

BOARD OF STUDIES IN B.Sc BOTANY

2022-2023

DEPARTMENT OF BOTANY

SYLLABUS FOR B.Sc BOTANY



PITHAPUR RAJAH'S GOVERNMENT COLLEGE

Autonomous and Accredited with 'A' Grade by NAAC (3.17 CGPA)
KAKINADA – 533 001, E G Dist., ANDHRA PRADESH

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA

I B.Sc., -Botany-I/ I Semester End (W.E.F. 2022-23)

FUNDAMENTALS OF MICROBES AND NON-VASCULAR PLANTS

(COURSE: BO1207)

Total hours of Teaching 60hrs @ 4 hrs/week

Total Credits:03

UNIT – I: ORIGIN OF LIFE AND VIRUSES

12 Hrs.

1. Origin of life, concept of primary Abiogenesis; Miller and Urey experiment. Five kingdom classification of R.H. Whittaker
2. Discovery of microorganisms, Pasteur experiments, germ theory of diseases.
3. Shape and symmetry of viruses; structure of TMV and Gemini virus; multiplication of TMV; A brief account of Prions and Viroid's.
4. A general account on symptoms of plant diseases caused by Viruses. Transmission of plant viruses and their control.
5. Significance of viruses in vaccine production, bio-pesticides and as cloning vector, Structure and functions of Scanning Electron Microscope, Transmission Electron Microscope.

UNIT – II: SPECIAL GROUPS OF BACTERIA AND EUBACTERIA

12 Hrs.

1. Brief account of Archaeobacterial, Actinomycetes and Cyanobacteria.
2. Cell structure and nutrition of Eubacteria.
3. Reproduction- Asexual (Binary fission and endospores) and bacterial recombination (Conjugation, Transformation, Transduction).
4. Economic importance of Bacteria with reference to their role in Agriculture and industry (fermentation and medicine).
5. A general account on symptoms of plant diseases caused by Bacteria; Citrus canker,

UNIT – III: FUNGI & LICHENS

12 Hrs.

1. General characteristics of fungi and Ainsworth classification (upto classes).
2. Structure, reproduction and life history of (a) Rhizopus (Zygomycota) and (b) Puccinia (Basidiomycota).
3. Economic uses of fungi in food industry, pharmacy and agriculture.
4. A general account on symptoms of plant diseases caused by Fungi; Blast of Rice,
5. Lichens- structure and reproduction; ecological and economic importance.

UNIT – IV: ALGAE

12 Hrs.

1. General characteristics of Algae (pigments, flagella and reserve food material); Fritsch classification (upto classes).
2. Thallus organization and life cycles in Algae.
3. Occurrence, structure, reproduction and life cycle of (a) Chara (Chlorophyceae) and
4. (b) Polysiphonia (Rhodophyceae).
5. Economic importance of Algae.

UNIT – V: BRYOPHYTES

12 Hrs.

1. General characteristics of Bryophytes; classification upto classes.
2. Occurrence, morphology, anatomy, reproduction (developmental details are not needed) and life cycle of (a) Marchantia and (b) Funaria (Bryopsida).
3. General account on evolution of sporophytes in Bryophyta.

Text books :

- Botany – I (Vrukshasastram-I): Telugu Akademi, Hyderabad
- Pandey, B.P. (2013) College Botany, Volume-I, S. Chand Publishing, New Delhi
- Hait, G., K. Bhattacharya & A.K. Ghosh (2011) A Text Book of Botany, Volume-I, New Central Book Agency Pvt. Ltd., Kolkata
- Bhattacharjee, R.N., (2017) Introduction to Microbiology and Microbial Diversity, Kalyani Publishers, New Delhi.

Books for Reference:

- Dubey, R.C. & D.K. Maheswari (2013) A Text Book of Microbiology, S. Chand & Company Ltd., New Delhi
- Pelczar Jr., M.J., E.C.N. Chan & N.R. Krieg (2001) Microbiology, Tata McGraw-Hill Co, New Delhi
- Prescott, L. Harley, J. and Klein, D. (2005) Microbiology, 6th edition, Tata McGraw – Hill Co. New Delhi.
- Alexopoulos, C.J., C.W. Mims & M. Blackwell (2007) Introductory Mycology, Wiley & Sons, Inc., New York
- Mehrotra, R.S. & K. R. Aneja (1990) An Introduction to Mycology. New Age International Publishers, New Delhi
- Kevin Kavanagh (2005) Fungi; Biology and Applications John Wiley & Sons, Ltd., West Sussex, England
- John Webster & R. W. S. Weber (2007) Introduction to Fungi, Cambridge University Press, New York
- Fritsch, F.E. (1945) The Structure & Reproduction of Algae (Vol. I & Vol. II) Cambridge University Press Cambridge, U.K.
- Bold, H.C. & M. J. Wynne (1984) Introduction to the Algae, Prentice-Hall Inc., New Jersey
- Robert Edward Lee (2008) Phycology. Cambridge University Press, New York
- Van Den Hoek, C., D.G. Mann & H.M. Jahns (1996) Algae : An Introduction to Phycology. Cambridge University Press, New York
- Shaw, A.J. & B. Goffinet (2000) Bryophyte Biology. Cambridge University Press, New York.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA

