

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

Semester wise Course Structure

B. Tech. Chemical Technology - Biochemical Engineering
(Applicable from Session 2017-2018 for new entrants)

Year I, Semester-I

Sl. No.	Course Type	Course Title	Subject Code	Credits	Periods			Sessional Marks				ESE	Total Marks
					L	T	P	MSE	TA	Lab.	Total		
1	BSC	Chemistry	BCY 101	4	3	0	2	15	20	15	50	50	100
2	BSC	Mathematics I	BMA 101	4	3	1	0	30	20	-	50	50	100
3	ESC	Electronics & Instrumentation Engineering	EET 101	3	3	0	0	30	20	-	50	50	100
4	ESC	Engineering Graphics	ECE 101	3	0	0	6	30	20	-	50	50	100
5	ESC	Computer Concepts & Programming	ECS 101	4	3	0	2	15	20	15	50	50	100
6	ESC	Workshop Practice	EWS 101	2	0	0	4	--	20	30	50	50	100
7	MC(Non-Credit)	Environment & Ecology	ECE 103	0	2	0	0	30	20	-	50	50	100
Total Credits 20													

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Semester wise Course Structure

B. Tech. Chemical Technology - Biochemical Engineering
(Applicable from Session 2017-2018 for new entrants)

Year I, Semester-II

Sl. No.	Course Type	Course Title	Subject Code	Credits	Periods			Sessional Marks ESE				Total Marks	
					L	T	P	MSE	TA	Lab	Total		
1	BSC	Physics	BPH 102	4	3	0	2	15	20	15	50	50	100
2	BSC	Mathematics II	BMA 102	4	3	1	0	30	20	-	50	50	100
3	ESC	Electrical Engineering	EEE 102	4	3	0	2	15	20	15	50	50	100
4	ESC	Engineering Mechanics	EME 102	3	3	0	0	30	20	-	50	50	100
5	HSMC	English Language & Composition	HHS 102	2	2	0	0	30	20	-	50	50	100
6	HSMC	Professional Communication	HHS 104	3	2	0	2	15	20	15	50	50	100
Total Credits					20								

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Semester wise Course Structure

B. Tech. Chemical Technology-Biochemical Engineering
(Applicable from Session 2018-2019 for new entrants)

Year II, Semester-III

Sl. No.	Course Type	Course Title	Subject Code	Credits	Periods			Sessional Marks				ESE	Total Marks	
					L	T	P	MSE	TA	Lab	Total			
1	BSC	Mathematics III	BMA 201	4	3	1	0	30	20	-	50	50	100	
2	ESC	Materials & Energy Balance	TCH 201	5	3	2	0	30	20	-	50	50	100	
3	PCC	Fluid Flow & Unit operation	TCH 203	5	3	1	3	15	20	15	50	50	100	
4	PCC	Microbiology	TBE 201	5	3	0	6	15	20	15	50	50	100	
5	HSMC	Organisational Behaviour	HHS 203	3	3	0	0	30	20	-	50	50	100	
6	MC (Non-Credit)	Cyber Security	ECS 205	0	2	0	0	30	20		50	50	100	
Total Credits 22														

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Semester wise Course Structure

B. Tech. Chemical Technology-Biochemical Engineering
(Applicable from Session 2018-2019 for new entrants)

Year II, Semester-IV

Sl. No.	Course Type	Course Title	Subject Code	Credits	Periods			Sessional Marks				ESE	Total Marks	
					L	T	P	MSE	TA	Lab	Total			
1	BSC	Modern Analytical Techniques	BCY 202	4	3	0	3	15	20	15	50	50	100	
2	BSC	Computer Oriented Numerical Methods	BMA 206	5	3	1	3	15	20	15	50	50	100	
3	ESC	Heat Transfer Operations	TCH 202	3	3	0	0	30	20	-	50	50	100	
4	PCC	Chemical Engineering Thermodynamics	TCH 204	3	3	0	0	30	20	-	50	50	100	
5	PCC	Biochemistry	TBE-202	4	3	0	3	15	20	15	50	50	100	
6	HSMC	Engg Economics & Management	HHS 202	3	3	0	0	30	20	-	50	50	100	
7	MC (Non-Credit)	Indian Constitution	HHS 206	0	2	0	0	30	20	-	50	50	100	
Total Credits					22									

