Semester-I

Core Course I: Microbiology and Phycology

(Credits: Theory-4, Practical-2)

THEORY

(60 credit hrs)

Unit 1: Introduction to microbial world (24 credit hrs)

Microbial nutrition, growth and metabolism of bacteria (brief introduction). Economic importance of viruses with reference to vaccine production, role in research, medicine and diagnostics, as causal organisms of plant diseases. Economic importance of bacteria with reference to their role in agriculture and industry (fermentation and medicine).

Viruses

Discovery, physiochemical and biological characteristics; classification (Baltimore), general structure with special reference to viroids and prions; replication (general account), DNA virus (T-phage), lytic and lysogenic cycle; RNA virus (TMV).

Bacteria& Cyanobacteria

Discovery, general characteristics; Types-archaebacteria, eubacteria, wall-less forms (mycoplasma and spheroplasts); Cell structure; Nutritional types; Reproduction-vegetative, asexual and recombination (conjugation, transformation and transduction).

Occurrence; Range of thallus organization; Cell structure; Reproduction, Morphology and life-cycle of *Nostoc***.**

Unit 2: Algae (**10 credit hrs)**

Distinctive features; Distribution; range of thallus organization in algae; Cell structure and components; cell wall, pigment system, reserve food (of only groups represented in the syllabus), flagella; methods of reproduction; Classification; criteria, system of Fritsch, and evolutionary classification of Lee (only upto group); Role of algae in the environment, agriculture, biotechnology and industry.

Unit 3: Chlorophyta, Charophyta and Xanthophyta (16 credit hrs)

General characteristics; Occurrence; Cell structure; Reproduction. Morphology and life-cycles of *Chlamydomonas, Volvox*, *Oedogonium, Chara, Vaucheria.* Evolutionary significance of *Prochloron.*

Unit 4: Phaeophyta and Rhodophyta (10 credit hrs)

Characteristics; Occurrence; Cell structure; Reproduction. Morphology and life-cycles of *Ectocarpus* and *Batrachospermum.*

PRACTICAL

Microbiology

1. Electron micrographs/Models of viruses – T-Phage and TMV, Line drawings/ Photographs of

Lytic and Lysogenic Cycle.

2. Types of Bacteria to be observed from temporary/permanent slides/photographs. Electron micrographs of bacteria, binary fission, endospore, conjugation, root Nodule.

3. Gram staining.

4. Endospore staining with malachite green using the (endospores taken from soil bacteria).

Phycology

Study of vegetative and reproductive structures of *Nostoc*, *Chlamydomonas* (electron micrographs), *Volvox*, *Oedogonium*, *Chara*, *Vaucheria*, *Ectocarpus*, *Batrachospermum* and *Procholoron* through electron micrographs, temporary preparations and permanent slides.

Suggested Readings

1. Lee, R.E. (2008). **Phycology**, 4th Edition Cambridge University Press, Cambridge..
2. Wiley JM, Sherwood LM and Woolverton CJ. (2013) **Prescott's Microbiology**. 9th Edition. McGraw Hill International.
3. Kumar, H.D. (1999). **Introductory Phycology**. Affiliated East-West Press, Delhi.
4. Sahoo, D. (2000). **Farming the ocean: seaweeds cultivation and utilization**. Aravali International, New Delhi.
5. Campbell, N.A., Reece J.B., Urry L.A., Cain M.L., Wasserman S.A. Minorsky P.V., Jackson R.B. (2008). **Biology**, 8th Edition Pearson Benjamin Cummings, USA..
6. Pelczar, M.J. (2001) **Microbiology**, 5th Edition, Tata McGraw-Hill Co, New Delhi.