**I B.Sc., BOTANY PRACTICAL PAPER – I PRACTICAL SYLLABUS
FUNDAMENTALS OF MICROBES AND NON-VASCULAR PLANTS**

Total hours of laboratory Exercises 30 hrs @ 2 per week

Total credits:02

PRACTICAL SYLLABUS:

1. Knowledge of Microbiology laboratory practices and safety rules.
2. Knowledge of different equipment for Microbiology laboratory (Spirit lamp, Inoculation loop, Hot-air oven, Autoclave/Pressure cooker, Laminar air flow chamber and Incubator) and their working principles. (In case of the non-availability of the laboratory equipment the students can be taken to the local college/clinical lab. with required infrastructural facilities or they can enter a linkage with the college/lab for future developments and it will fetch credits during the accreditation by NAAC).
3. Demonstration of Gram's staining technique for Bacteria.
4. Study of Viruses (Corona, Gemini and TMV) using electron micrographs/ models.
5. Study of Archaeobacteria and Actinomycetes using permanent slides/ electron micrographs/diagrams.
6. Study of Anabaena and Oscillatoria using permanent/temporary slides.
7. Study of different bacteria (Cocci, Bacillus, Vibrio and Spirillum) using permanent or temporary slides/ electron micrographs/ diagrams.
8. Study/ microscopic observation of vegetative, sectional/anatomical and reproductive structures of the following using temporary or permanent slides/ specimens/ mounts:
 - a. Algae: Volvox, Chara, Ectocarpus and Polysiphonia
 - b. Fungi: Rhizopus and Puccinia
 - c. Lichens: Crustose, foliose and fruticose
 - d. Bryophyta: Marchantia and Funaria
9. Study of specimens of Tobacco mosaic virus, Citrus canker and Blast of Rice.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
I B.Sc., Botany Practical Examinations at the End of Semester-I
FUNDAMENTALS OF MICROBES AND NON-VASCULAR PLANTS
Botany Practical Model Paper-I (w.e.f 2022-23)

Time: 2 hours

Max. Marks: 50

1. Analyze T.S. of material 'A' (Fungi), make a temporary mount and make comments about identification. 10 M
2. Differentiate any 2 algae from the mixture (material 'B') given with specific comments about identification. 10 M
3. Analyze the T.S. of material 'C' (Bryophyta), make a temporary mount and make comments about identification. 10 M
4. Identify the following with specific reasons. 4 x 3 = 12 M
D. A laboratory equipment of Microbiology
E. Virus
F. Other microbial specialized Bacteria
G. Lichen
5. Record + Viva-voce 5 + 3 = 08 M

Suggested co-curricular activities for Botany Core Course-1 in Semester-I:

A. Measurable:

a. Student seminars:

1. Baltimore classification of Viruses.
2. Lytic and lysogenic cycle of T- even Bacteriophages.
3. Viral diseases of humans and animals.
4. Retroviruses
5. Bacterial diseases of humans and animals.
6. Significance of Bacteria in Biotechnology and Genetic engineering.
7. Fungi responsible for major famines in the world.
8. Poisonous mushrooms (Toad stools).
9. Algae as Single Cell Proteins (SCPs)
10. Parasitic algae
11. Origin of Bryophytes through: Algae vs Pteridophytes
12. Fossil Bryophytes
13. Evolution of gametophytes in Bryophyta
14. Ecological and economic importance of Bryophytes.

b. Student Study Projects:

1. Isolation and identification of microbes from soil, water and air.
2. Collection and identification of algae from fresh /estuarine /marine water.
3. Collection and identification of fruiting bodies of Basidiomycetes and Ascomycetes.
4. Collection and identification of Lichens from their native localities.
5. Collection of diseased plants/parts and identification of symptoms.
6. Collection and identification of Bryophytes from their native localities.

