

Affiliated by Sant Gadge Baba Amravati University  
Amravati.

## Department of Botany

Syllabus Prescribed for Three Year U G  
Programme

**BOT(1S) Botany**

Total No. of periods 72

### **Diversity of Microbes, Phycology, Mycology and Phytopathology**

**Marks: 80**

#### **Unit1. Introduction to Microbial World**

- 1.1 Important groups of Microorganisms- Prion, Viroids, Viruses, Mycoplasma, Eubacteria, Archaeobacteria and Cyanobacteria
- 1.2 Viruses – General characteristics and Morphological types of viruses, Structure of TMV and SARS-CoV-2 (Covid-19) , Replication of viruses-lytic & lysogenic , Economic importance of viruses with reference to vaccine production.

General characteristics and Economic importance of Archaeobacteria, General characteristics, cell structure, reproduction and economic importance of bacteria with reference to industry (Fermentation and Medicines)

#### **Unit 2. Cyanobacteria and Algae**

- 2.1 General characteristics, structure and reproduction of cyanobacteria.
- 2.2 Introduction to cryptogams.
- 2.3 General characteristics of algae with reference to habitat, thallus organization, pigmentation, reserve food and reproduction.
- 2.4 Classification according to F.E. Fritsch up to the classes
- 2.5 Economic importance of algae as food and in industry.
- 2.5.1 Ecological importance of Cyanobacteria with reference with soil fertility.

#### **Unit 3. Algae**

General characteristics of following Classes and life cycle of respective genera.

- 3.1 Chlorophyceae – *Oedogonium*
- 3.2 Charophyceae - *Chara* (only Morphology and Sexorgans)
- 3.3 Xanthophyceae- *Vaucharia*
- 3.4 Phaeophyceae - *Ectocarpus*
- 3.5 Rhodophyceae- *Batrachospermum*

#### **Unit 4. Introduction to Fungi**

- 4.1 General Characteristics of Fungi
- 4.2 Classification of fungi (Ainsworth-1973)
- 4.3 General characteristics of following Subdivisions and life cycle of respective genera

- 4.3.1 Myxomycotina - *Stemonitis*
- 4.3.3 Mastigomycotina- *Albugo*
- 4.3.3 Zygomycotina -*Rhizopus*
- 4.3.4 Ascomycotina -*Aspergillus*

## **Unit 5. Fungi and Applied Mycology**

### **5.1** General characteristics of following Subdivisions and life cycle of respective genera

- 5.1.1 Basidiomycotina- *Puccinia graminis tritici*
- 5.1.2 Deuteromycotina- *Alternaria*

### **5.2** Lichen –Types and Economic importance

### **5.3** Applied mycology - Application of fungi in industry, medicines and agriculture

## **Unit 6. Phytopathology**

6.1 General symptoms – Rust, smut, powdery mildew, downy mildew, blight stem rot and root rot anthracnose, leaf spot etc.

6.2 Symptoms, Pathogen biology and disease management of Bacterial diseases-

- 6.2.1- Citrus canker
- 6.2.2- Angular leaf spot of cotton

6.3 Symptoms, pathogen biology and disease management of viral diseases-

- 6.3.1- Yellow vein mosaic of Bhindi
- 6.3.2- Curl leaf of papaya

6.4 Symptoms, pathogen biology and disease management of fungal diseases

- 6.4.1 Tikka disease of groundnut
- 6.4.2 Powdery mildew of *Tectona grandis* (Teak)

## **Skill Enhancement Module-**

### **Module 1- Mycotechnology and Phytopathology**

#### **1. Mycorrhizal technology –**

- 1.1 Definition, types and application of Mycorrhiza
- 1.2 Arbuscular Mycorrhizal Fungi (AMF) - Isolation technique of AMF spores and identification.
- 1.3 Soil trap culture, Monoculture, Mass multiplication and Biofertilizer.

**Or**

#### **2. Mushroom cultivation technology**

- 2.1 Nutritional and medicinal value of edible mushroom
- 2.2 Types of edible mushroom available in local area-*Agaricus bisporus*, *Pleurotus*.
- 2.3 Cultivation technology – infrastructure, substrate, polythene bags, vessels, sterilization, preparation of spawn, bed preparation, paddy straw (or locally available), etc. Storage and marketing.

**Or**

**3. Study of plant pathology of local crop plants.**

- 1.1 Symptomology
- 1.2 Fungal diseases of cotton and soybean
- 1.3 Chemical fungicides against diseases of cotton and soybean.
- 1.4 Biological control

**Activities-**

1. Collection of rhizosphere soils from different locations and isolation of AMF spores from these soil samples and identification. Submission of skill enhancement report with microphotographs of AMF species and its culture.

