Vol.II Embryophyta. Ratan Prakashan Mandir, Agra.
14. Sharma, O.P. (1989). A Text Book of Fungi. Tata Mc Graw-hill Publishing Company Limited, New Delhi.
15. Sharma, O.P. (1990). A Text Book of Algae. Tata Mc Graw-hill Publishing Company Limited, New Delhi.
16. Smith, G.M. (1995). Cryptogamic Botany. Vol. II (Bryophytes and Pteridophytes).
Mc Graw-Hill Book Company, New York and London.
17. Sporne, K.R. (1995). The Morphology of Pteridophyta. The Hutchinson University Library, London, U.K.
18. Varma, P. S. and Agrawal, V. K. (2000). Cell Biology, Genetics, Molecular Biology, Evolution and Ecology. S. Chand and Company (P.) Ltd. New Delhi.
19. Vashistha, B.R. (1997). Botany For Degree Students-Bryophyta. S. Chand and company (P.) Ltd. New Delhi.
20. Vashistha, P.C. (1984). Pteridophytes. S. Chand and company (P.) Ltd. New Delhi.
21. Sharma, P.D. (1998). The Fungi. Rastogi Publications, Merrut.
22. Smith, G.M. (1995). Cryptogamic Botany. Vol. I (Algae and Fungi). McGraw-Hill Book Company, New York and London.
23. Vashistha, B.R. (1995). Botany for Degree Students-Algae. S. Chand and Company (P.) Ltd. New Delhi.
24. Vashistha, B.R. (1995). Botany for Degree Students-Fungi (9th Ed.) S. Chand and company (P.) Ltd. New Delhi. 7
25. Pandey Dr.B.P., Botany for Degree Students, S.Chand & Co. Ltd. New Delhi.
26. Modern Practical Botany Volume-I, Dr.P.B.Pandey, S.Chand Pub., N. D.
27. Modern Practical Botany Volume-II, Dr.P.B.Pandey, S.Chand Pub., N. D.
28. Modern Practical Botany Volume-III, Dr.P.B.Pandey,S.Chand Pub., N. D.

29. A Text Book of Botany – Diversity of Microbes and Cryaptogams (2013), Dr.N.H.Shahare, Dr.A.U.Pachkhede, Dr.D.V.Hande, Dr.S.H.Kanherkar, Sh.R.S.Dhande, Dr.D.S.Talwankar, Published by Nabh Prakashan, Amravati.

B. Sc. I: Semester – I

Practical Schedule

Time: 4 hours Marks: 50

Q1: Temporary mount and identification of given algal form

(Any two) 10

Q2: Temporary mount and identification of given fungal form

(Any two) 10

Q3: Salient features and identification of bryophytic material 05

Q4: Salient features and identification of pteridophytic material 05

Q5: Spotting (Algae, Fungi, Bryophyte, Pteridophyte, Pathology) 10

Q6: Viva-voce and Practical Record 05

Q7: Excursion Report 05