

## **2.13 40134 FERMENTATION TECHNOLOGY**

### **UNIT-1 INTRODUCTION TO FERMENTATION PROCESS**

- 1.1 Definition of fermentation and its scope,
- 1.2 History of industrial fermentation, Chronological Development of Industrial Fermentation,
- 1.3 The Component parts of Fermentation processes,
- 1.4 Market Potential of Fermentation Products, Recovery Cost

### **UNIT-2 DESIGN OF FERMENTER**

- 2.1 Basic functions of Fermenter, Aseptic Operation and Containment,
- 2.2 Body Construction, Fermentation Vessels,
- 2.3 Main parameters to be monitored and controlled in fermentation

### **UNIT-3 FERMENTATION MEDIA AND STERILIZATION**

- 3.1 Definition, Ideal Fermentation Media, Medium Formulation,
- 3.2 Types of Fermentation Media, Medium Optimization
- 3.3 Sterilization of media, Sterilization of Air,
- 3.4 Sterilization of Fermentor, Feed and Liquid waste

### **UNIT-4 MICROBIAL GROWTH AND PRODUCT FORMATION**

- 4.1 Introduction to Growth, Definition,
- 4.2 Types of Culture, Growth Kinetics, Growth Synchronization,
- 4.3 Effect of Inhibitors on Product Formation

### **UNIT-5 REACTION KINETICS**

- 5.1 Introduction to kinetics, Law of mass action,
- 5.2 Elementary and non-elementary reactions,
- 5.3 Reaction rate and Rate equation, Temperature dependency rate of reaction,
- 5.4 Analysis of experimental reactor data

### **UNIT-6 BIOREACTORS AND ITS CONTROL**

- 6.1 Introduction, Types of reactors,
- 6.2 Residence time distribution studies,
- 6.3 Control of Fermentor

### **UNIT-7 TYPICAL FERMENTATION PROCESS**

- 7.1 Antibiotic Fermentation- Penicillin,
- 7.2 Anaerobic Fermentation- Industrial Alcohol,
- 7.3 Microbial Cells as Fermentation Products
- 7.4 Baker's Yeast, Enzymes as Fermentation Products
- 7.5 Streptokinase, Monoclonal antibodies,
- 7.6 Insulin, Erythropoietin, Interferon

**Reference Books:**

1. Principles of Fermentation Technology- P. F. Stanbury & Whitaker
2. Industrial Microbiology – L. E. Casida JR
3. Fermentation Microbiology and Biotechnology- E. M. T. EL- Mansi et al
4. Concise Microbiology by N. H. Zaki and M. H. Rafiee et al
5. Industrial Microbiology by Prescott & Dunn
6. Microbial Biotechnology by Glaser A.N. & Nilaido H.
7. Frontiers in Microbial Technology bt Bisen P.S.

