UCH722 FERMENTATION TECHNOLOGY

L	**T**	**P**	**Cr**
3	**0**	**0**	**3.0**

Course Objectives:
To impact knowledge about biological and biochemical technology, with a focus on biological products, the design and operation of industrial practices.

Introduction to Fermentation Technology: History, types of fermentation, examples of fermentation industry.

Microbial Growth Kinetics: Growth, substrate utilization and product formation.

Fermentation Media: Formulation, carbon, nitrogen, oxygen, minerals sources, etc.

Sterilization: Sterilization of air and medium; sterilization of fermentor, thermal death kinetics of microorganisms.

Bioreactor Design: Material and energy balances in bioprocess: open and closed systems, steady-state and non-steady state systems, reacting and non-reacting systems, stoichiometry.

Bioreactor Operation Systems: stirred tank reactor (batch, semi-batch, continuous), bubble column, airlift and packed bed.

Physical Processes in Fermentation System: fluid flow and mixing, mass and heat transfer.

Course Learning Outcomes (CLO):

The students will be able to:

1. evaluate factors that contribute in enhancement of cell and product formation during fermentation process.
2. analyse kinetics of cell and product formation in batch, continuous and fed-batch cultures
3. differentiate the rheological changes during fermentation process

Text Books:
1. *Stanbury, P.F. and Whitaker, A., and Hall S. J. Principles of Fermentation Technology, Pergamon Press (2007).*
2. *Doran, P.M Bioprocess Engineering Principles, Academic Press (2012).*

Reference Books:
1. *Aiba, S., Humphrey, A.E and Millis, N.F., Biochemical Engineering, Academic Press (1973).*
2. *Bailey, J.E. and Ollis, D.F., Biochemical Engineering Fundamentals, McGraw-Hill (1986).*
3. *Shuler, M.L. and Kargi, F., Bioprocess Engineering: Basic Concepts, Prentice-Hall (1992).*

Evaluation Scheme:

S. No.	Evaluation Elements	Weightage (%)
1	MST	30

| 2 | EST | 50 |
| 3 | Sessional (May includes assignments/ quiz's etc) | 20 |