B.Tech. Biotechnology: Semester-VI BBT 603: BIOREACTOR DESIGN & ANALYSIS	
Teaching Scheme	**Examination Scheme**
Lectures: 3 hrs/Week	Class Test -12 Marks
Tutorials: 1 hr/Week	Teachers Assessment – 6 Marks
Credits: 4	Attendance – 12 Marks
	End Semester Exam – 70 marks

Course Objective

The objective of this course is to provide students with detail understanding of different bioreactors types, design and its uses for industrial bioprocess

Course Learning Outcomes

After completing the course, the student shall be able to:

CO1: Understand various types of bioreactor.
CO2: Differentiate CSTR and PFR
CO3: Identify different types of valves and pumps employed in a reactor
CO4: Understand scale up criteria for a bioreactor.
CO5: Evaluate mechanics of a bioreactor

Unit 1: Bioreactor:
Types of reactor: Batch culture bioreactor, plug flow reactor (PFR), continuous stirred tank reactor (CSTR), Fixed and Fluidized bed, bubble column, air lift fermenter.
Unit 2: Mechanical design of bioreactors
Instrumentation and control of process parameters, different types of valves and pumps, Dimensionless numbers, Aeration and Agitation, Volumetric mass transfer coefficient and its measurement, Mass transfer in bioreactor, Scale-up criteria
Unit 3: Designing of Bioreactors
Introduction of designing, aseptic operations and containments, body construction, aeration and agitation, agitator,baffles, spargers, valves and steam traps, pressure control valves, complete loss of contents from a reactor, sterilization of reactor.

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