**Fundamentals of Microbiology BVOMLT-102**

**UNIT I**

Introductory Microbiology

History, development, scope and applications of Microbiology. Methods of Microbiology isolation of pure cultures, theory and practice of sterilization.

Microscopic examination of micro-organism, bright field microscopy, dark field microscopy, phase contrast microscopy, electron microscopy.

Staining of microbes, theory of Gram staining. Nature of Microbial World : Prokaryotes and eucaryotes, growth pattern in microbes

**UNIT II**

Morphology and Structure of Microorganisms Morphology & fine structure of bacteria, fungi, actinomycete and algae. Organization of cell wall, cell membrane, flagella and capsules in bacteria. Morphogenesis in bacteria, formation of spores and cysts. Animal Viruses : Morphology, cultivation and viral disease cycle. Bacteriophages : Morphology, multiplication, detection and enumeration. Biotransformation of (a) D-Sorbitol to L-Sorbose. (b) Antibiotics.

(c) Steroids.

**UNIT III**

Recombinant DNA Technology, genetic engineering and gene cloning in micro-organisms. Strategies of genetic engineering. Restriction enzymes, vectors, plasmids. Genetic engineering for human welfare : (a) Production of pharmaceuticals. (b) Insect pest control. (c) Use of Genetically Engineered Micro-organisms (GEMs) for control of pollution

**UNIT IV**

Microbial Ecology and Biotic Interactions Rhizosphere & Rhizoplane micro-organisms, reasons for increased microbial activity in rhizosphere.

Biogeochemical Cycling—Carbon cycle, Nitrogen cycle, Phosphorus & Sulphur cycle. Symbiotic & non-symbiotic Nitrogen fixation biofertilisers & biopesticides.

Sewage (waste-water) treatment, chemical characteristics, microbiological characteristics, waste water treatment processes.