

CORE COURSE XIII: BIOPROCESS TECHNOLOGY

UNIT -I

Isolation, Preservation and Maintenance of Industrial Microorganisms .Kinetics of microbial growth and death. Media for industrial fermentation. Air and Media Sterilization.

UNIT- II

Types of fermentation processes: Analysis of batch, Fed-batch and continuous bioreactions; Air-lift, stirred tank, tower, fluidized bed, packed bed, pulsed, photobioreactors- Measurement and control of bioprocess parameters.

UNIT -III

Downstream Processing: Introduction, Removal of microbial cells and solid matter, foam reparation, precipitation, filtration, centrifugation, cell disruption, liquid-liquid extraction chromatography, Membrane process, Drying and Crystallization. Effluent treatment: D.O.C. and C.O.D. treatment and disposal of effluents.

UNIT- IV

Industrial Production of Chemicals: Alcohol (Ethanol), Acids (Citric,) Antibiotics (penicillin,), Amino acids (lysine,), Single Cell Protein (algae/fungi).

UNIT- V

Introduction to Food Technology-Elementary idea of canning and packing; Food Preservation -Sterilization and Pasteurization of food products.

REFERENCES:

1. Stanbury, P.F. and Whitaker, A.,(Eds).Principles of Fermentation Technology. 1984. Pergamon Press, Oxford.
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3. Frazier, W.C. and Dennis, C. Westhoff. 1995 Food Microbiology, Tata McGraw Hill Publishing Company, New Delhi.
4. Casida, L.E. 2003. Industrial Microbiology. New Age International (P) Ltd., New Delhi.
5. Michael Shuler and Fikret Kargi. 2002. Bioprocess Engineering: Basic Concepts, 2nd Edition, Prentice Hall, Englewood Cliffs, NJ,
6. Pauline M. Doran. 1995. Bioprocess engineering principles, 1 Edition, Academic Press
7. Bailey, J.E. and D.F Ollis. 1986. Biochemical Engineering Fundamentals, 2nd ed. McGraw-Hill Chemical Engineering Series, Berkshire, U.K.
8. Aiba. S., Humphrey, A.E. and Millis N.F. 1973. Biochemical Engineering. University of Tokyo Press, Tokyo
9. Aktinson B. 1974. Biochemical Reactors. Pion Ltd., London
10. Jackson, A.T . 1991. Process Engineering in Biotechnology. Prentice Hall, Englewood Cliffs, NJ, USA.
11. Enfors, S. O. and Haggstrom, L.H. 1998. Bioprocess Technology – Fundamentals and Application. KTH, Stockholm.