



GOVIND GURU TRIBAL UNIVERSITY BANSWARA

B.Sc. Three-Year Graduate Course Semester I BOTANY DCC Biodiversity (Microbes, Algae, Fungi, Lichen and Mycorrhiza)

Unit 1 : Microbes and Fungi

Viruses - Discovery, general structure, replication, Viroid and Prion; **Bacteria**- Discovery, General characteristics and cell structure; Recombination transformation and transduction and conjugation, **Mycoplasma** - General characteristics; **Fungi**- General characteristics, reproduction and classification proposed by Alexopoulos; True Fungi - General characteristics, Brief study of life cycle of *Penicillium*, *Alternaria*, *Puccinia*; Symbiotic Associations- Lichens and Mycorrhiza.

Unit2: Algae and Bryophytes

General characteristics; Range of thallus organisation and reproduction; Classification of algae proposed by Frietsch.; Morphology and life-cycles of the following: *Nostoc*, *Oedogonium*, *Ectocarpus*, *Polysiphonia*. Economic importance of algae
Bryophytes-General characteristics, Classification (up to family) with examples, morphology, anatomy and reproduction of *Riccia*, *Marchantia*, *Anthoceros* and *Sphagnum*, Economic and Ecological importance.

राजेन्द्र कुमार अग्रवाल
कुलसचिव
गोविंद गुरु जनजातीय विश्वविद्यालय
बान्सवारा (राजस्थान)

Unit 3 : Pteridophytes and Gymnosperms

Pteridophytes- General characteristics, Classification (up to family) with example morphology, anatomy and reproduction of *Psilotum*, *Equisetum*, *Selaginella* and *Marsilea*, Heterospory and origin of seed habit, stelar types and evolution. **Gymnosperm-** General characteristics and broad classification (up to family) with examples of gymnosperms. Occurrence, structure, life history of *Cycas*, *Pinus* and *Ephedra* and economic importance.

Suggested Reading:

1. Robert Edward Lee. (2018). Phycology. Cambridge University Press, U.K. 5th edition.
2. Kumar, H.D. (1999). Introductory Phycology. Affiliated East-We'st. Press Pvt, Ltd. Delhi. 2nd edition.
3. Sambamurty, A.V.S.S. (2006). A textbook of Algae. I.K International Publishing House, Pvt. Ltd.
4. Sharma, O. P. (2011). Algae. Tata McGraw Hill Education Private Limited, U.K. 1st edition
5. Pandey, S.N and Trivedi, P.S. (2015). A text book of Botany Vol.I Vikas publishing House Pvt Ltd, New Delhi.
6. Pandey, B.P. (2010). College Botany Vol II. S. Chand and Company Ltd., New Delhi, India.
7. Tortora, G.J. Funke, B.R., Case, C.L. (2010). Microbiology: An Introduction, Pearson Benjamin Cummings, U.S.A. edition.

- 8 Pelczar M.J., Chan E.C.S and Kreig N.R. (1997). Microbiology. Tata MacGrawHill.
- 9 Willey, J M., Sherwood, L.M. and Woolverton, C.J. (2017). Prescott's Microbiology, 11th Edition, McGraw-Hill, USA.
- 10 Raven, P.H., Johnson, G.B., Losos, J.B., Singer, S.R. (2005). Biology. Tata McGrawHill, Delhi, India.
- 11 Sethi, I.K. and Walia, S.K. (2011), Textbook of Fungi & Their Allies, MacMillan Publishers Pvt. Ltd., Delhi.
- 12 Alexopoulos, C..1., Mims, C.W., Blackwell, M. (1996). Introductory Mycology, John Wiley and Sons (Asia), Singapore. 4th edition.
- 13 Mehrotra, R.S. and K.R. Aneja. (1999). An Introduction to Mycology. New Age International Publisher.
- 14 Webster, J. and Weber, R. (2007). Introduction to Fungi. Third Edition. Cambridge University Press. Cambridge and New York.
- 15 Parihar, N.S. (1991). An Introduction to Embryophyta Vol. I Bryophyta. Central Book Depot, Allahabad.
- 16 Vashishta, P.C., Sinha, A.K., Kumar, A. (2010). Bryophyta, S. Chand. Delhi, India.
- 17 Bhatnagar S.P and Moitra Alok 1996. Gymnosperms. New Age International Pvt. Ltd. Publishers, New Delhi, India.
- 18 Bierhorst D.W. (1971). Morphology of Vascular Plants. New York and London.
- 19 Sporne K.R. (2015). Morphology of Gymnosperms, Scientific Publishers, Jodhpur

Practical Exercises

1. Study of vegetative and reproductive structures of *Nostoc*, *Oscillatoria*, *Volvox*, *Oedogonium*, *Chara*, *Ectocarpus* and *Polysiphonia* through temporary preparations / permanent slides/specimens.
2. Study of external and internal morphology and microscopic preparations of the following taxa of Bryophytes, Pteridophytes, Fungi and Pathogens: *Riccia*, *Marhantia*, *Anthoceros*, *Sphagnum*, *Selaginella*, *Equisetum*, *Penicillium*, *Alternaria*, *Puccinia*, *Agaricus*.
3. Lichens: (specimens)
4. Mycorrhiza: ectomycorrhiza and endomycorrhiza (Photographs).
5. Electron micrographs/Models of Viruses – T-Phage and TMV, Line drawing / Photograph of Lytic and Lysogenic Cycle.
6. Gram staining technique
7. Temporary, double-stained microscopic preparations of T.S. of the stem of *Pinus* and *Ephedra* and T.S. Leaflet and Rachis of *Cycas* and needle of *Pinus*, T.S. of normal and coral loid roots of *Cycas*. Study of male cone and megasporophyll of *Cycas*.

Scheme of Practical Examination

S. No.	Exercise	Marks
1.	Exercise-1 Algae	10
2.	Exercise-2 Fungi	8
3.	Exercise-3 Bryophyte	10
4.	Exercise-4 Pteridophyte	10
5.	Exercise-5 Gymnosperm	10
6.	Exercise-6 Microbiology	6
7.	Spot Test	18
8.	Record	8
9.	Viva Voce	20

राजेन्द्र प्रसाद अग्रवाल
कुलसचिव
भोलेन्द्र मुठ्ठल जीवविज्ञान विभाग
बोसवाड़ा (राजस्थान)