

**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**

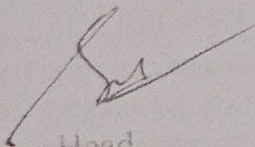
The objective of this course is to provide students with detail understanding of different bioreactors types, design and its uses for industrial bioprocess

**Course Learning Outcomes**

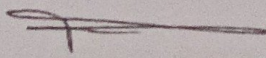
After completing the course, the student shall be able to:

- 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

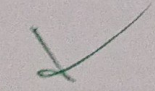
<b>Unit 1: Bioreactor:</b> Types of reactor: Batch culture bioreactor, plug flow reactor (PFR), continuous stirred tank reactor (CSTR), Fixed and Fluidized bed, bubble column, air lift fermenter.
<b>Unit 2: Mechanical design of bioreactors</b> Instrumentation and control of process parameters, different types of valves and pumps, Dimensionless numbers, Aeration and Agitation, Volumetric mass transfer coefficient and its measurement, Mass transfer in bioreactor, Scale-up criteria
<b>Unit 3: Designing of Bioreactors</b> 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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