



VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
(Autonomous Institution, Affiliated to Anna University, Chennai)
Elayampalayam, Tiruchengode – 637 205
DEPARTMENT OF BIOTECHNOLOGY



Course Code / Name : U15BT511- BIOPROCESS TECHNOLOGY
Class (Year / Programme / Department / Section): III/B.TECH/BT

UNIT I- BIOREACTOR OPERATION				
S.No	Topics To Be Covered	Duration in Minutes	Teaching Aid	Books Referred
1.	Bioreactors-principle and working., ,, , ,,	45	BB	T1,R1
2.	Choosing the cultivation method, design and operation of a typical aseptic	45	BB	R1,R1
3.	Aerobic fermentation process, alternate bioreactor configurations	45	PPT	T1
4.	Environmental requirements for animal cell cultivations	45	BB	T1
5.	reactors for large scale production using animal cell	45	BB	R1
6.	. Active and Passive Immobilization of cells	45	PPT	R1
7.	Diffusional limitations in Immobilized cells	45	BB	R1
8.	Bioreactor considerations in Immobilized cell	45	PPT	T1
9.	Problems	45	BB	T1
UNIT-II - BIOREACTORS				
S.No	Topics To Be Covered	Duration in Minutes	Teaching Aid	Books Referred
10.	Introduction	45	BB	T1,R1
11.	Packed Bed bioreactor	45	PPT	T1
12.	Bubble columns bioreactor	45	BB	T1
13.	fluidized bed bioreactor	45	PPT	T1,R1

14.	Airlift bioreactor	45	BB	R1
15.	Trickle bed bioreactor	45	PPT	R1
16.	circulating fluid bed reactor	45	BB	T1
17.	Bioreactor design and operation for microbial and animal cell	45	PPT	T1
18.	Bioreactor design for waste water treatments	45	BB	R1

Unit – III -MODELLING AND SIMULATION OF BIOPROCESSES

S.No	Topics To Be Covered	Duration in Minutes	Teaching Aid	Books Referred
19.	Study of structured models for analysis of various bioprocess	45	PPT	R1
20.	compartmental models	45	BB	R1
21.	models of cellular energetic and metabolism	45	BB	T1
22.	single cell models	45	BB	T1
23.	plasmid replication	45	BB	R1
24.	plasmid stability model	45	BB	R1
25.	Dynamic simulation of batch	45	PPT	R1
26.	Dynamic simulation of fed batch	45	BB	T1
27.	Steady and Transient culture metabolism	45	BB	T1

UNIT-IV MIXED CULTURE AND SOLID STATE FERMENTATION

S.No	Topics To Be Covered	Duration in Minutes	Teaching Aid	Books Referred
28.	Introduction	45	PPT	T1,R1
29.	Mixed culture	45	BB	R1
30.	major classes of interactions in mixed cultures	45	PPT	R1
31.	simple models describing mixed cultures interactions	45	BB	T1,R1
32.	Mixed cultures in nature	45	PPT	R1
33.	industrial utilization of mixed cultures	45	BB	R1
34.	Solid-state fermentation	45	BB	T1,R1
35.	Various Applications of Mixed culture	45	BB	T1,R1
36.	Problems	45	BB	R1

UNIT V- TRANSPORT PHENOMENA IN BIOPROCESS SYSTEMS

S.No	Topics To Be Covered	Duration in Minutes	Teaching Aid	Books Referred
37.	Gas – Liquid Mass Transfer in cellular systems	45	BB	T1
38.	determination of oxygen rates	45	BB	R1
39.	mass transfer for freely rising or falling bodies	45	BB	T1,R1
40.	correlations for mass transfer coefficient and interfacial area	45	PPT	T1
41.	mass transfer across free surface	45	BB	T1,R1
42.	other factors affecting KLA	45	PPT	R1
43.	heat transfer correlations	45	BB	R1
44.	sterilization of gases and liquids by filtration.	45	BB	T1
45.	Problems	45	BB	T1

TEXT BOOKS:

1. Michael Shuler and Fikret Kargi, Bioprocess Engineering: Basic Concepts, 2nd Edition, Prentice Hall, Englewood Cliffs, NJ, 2005

REFERENCE:

- 1) Stanbury, P.F. Whitaker, A. & Hall, S.J., —Principles of fermentation Technology 2nd Ed., Elsevier Science Publishers, BV, Amsterdam. 2005