

UG
Course Code: **CH413**
Credit: **3**
Version: **1**
Prerequisite Course: **Nil**

Department: **Chemical Engineering**
Course Name: **Bioprocess Engineering**
L-T-P: **3-0-0**
Approved on:

Interaction of chemical engineering principles with biological sciences. Life processes, unit of living system, microbiology, reaction in living systems, biocatalysts, model reactions. Fermentation mechanisms and kinetics : kinetic models of microbial growth and product formation. Fermenter types; Modeling of batch and continuous fermentor. Bioreactor design, mixing phenomena in bioreactors. Sterilization of media and air, sterilization equipment, batch and continuous sterilize design. Biochemical product recovery and separation. Membrane separation process: reverse osmosis, dialysis, ultrafiltration; Chromatographic methods: adsorption chromatography, gel filtration, affinity chromatography etc. Electrokinetic separation: electro-dialysis, electrophoresis. Waste water treatment: activated sludge process, anaerobic digestion, trickling filter.

Books

1. Shuler, M.L. and Kargi, "Bioprocess Engineering Basic Concepts," 2nd ed, Prentice Hall of India, New Delhi, 2002.
2. Bailey & Ollis, Biochemical Engg. Fundamentals, McGraw Hill.
3. Dubey R.C., "A Textbook of Biotechnology", S. Chand and Co., New Delhi 2002.
4. Schugerl, K. and Bellgardt, K. V., Bioreaction Engineering: Modeling and Control, Springer Verlag, Heidelberg, 2000.
5. Blanch H. W. and Clark D. S., Biochemical Engineering, Dekker, NewYork, 1996.
6. Doran P., Bioprocess Engineering Principles, Academic Press, NewYork, 1995.
7. Aiba, S., Humphrey, J. Biochemical Engineering, Academic Press, 1973.