**OR**

2. Hands on training to students on mushroom cultivation outside institution
3. Visit to local mushroom cultivation center and submission of its report / Internship in mushroom cultivation center
4. Arranging workshop of mushroom cultivation for hands on training within institution.
5. Submission of activity report.

**Or**

1. Collection of diseased plant parts of soybean and cotton from local fields.
2. Diagnosis of disease on the basis of symptoms and micro-examination or culturing of pathogen.
3. Suggestion of fungicide or biological control.

Report submission including photographs and microphotographs of host and pathogen.

**Laboratory/Practical/practicum/hands- on/Activity-  
(No. of Periods/Week) -2**

**Practical**

1. Study of types of bacteria from temporary / permanent slides / photographs.
2. Study of TMV and SARS CoV-2 Viruses from Models/ Photographs.
3. Algae - Preparation of temporary mount, identification with reasons of following. algal materials (Nostoc, Oedogonium, Chara, Vaucheria, Ectocarpus, Batrachospermum).
4. Fungi and Plant Pathology :
  1. Study of following Genera - Stemmonitis, Albugo, Rhizopus, Aspergillus, Puccinia, Cercospora,
  2. Study of Crustose, Fruticose and Foliose lichen.
  3. Study of symptoms of fungal, viral, bacterial diseases.

Photographic herbarium of diseased plant parts from local region.

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## Additional Activities

1. Botanical Excursion (short/long)
2. Visit to any biodiversity rich area to study the plant diversity in natural

habitat.

The botanical excursion is compulsory for all students and the report of excursion should be submitted at the time of practical examination

- Submission**
1. Photographic herbarium of diseased plant plants.
  2. Tour reports or field visit report.

## Course Material/Learning Resources

### Text books:

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. New Delhi.
6. Pandey, B.P. (1994). A Text Book of Botany-Algae. S.Chand and Co. Ltd. New Delhi. <https://microbiologynote.com/12-best-books-for-plant-pathology/>
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 McGraw-hill Publishing Company Limited, New Delhi.
15. Sharma, O.P. (1990). A Text Book of Algae. Tata McGraw-hill Publishing Company Limited, New Delhi.
16. Smith, G.M. (1995). Cryptogamic Botany. Vol. II (Bryophytes and Pteridophytes). McGraw-Hill Book Company, New York and London 33
17. Sethi, I.K. and Walia, S.K. (2011). Text book of Fungi and Their Allies, Macmillan Publishers India Ltd.
18. Sharma, P.D. (2011). Plant Pathology, Rastogi Publication, Meerut, India.
19. A Text book of microbiology – R.C. Dubey, S.Chand publication pvt ltd.
20. A Text book of microbiology – D.R. Arora, CBC, publication

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21. A Text book of Botany – Diversity of microbes and cryptogams-Singh,Pande,JainRastogi publication meerut.

### **Reference Books:**

1. Lee, R.E. (2008), Phycology, Cambridge University Press, Cambridge. 4 thedition.2.. Agrios, G.N. (1997), Plant Pathology, 4<sup>th</sup> edition, Academi Press, U.K.
- 3..Alexopoulos, C.J., Mims, C.W., Blackwell, M. (1996). Introductory Mycology, 4<sup>th</sup>32. 22
4. Prescott's microbiology- Christopher,J.Woolverton,JoanneM.Wiley-McGraw Hil
- 5.Webster, J. and Weber, R. (2007). Introduction to Fungi.3 rd edition. Cambridge University Press,
6. The Algae World -Dinabandhu Sahoo • Joseph Seckbach Editors Springer 2016

### **Weblink to Best Reference Books-**

[https://www.bioexplorer.net/microbiology-textbooks.html/#Best\\_Microbiology\\_Textbooks](https://www.bioexplorer.net/microbiology-textbooks.html/#Best_Microbiology_Textbooks)

[https://microbiologynote.com/12-best-books-for-](https://microbiologynote.com/12-best-books-for-plant-pathology/)

[plant-pathology/](https://microbiologynote.com/12-best-books-for-plant-pathology/) **Weblink to Equivalent MOOC on**

**SWAYAM if relevant**

<https://swayam.gov.in/explorer>

**Weblink to Equivalent Virtual Lab**

**if relevant:**

<https://youtu.be/9JwkHjCTKtQ>

(<https://youtu.be/zIVvObvfXdw>

[https://youtu.be/0OF8n\\_sY8as](https://youtu.be/0OF8n_sY8as)



