

**JYOTI NIVAS COLLEGE AUTONOMOUS
SYLLABUS FOR 2018 BATCH AND THEREAFTER**

Programme: B.Sc.

Semester: I

BOTANY PAPER I

DIVERSITY OF NON – VASCULAR PLANTS

Course Code: 18IBO1

No. of Hours: 60

COURSE OBJECTIVES:

- To Know the importance and scope of the Cryptogams.
- Make them aware about the knowledge of Microbiology, Virology, Bacteriology and Algology.
- To understand the life cycle pattern of cryptogams.

LEARNING OUTCOMES:

- Know the scientific contribution of renowned scientist in the filed of Microbiology.
- Know the systematics, morphology and structure of Viruses, Bacteria and Algae.
- Know economic importance of cryptogams.

UNIT I Introduction to Microbiology

15 HRS

Aim and Scope. A brief account of the contribution of Antonie Van Leeuwenhoek, Louis Pasteur and Robert Koch.

Microbiology techniques: Sterilization:- Physical:- Moist heat (Autoclave), Filtration (LAF), Dry heat (Hot air oven).

Chemical:- (Alcohol, Phenols and Halogens) and Radiation: (UV and Gamma).

Isolation of microorganisms from air (**Air Exposure**), water and soil(**Serial Dilution**)

Types of Cculture :- Mixed and pure cultures (Definitions only)

Maintenance of pure cultures:- Brief account of Broth culture, Stab culture and Slant culture

Composition and Preparation of media:- Nutrient agar medium.

Types of media :-(**Definition, composition and example**)1. Natural medium –Carrot and Corn meal agar. 2. Artificial Media- 2.1. *Semisynthetic* – Potato Dextrose Agar (PDA) cZapek Dox Agar medium for fungi, Bennett’s broth – for Actinomycetes and cyanobacteria (BGA), 2.2) *Synthetic media* – Chu 10 broth medium for algae.

3. Special media 3.1. *Enrichment media* - Blood Agar 3.2. *Selective media* – Mannitol Salt Agar 3.3. *Differential/ Indicator Media* - MacConkey agar. 3.4 *Enriched media*. – Chocolate Agar.

Colony morphology of Bacteria and fungi.

A Brief account on Immune system and its Applications in Agriculture and Industry (ELISA and Hybridoma technology)

UNIT II Viruses

10 HRS

Characteristics of viruses. Classification of viruses as per ICTV –Baltimore and Holmes Classification. Structure and reproduction of Plant Virus (TMV), Animal Virus (HIV) and Bacteriophage – (T4 phage).

A brief account of symptoms and control of Plant Viral diseases with examples. (mosaic vein banding, vein clearing, little leaf, leaf curl & mottling.

A brief account of Interferon's, Viroids and Prions and their importance.

UNIT III Bacteria

13 HRS

Bacterial types based on morphology, flagella and nutrition. A brief note on Autotrophs and Chemotrophs. Structure of a typical Bacterial cell. Structure and chemical composition of bacterial cell walls - Gram positive and Gram negative. Glycocalyx (capsule and slime layer), Ultrastructure of flagella and pili. Endospore – structure and formation.

Reproduction: Binary fission and Genetic recombination (Conjugation, Transformation Transduction).

Bacterial growth curve and Factors affecting bacterial growth (Temperature, pH and Oxygen). Importance of Bacteria in Agriculture, Medicine, Environment and Industry.

Brief account of general symptoms and control measures of bacterial diseases in plants.

Brief account of Drug resistance, Transposons and Plasmids –R (Resistance), F (Fertility) and Virulence (V), Degradative and Col Plasmid *Mycoplasma*: Structure and reproduction. Eg. Sandal Spike disease.

UNIT IV Cyanobacteria

6 HRS

A general account of occurrence, thallus structure, ultra-structure of a Cyanophyceae cell and Reproduction. Importance of Cyanobacteria as biofertilizers, food, and Cyanobacteria blooms. Type study: *Spirulina* and *Scytonema* (Structure and Reproduction).

UNIT V Phycology

16 HRS

A general account of Algae, Classification of Algae based on pigmentation, **Thallus** structure, **Reproduction** and Economic importance of algae. Study of distribution, thallus structure, reproduction and life cycle of *Volvox*, *Oedogonium*, *Chara*, *Diatoms* (structure of *centric diatoms* and detailed study of *Pennate diatoms*), *Ectocarpus* and *Polysiphonia*.

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BOTANY PRACTICAL – I

1. Mounting techniques
2. Culture of microbes from air, soil and water. (only demonstration) Instrument / photographs / culture plates as spotters. (streaking, pour plate, spread plate and drug sensitive test).
3. Study of viral diseases – Bean mosaic, leaf curl of Tomato.
4. *Mycoplasma* - Sandal spike.
5. Study of bacterial diseases – Angular leaf spot of cotton and citrus canker.
6. Gram staining of Bacteria. (*Lactobacillus*, *Rhizobium* and negative staining).
7. Calculation of microbial population using Haemocytometer.
8. Study of Cyanobacteria – *Spirulina*, *Anabaena* and *Scytonema*.
9. Study of the following algal members:-*Volvox*, *Spirogyra*, *Chara*, *Hydrodictyon*, *Caulerpa*, *Vaucheria*, *Sargassum* and *Polysiphonia*.
10. Test and Repetition

ACTIVITY FOR I SEMESTER: Algal collection.