1.	Title of the course	Bioprocess Engineering
2.	Course number	CH404L
3.	Structure of credits	3-0-0-3
4.	Offered to	UG
5.	New course/modification to	Modification To CH4202/12
6.	To be offered by	Department of Chemical Engineering
7.	To take effect from	July 2022
8.	Prerequisite	Nil
9.	**Course Objective(s):** To introduce concepts of enzyme kinetics, transport limitations, reactor design and separations in bioprocesses.	
10.	**Course Content:** Introduction to bioprocesses; Metabolic stoichiometry and energetics; Enzyme kinetics; Inhibition of enzymatic reactions; Transport phenomena in bioprocess systems; Immobilization techniques; Industrial application of enzymes for conversion of carbohydrates, starch and cellulose; Microbial cell cultivation; Animal cell cultivation; Plant cell cultivation; Cell growth and measurement; Introduction to bioreactor design; Sterilization; Downstream processing for separation and purification.	
11.	**Textbook(s):** 1. Belter P A, Cussler E L and Hu W-S, *Bioseparations: Downstream Processing for Biotechnology*, 1st Edition, Wiley India (2011). 2. Shuler M L and Kargi F, *Bioprocess Engineering â€“ Basic Concepts*, 2nd Edition, Prentice Hall India (2002).	
12.	**Reference(s):** 1. Bailey J E and Ollis D F, *Biochemical Engineering Fundamentals*, 2nd Edition, Tata McGraw Hill (2010). 2. Lee J M, *Biochemical Engineering*, 1st Edition, Prentice Hall (1992).	