

**HARCOURT BULTER TECHNICAL UNIVERSITY KANPUR
SCHOOL OF CHEMICAL TECHNOLOGY
DEPARTMENT OF BIOCHEMICAL ENGINEERING**

Semester-wise Course Structure

**M. Tech. Chemical Technology (Biochemical Engineering)
(Applicable from Session 2023-2024 for new entrants)**

Year I, Semester-I

'A' Stream is only for the students having B. Tech. in Biochemical Engineering

**'B' Stream is only for the students having B. Tech. in relevant discipline other than
Biochemical Engineering**

'C' Stream is only for the students having M. Sc. in relevant discipline

Stream 'A'												
S. No.	Course Type	Course Code	Subject	Periods			Sessional Marks				ESE	Credit
				L	T	P	MSE	TA	Lab	Total		
1	PCC	NBE-501	Advance Bioreactor Design	3	1	0	30	20	--	50	50	4
2	PCC	NBE-503	Structural Molecular Biology	3	1	0	30	20	--	50	50	4
3	PCC	NBE-505	Advances in Environmental Biotechnology	3	0	2	15	20	15	50	50	4
4	PEC	NBE-509	Analytical Methods in Bioprocesses	3	1	0	30	20	--	50	50	4
		NCH-507	Artificial Intelligence in Chemical Engineering									
Total				12	3	2	--	--	--	200	200	16

OR

Stream 'B' or 'C'												
S. No.	Course Type	Course Code	Subject	Periods			Sessional Marks				ESE	Credit
				L	T	P	MSE	TA	Lab	Total		
1	PCC	NBE-511	Design of Fermenters	3	1	0	30	20	--	50	50	4
2	PCC	NBE-513	Advanced Molecular Biology	3	1	0	30	20	--	50	50	4
3	PCC	NBE-505	Advances in Environmental Biotechnology	3	0	2	15	20	15	50	50	4
4	PEC	NBE-509	Analytical Methods in Bioprocesses	3	1	0	30	20	--	50	50	4
		NBE-515	Plant Cell Culture Techniques									
Total				12	3	2	--	--	--	200	200	16

Year I, Semester-II

S. No.	Course Type	Course Code	Subject	Periods			Sessional Marks				ESE	Credit
				L	T	P	MSE	TA	Lab	Total		
1	PCC	NBE-502	Advanced Industrial Enzymes	3	0	2	15	20	15	50	50	4
2	PCC	NBE-504	Bioenergy	3	1	0	30	20	--	50	50	4
3	PCC	NBE-506	Bioprocess Technology	3	1	0	30	20	--	50	50	4
4	PEC	NBE-508 NBE-510	Advance Protein Engineering Bioprocess Plant Design	3	1	0	30	20	--	50	50	4
Total				12	3	2	--	--	--	200	200	16

Year II, Semester-III

S. No.	Course Type	Course Code	Subject	Periods			Sessional Marks				ESE	Credit
				L	T	P	MSE	TA	Lab	Total		
1	PEC	NBE-601 NBE-603 NBE-605	Advanced Bioseparation Processes Bioentrepreneurship and Regulatory Issues Nanobiotechnology	3	1	0	30	20	--	50	50	4
2	OEC	OBE-601	Fermentation Technology	3	0	0	30	20	--	50	50	3
3	PCC	NBE-607	Seminar	0	0	2	--	50	--	50	50	1
4	PCC	NBE-609	*Dissertation	0	0	16	--	50	--	50	50	8
Total				6	1	18	--	--	--	200	200	16

* to be continued in fourth semester

Year II, Semester-IV

S. No.	Course Type	Course Code	Subject	Periods			Sessional Marks				ESE	Credit
				L	T	P	MSE	TA	Lab	Total		
1	PCC	NBE-602	Dissertation	0	0	32	--	50	--	50	50	16
Total				0	0	32	--	--	--	50	50	16

Total Credit: 64