- c. **Assignments:** Written assignment at home / during '0' hour at college; preparation of charts with drawings, making models etc., on topics included in syllabus.

B. General:

1. Visit to Agriculture and/or Horticulture University/College/Research station to learn about microbial diseases of plants.
2. Visit to industries working on microbial, fungal and algal products.
3. Group Discussion (GD)/ Quiz/ Just A Minute (JAM) on different modules in syllabus of the course.

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA

**I Year B.Sc., Degree Examinations at I Semester End
Botany Paper I: FUNDAMENTALS OF MICROBES AND NON-VASCULAR
PLANTS**

(Course: BO1207 Model Paper w.e.f. 2022-23)

Time: 2Hrs.

Max. Marks: 50

SECTION – A

3 × 10 = 30 M

Answer any **THREE** of the following by choosing atleast one question from each Part.

PART – I

1. a. Transmission of plant diseases caused by viruses and their control
OR
b. Illustrate five kingdom classification
2. a. Describe the sexual reproduction in bacteria
OR
b. Explain about economic importance of bacteria
3. a. Explain about Lichen structure and reproduction
OR
b. Describe the life cycle of Puccinia on Barberry plant

PART - II

4. a. Explain about thallus organization in Algae
OR
b. Describe the sexual reproduction in Polysiphonia
5. a. Describe the sexual reproduction in Marchantia
OR
b. General account on evolution of sporophytes in Bryophytes
6. a. Elucidate the sexual reproduction in Rhizopus.
OR
b. Analyze the asexual reproduction in lichens

SECTION – B

4 × 5 = 20 M

Answer any **FOUR** of the following Questions

1. Germ theory of diseases
2. Prions
3. Actinomycetes
4. Ecological importance of Lichens
5. Economic importance in fungi
6. General characteristics of bacteria

BLUE PRINT FOR QUESTION SETTER

UNIT NO / TITLE	LAQ	SAQ	Marks allotted to the Module
UNIT – I: ORIGIN OF LIFE AND VIRUSES	2	1	25
UNIT – II: SPECIAL GROUPS OF BACTERIA AND EUBACTERIA	2	1	25
UNIT – 3: FUNGI & LICHENS	4	2	50
UNIT – 4: ALGAE	2	1	25
UNIT – 5: BRYOPHYTES	2	1	25
Total Marks Allotted To All Questions Including Choice			150

Note: Question paper setters are requested to adhere strictly to the above blue print while preparing the said paper

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
I B.Sc-Botany-I/ I Semester End (W.E.F. 2022-23)
FUNDAMENTALS OF MICROBES AND NON-VASCULAR PLANTS

I B.Sc-Botany-I/ I Semester Question Bank

UNIT – I: ORIGIN OF LIFE AND VIRUSES

Essay Questions

1. Illustrate Five kingdom classification
2. Explain about Transmission of plant viruses and their control
3. Miller & Urey experiment
4. General account on significance of Viruses in vaccines and biopesticides production

Short Answer Questions

1. Viroid
2. Prions
3. Germ theory of diseases
4. Pasteur's experiment

UNIT – II: SPECIAL GROUPS OF BACTERIA AND EUBACTERIA

Essay Questions

1. Explain recombination in Bacteria
2. Describe nutritional types & economic importance of Bacteria
3. Describe the Cell structure of Eubacteria

Short Answer Questions

1. Archaeobacteria
2. Cyanobacteria
3. Citrus canker

UNIT – III: FUNGI & LICHENS

Essay Questions

1. General note on Lichen reproduction
2. Describe the life cycle of Puccinia on wheat plant
3. Describe the sexual reproduction in Rhizopus
4. General characters of Fungi

Short Answer Questions

1. Spermatogonium
2. Blast of rice
3. Economic importance of Fungi
4. Economic importance of Lichens

UNIT – IV: ALGAE

Essay Questions

1. Illustrate thallus organization in Algae
2. Describe the sexual reproduction in Polysiphonia
3. Explain the classification of Algae
4. Describe the reproduction in Chara.

Short Answer Questions

1. Pigments in Algae
2. Economic importance of Algae
3. Cystocarp

UNIT – V: BRYOPHYTES

Essay Questions

1. Describe the sexual reproduction in Marchantia
2. Explain about evolution of sporophytes in Bryophytes
3. Describe the structure of Funaria capsule

Short Answer Questions

1. Protonema
2. Gemma cup
3. Marchantia T.S.of Thallus