



Telangana University

Syllabus of Bachelor of Science (B.Sc) Botony - I year

Paper - I: Microbial Diversity, Cryptogams and Gymnosperms

(Total Hours of Teaching: 120 @ 4 h / Week)

Unit - I: Evolution of Life and Diversity of Microbes (30 h)

1. Origin and evolution of Life - an outline. (2 h)
2. Viruses: Structure, replication and transmission; plant diseases caused by viruses and their control.(8 h)
3. Bacteria: Structure, nutrition, reproduction and economic importance. An outline of Plant diseases of important crop plants caused by bacteria and their control. (8 h)
4. Brief account of Archaeobacteria, Chlamydia, Actinomycetes and Mycoplasma. (4 h)
5. Cyanobacteria: Cell structure, thallus organisation and their prospecting (uses) – Biofertilizers. Structure and life history of Oscillatoria, Nostoc and Anabaena. (8 h)

Unit - II: Algae and Fungi (32 h)

6. Algae: General account, thallus organisation, structure, reproduction, classification and economic importance. (4 h)
7. Structure, reproduction, life history and systematic position of Oedogonium, Coleochaete, Chara, Ectocarpus and Polysiphonia. (12 h)
8. Fungi: General characters, classification and economic importance. (3 h)
9. Structure, reproduction and life history of Albugo, Saccharomyces, Penicillium, Puccinia, Alternaria,. General account of plant diseases caused by Fungi and their control. (10 h)
10. Lichens: Structure and reproduction; ecological and economic importance. (3 h)

Unit - III: Bryophyta and Pteridophyta (32 h)

11. Bryophytes: General characters, classification and alternation of generations. (3 h)
12. Structure, reproduction, life history and systematic position of Marchantia, Anthoceros and Polytrichum. Evolution of Sporophyte in Bryophytes. (10 h)

13. Pteridophytes: General characters, classification, alternation of generations and evolution of sporophyte. (5 h)

14. Structure, reproduction, life history and systematic position of Rhynia, Lycopodium, Equisetum and Marsilea. (12 h)

15. Evolution of stele, heterospory and seed habit in Pteridophytes. (2 h)

Unit - IV: Gymnosperms and Palaeobotany (26 h)

16. Gymnosperms: General characters, structure, reproduction and classification. (4 h)

17. Morphology of vegetative and reproductive parts, systemic position, life history of Pinus and Gnetum (8 h)

18. Distribution and economic importance; endangered Gymnosperms. (4 h)

19. Palaeobotany: Introduction, Fossils and fossilization; Geological time scale; Importance of fossils. (6 h)

20. Bennettitales: General account (4 h)

Suggested Readings:

Alexopolous, J. and W. M. Charles. 1988. Introduction to Mycology. Wiley Eastern, New Delhi.

Mckane, L. and K. Judy. 1996. Microbiology – Essentials and Applications. McGraw Hill, New York.

Pandey, B. P. 2001. College Botany, Vol. I: Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta. S. Chand & Company Ltd, New Delhi.

Pandey, B. P. 2006. College Botany, Vol. II: Pteridophyta, Gymnosperms and Paleobotany. S. Chand & Company Ltd, New Delhi.

Pandey, B. P. 2007. Botany for Degree Students: Diversity of Microbes, Cryptogams, Cell Biology and Genetics. S. Chand & Company Ltd, New Delhi.

Sambamurthy, A. V. S. S. 2006. A Textbook of Plant Pathology. I. K. International Pvt. Ltd., New Delhi.

Sambamurthy, A. V. S. S. 2006. A Textbook of Algae. I. K. International Pvt. Ltd., New Delhi.

Sharma, O. P. 1992. Textbook of Thallophyta. McGraw Hill Publishing Co., New Delhi.

Sporne, K. R. 1965. Morphology of Gymnosperms. Hutchinson Co., Ltd., London.

Thakur, A. K. and S. K. Bassi. 2008. A Textbook of Botany: Diversity of Microbes and Cryptogams. S. Chand & Company Ltd, New Delhi.

Vashishta, P. C., A. K. Sinha and Anil Kumar. 2006. Botany - Pteridophyta (Vascular Cryptogams). S. Chand & Company Ltd, New Delhi.

Vashishta, B. R., A. K. Sinha and V. P. Singh. 2008. Botany for Degree Students: Algae. S. Chand & Company Ltd, New Delhi.

Vashishta, B. R., A. K. Sinha and Adarsha Kumar. 2008. Botany for Degree Students: Bryophyta. S. Chand & Company Ltd, New Delhi.

Vashishta, P. C., A. K. Sinha and Anil Kumar. 2006. Botany for Degree Students: Gymnosperms. S. Chand & Company Ltd, New Delhi.

Vashishta, B. R. 1990. Botany for Degree Students: Fungi, S. Chand & Company Ltd, New Delhi.

Watson, E. V. 1974. The structure and life of Bryophytes, B. I. Publications, New Delhi.

Bachelor of Science (B.Sc) Physics – I Year

(Laboratory exercises related to the syllabus included in Theory Paper – I)

Practical - I: Microbial Diversity, Cryptogams and Gymnosperms

(Total Hours of Laboratory Exercises: 90 @ 3 h / Week in 30 Sessions)

Suggested Laboratory Exercises:

1. Knowledge of equipment used in Microbiology: Spirit lamp, Inoculation loop, Hot air oven, Autoclave / Pressure cooker, Laminar air flow / Inoculation chamber, Incubator, etc. (3 h)

2. Preparation of solid and liquid media for culturing of microbes (Demonstration) (9 h)

3. Study of viruses and bacteria using electron micrographs (photographs). (3 h)

4. Gram staining of Bacteria (3 h)

5. Study of symptoms of plant diseases caused by viruses and bacteria:

Viruses: Tobacco mosaic virus, Bunchy top of banana, Yellow vein clearing of bhendi, Leaf curl of papaya (3 h)

Bacteria: Citrus canker, Leaf blight of Rice, Angular leaf spot of cotton. (3 h)

6. Vegetative and reproductive structures of the following taxa:

Algae: Oscillatoria, Nostoc, Anabena, Volvox, Oedogonium, Coleochaete, Ectocarpus and Polysiphonia. (6 h)

Fungi: Albugo, Saccharomyces Penicillium, Puccinia and Alternaria. (6 h)

7. Section cutting of diseased material infected by Fungi and identification of pathogens as per theory syllabus. (6 h)

8. Lichens: Different types of thalli and their external morphology (3 h)

9. Morphology (vegetative and reproductive structures) and anatomy of the following taxa:

Bryophytes: Marchantia, Anthoceros and Polytrichum. (9 h)

Pteridophytes: Lycopodium, Equisetum and Marsilea. (12 h)

Gymnosperms: Pinus and Gnetum. (6 h)

10. Fossil forms using permanent slides / photographs: Rhynia and Cycadeoidea (3 h)

11. Symptoms of plant diseases caused by Fungi and mycoplasma: Tikka disease of Groundnut, Late blight of Potato, Ergot of Bajra, Whip smut of Sugarcane, Wheat rust, Brown spot of Rice, Rice (Paddy) blast, Head smut of Sorghum, Little leaf disease of Brinjal (3 h)

12. Enumeration and examination of important microbial, fungal and algal products: Biofertilizers, protein capsules, antibiotics, mushrooms, SCP, Agar-agar etc. (6 h)

13. Field visits to places of algal / microbial / fungal interest (e.g. Mushroom cultivation, water bodies) (6 h)