

**Educational Objectives:**

1. 'Principles of Fermentation Processes' will strengthen your knowledge of fermentation processes, and through a series of lectures, case studies and a pilot plant visit, will enable to furnish their concepts in the field.

**Course Outcomes:**

2. Students will be able to understand the various industrial fermentation processes.

3. **Course Contents:**

- a. Define different modes of fermentation and know their limitations.
- b. Develop a suitable medium and perform a material balance.
- c. Interpret fermentation data and use it effectively.
- d. Characterise the kinetics of cell growth and how they apply to different cell systems.
- e. Determine fermentation productivity and yields.
- f. Understand the impact of microbial physiology on fermentation performance.
- g. Develop a strategy for fermentation process development.
- h. Evaluation of different expression systems
- i. Fermentation Mass Balancing
- j. Biomass Growth Kinetics
- k. Fermentation Mass balancing II
- l. Biomass Growth Kinetics II
- m. Tour of facilities
- n. Growth Kinetics

- o. Case Study: Mass balancing
- p. New Developments in Fermentation Technology
- q. Different Modes of Fermentation
- r. Fermenter Productivity and Operating Economics
- s. Impact of Microbial Physiology on Fermentation
- t. Case Study: Fermentation Simulation
- u. Case Study: Microbial Media Development
- v. Introduction to Animal Cell Culture
- w. Present and Future Fermentation Trends
- x. Module Round-up and Close

**Recommended Books:**

1. Principles of Fermentation Technology, Second Edition by P F STANBURY, S. Hall, A. Whitaker
2. Fermentation and Biochemical Engineering Handbook, 2nd Ed., Second Edition: Principles, Process Design and Equipment by Henry C. Vogel, Celeste C. Todaro