

Course Objective:

Subject deals with engineering principles for design of systems for processing biological materials into desired products

Course Outcome (CO):

1. Outline the key technologies used in bioprocess plant design.
2. Discuss construction material for a bioprocess plant and its mechanical design.
3. Compare designs of bioreactor to ensure its sterility of equipment using different case study.
4. Knowledge of mass transfer equipment designing and utilities in Biotechnology.
5. Explain Production plants; Process economics; Bioprocess validation; Safety considerations. Case studies.

| S.No. | Content | Contact Hours |
|-------|--|---------------|
| 1 | Process development: Introduction to Design – nature of design – Technical feasibility survey, Mass and energy balance, process development – data acquisition – design data information of project - Organization of project – Project documentation – codes and standards. | 7 |
| 2 | Design Development: Equipment selection and specifications-materials of construction – flow sheeting - piping and instrumentation – process safety and loss prevention. | 6 |
| 3 | General site consideration: Introduction – plant location and site selection – site layout- plant layout utilities – environmental considerations– waste management – visual impact – government regulations and other legal restrictions, community factors and other factors affecting investment and production costs – human resources. | 7 |
| 4 | Selection and specification: Selection and specification of equipment for handling fluids and solids; Selection, specification, design of heat and mass transfer equipment used in bioprocess industries; Design of facilities for cleaning of process equipment used in biochemical industries; Utilities for biotechnology | 8 |
| 5 | Design of fermenters: Design of fermentation, Design considerations for maintaining sterility of processing equipment. | 8 |
| 6 | Process economics: Production plants; Bioprocess validation; Safety considerations | 6 |
| Total | | 42 |