
Semester-I

Course Code: BC101T
Core Course I: Microbiology and Phycology

The objective of this course is to provide knowledge to the students on various forms of microbes and algae - their characteristics and economic importance.

(Credits: Theory-4, Practical-2)

THEORY

Lectures: 60

Unit 1: Introduction to microbial world

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). **(7 lectures)**

Unit 2: Bacteria

Discovery, general characteristics; Types-archaeobacteria, eubacteria, wall-less forms (mycoplasma and spheroplasts); Cell structure; Nutritional types; Growth, Reproduction-vegetative, asexual and recombination (basic concept of conjugation, transformation and transduction). **(7 lectures)**

Unit 3: Viruses

Discovery, physiochemical and biological characteristics;, general structure with special reference to viroids and prions; DNA virus (T-phage), RNA virus (TMV). replication (general account), lytic and lysogenic cycle; outline of classification (Baltimore) **(7 lectures)**

Unit 4: Algae

General characteristics; Ecology and distribution; range of thallus organization; 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 groups); Significant contributions of important phycologists (F.E. Fritsch, G.M. Smith, R.N. Singh, T.V. Desikachary, H.D. Kumar, M.O.P. Iyengar). Role of algae in the environment, agriculture, biotechnology and industry. **(11 lectures)**

Unit 5: Cyanophyta, Chlorophyta, Xanthophyta and Charophyta

Ecology and occurrence; Range of thallus organization; Cell structure; Reproduction, Morphology and life-cycle of *Nostoc* and *Vaucheria*. General characteristics; Occurrence; Range of thallus organization; Cell structure; Reproduction. Morphology and life-cycles of *Chlamydomonas*, *Volvox*, *Oedogonium*, *Coleochaete*, *Chara*. Evolutionary significance of *Prochloron*. **(16 lectures)**

Unit 6: Phaeophyta and Rhodophyta

Characteristics; Occurrence; Range of thallus organization; Cell structure; Reproduction. Morphology and life-cycles of *Ectocarpus*, *Fucus*, *Gracilaria* and *Polysiphonia*. **(12 lectures)**

Course Code: BC101P

Core Course I - Practical: Microbiology and Phycology

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.

Phycology

Study of vegetative and reproductive structures and semi-permanent slide preparations of *Nostoc*, *Volvox*, *Oedogonium*, *Coleochaete*, *Chara*, *Vaucheria*, *Ectocarpus*, *Fucus* and *Polysiphonia*, *Prochloron* through electron micrographs, temporary preparations, study of permanent slides.

Suggested Readings

1. Lee, R.E. (2008). Phycology, Cambridge University Press, Cambridge. 4th edition.
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, Pearson Benjamin Cummings, USA. 8th edition.
6. Pelczar, M.J. (2001) Microbiology, 5th edition, Tata McGraw-Hill Co, New Delhi.