

7th Semester	RBT7D005	Industrial Biotechnology	L-T-P 3-0-0	3 Credits
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Module-I:**(10 hours)**

Introduction to Industrial Biotechnology, historical development of Industrial biotechnology, industrial production of microbial enzymes: Advantages of industrial production of microbial enzymes, selection of process micro-organisms, extraction, separation and purification of enzymes. Applications of enzymes in industries: in food, leather and detergents, Uses of enzymes in medical diagnosis and clinical treatment

Module-II:**(10 hours)**

Primary and secondary metabolites production, Isolation and screening of microorganisms, Maintenance and preservation of microorganism isolates, Strain development, fermentation media: nutritional requirements of micro-organisms, medium formulation, importance of medium formulation, types of media, downstream processing: removal of cells from bioreactors by filtration, centrifugation, drying and crystallization.

Module-III:**(8 hours)**

Basic design and construction of fermenter, types of fermentation: solid state fermentation, anaerobic fermentation, aerobic fermentation, immobilized cell bioreactor, immobilized enzymes bioreactors, methods of enzyme immobilization: absorption, entrapment and cross linking, applications of immobilized enzymes.

Module-IV:**(8 hours)**

Industrial production of chemicals: alcohol, citric acid and antibiotics, biogas production, large scale production of biofertilizers, microbial enhancement of oil recovery (MEOR)

Books:

- [1] Principles of fermentation technology by P.F Stanbury, A.Whitaker and S.J. Hall.
- [2] Enzyme: Biochemistry, biotechnology and clinical chemistry by Trevor Palmer.
- [3] Bioprocess engineering by Michael L. Shuler and Fikret Kargi.
- [4] Industrial microbiology by A.H. Patel.
- [5] Industrial microbiology by Casida.