BT 609 Bioprocess Engineering (3 0 0 6)

Basic structure of bioprocesses, biological systems in bioprocesses, introduction of organisms as mass and energy consumers, metabolic stoichiometry, energetics of cellular growth, microbial and enzyme kinetics, multiple substrate and multiple species of fermentation, immobilized enzyme and cell bioreactors, transport phenomena in microbial systems, various approaches to scale-up including regime analysis and scale-down, scale-up methods by currently used rules-of-thumb viz. constant P/V, kLa etc., bioprocess control methodologies, product recovery, bioprocess economics

Texts:

1. J. E. Bailey and D. F. Ollis, *Biochemical Engineering fundamentals*, 2nd ed., McGraw-Hill, 1986.
2. H. W. Blanch and D. S. Clark, *Biochemical Engineering*, Marcel Dekker, Inc., 1996.
3. M. L Shuler and F. Kargi., *Bioprocess Engineering,* Prentice Hall Inc., 1997.
4. P. A. Belter, E. L. Cussler and W. S. Hu, *Bioseparations: Downstream Processing for Biotechnology*, John Wiley & Sons, 1988

References:

1. S. Aiba, A. E. Humphrey and N. Millis, *Biochemical Engineering,* Prentice-Hall 1978.
2. H. S. Rehm and G. Reed, Eds, *Biotechnology*, Vols. 3 & 4. VCH, 1991.
3. A. Moser, *Bioprocess Technology - Kinetics & Reactors*, Springer- Verlag, 1981
4. B. Atkinson and F. Mavituna, *Biochemical Engineering and Biotechnology Handbook,* 2nd Ed. Stockton Press, 1991
5. BIOTOL series, *Biorector Design & Product Yield*, Butterworth - Heinemann, 1992.