

MBH-552: INDUSTRIAL MICROBIOLOGY

52h

Unit-I

13 h

History and Development of Industrial Fermentation Technology, Industrial Microorganisms: Screening, selection, Isolation, Identification and characterization of industrially important microbes. Strain improvement- mutation, recombination- **gene regulation and genetic manipulation. Preservation of industrially important microbes. Culture collection centres** and their importance.

Unit-II

13 h

Fermentation: aerobic and anaerobic fermentation and their application. Substrate and oxidative phosphorylation and their energy yield, Types of fermentation processes- Surface, submerged, solid-substrate Batch, Continuous, Dual, Fed batch fermentation and their applications. Fermentation economics and feasibilities.

Unit-III

13 h

Media for Industrial Fermentations: Media formulation, growth factors, carbon, nitrogen, Energy and Mineral sources, buffers, inhibitors, precursors, inducers, Oxygen requirements Antifoam agents. Sterilization of bioreactor, media, air and exhaust air and filter sterilization. Downstream processing: Steps in recovery and purification of fermented products.

Unit-IV

13 h

Primary and Secondary metabolites. **Production of amino acids, Enzymes, Biopolymers-** Xanthans, chitin and pullulan. Production of beer, wine, alcohol. Organic acids- Citric acid, Lactic acid, vinegar and gluconic acid. **Biopesticides-** Production and formulation, Production of **Biofertilizers, Bioethanol production.** Good Manufacturing Practices(GMP) and Good Laboratory Practices (GLP) Quality control, quality assurance, ISO, WHO Certifications.