



**Tulsiramji Gaikwad-Patil College of Engineering and Technology**  
Wardha Road, Nagpur - 441108  
Accredited with NAAC A+ Grade  
Approved by AICTE, New Delhi, Govt. of Maharashtra  
**(An Autonomous Institution Affiliated to RTM Nagpur University)**



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Department of Biotechnology

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## **B. Tech Biotechnology**

### **Course Name BBT4702: Bioprocess Equipment Design**

<b>BBT32304</b>	<b>Course Outcomes</b>
<b>CO1</b>	Apply design methods to determine the design variables in distillation for binary systems
<b>CO2</b>	Evaluate the design requirements for flanges, nozzles, gaskets, supports, piping, jackets, and coils in bioreactors.
<b>CO3</b>	Design agitators, aerators, air filters, and stabilizers for bioreactors
<b>CO4</b>	Design the baffles and tube joining methods for shell and tube heat exchangers.
<b>CO5</b>	Evaluate the scale-up principles and apply them to design larger bioreactors.