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Semester wise Course Structure

B. Tech. Chemical Technology-Biochemical Engineering
(Applicable from Session 2019-2020 for new entrants)

Year III, Semester-V

Sl. No.	Course Type	Course Title	Subject Code	Credits	Periods			Sessional Marks				ESE	Total Marks
					L	T	P	MSE	TA	Lab	Total		
1	PCC	Mass Transfer Operations	TCH 301	4	3	1	0	30	20	-	50	50	100
2	PCC	Chemical Reaction Engineering	TCH 303	4	3	1	0	30	20	-	50	50	100
3	PCC	Molecular Biology & Genetic Engineering	TBE 301	3	3	0	0	30	20	-	50	50	100
4	PCC	Bioprocess Engineering	TBE 303	5	3	0	6	15	20	15	50	50	100
5	OEC (Mechanical)	Energy Conversion Systems and Devices	EME 325	3	3	0	0	30	20	-	50	50	100
6	OEC (Humanities)	Entrepreneurship Development	HHS 341	3	3	0	0	30	20	-	50	50	100
Total Credits					22								

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Semester wise Course Structure

**B. Tech. Chemical Technology-Biochemical Engineering
(Applicable from Session 2020-2021 for new entrants)**

Year III, Semester-VI

Sl. No.	Course Type	Course Title	Subject Code	Credits	Periods			Sessional Marks				ESE	Total Marks
					L	T	P	MSE	TA	Lab.	Total		
1	PCC	Instrumentation & Process Control	TCH 302	5	3	1	3	15	20	15	50	50	100
2	PCC	Down Stream Processing	TBE- 302	4	3	1	0	30	20	-	50	50	100
3	PCC	Fermentation Technology	TBE- 304	5	3	0	6	15	20	15	50	50	100
4	PCC	Environmental Biotechnology	TBE 306	5	3	0	6	15	20	15	50	50	100
5	OEC (Maths)	Operations Research	BMA 302	3	3	0	0	30	20	-	50	50	100
Total Credits					22								

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B. Tech. Chemical Technology-Biochemical Engineering
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Year IV, Semester-VII

Sl. No.	Course Type	Course Title	Subject Code	Credits	Periods			Sessional Marks				ESE	Total Marks
					L	T	P	MSE	TA	Lab	Total		
1	PCC	Enzyme Engineering & Technology	TBE 401	4	3	0	3	15	20	15	50	50	100
2	PEC	Programme Elective Course I	TBE 403 OR TBE 405	3	3	0	0	30	20	-	50	50	100
3	PEC	Programme Elective Course II	TBE 407 OR TBE 409	2	2	0	0	30	20	-	50	50	100
4	PEC	Programme Elective Course III	TBE 411 OR TBE 413	2	2	0	0	30	20	-	50	50	100
5	OEC BE	Open Elective : Principles of Biochemical Engineering	TBE 415	3	3	0	0	30	20	-	50	50	100
6		Industrial Training	TBE 461	2	0	0	4	-	50	-	50	50	100
7		Seminar	TBE 471	2	0	0	4	-	50	-	50	50	100
8		Project	TBE 497	4	0	0	8	-	50	-	50	50	100
9		Educational Tour	TBE 417	0	0	0	0	-	-	-	-	-	-
Total Credits				22									

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B. Tech. Chemical Technology-Biochemical Engineering
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Year IV, Semester-VIII

Sl. No.	Course Type	Course Title	Subject Code	Credits	Periods			Sessional Marks				ESE	Total Marks
					L	T	P	MSE	TA	Lab	Total		
1	PEC	Programme Elective Course IV	TBE 402 OR TBE 404	3	3	0	0	30	20	-	50	50	100
2	PEC	Programme Elective Course V	TBE 402 OR TBE 404	3	3	0	0	30	20	-	50	50	100
3	PEC	Programme Elective Course VI	TBE 406 OR TBE 408	2	2	0	0	30	20	-	50	50	100
4	OEC (Chemical Engg.)	Transport Phenomenon	TCH 406	4	3	1	0	30	20	-	50	50	100
5		Project	TBE 498	10	0	0	20	-	50	-	50	50	100
Total Credits					22								

List of Elective Courses

S. No.	PEC Names	Subject Name	Subject Code
1.	Programme Elective Course I	Bioreactor Design	TBE 403
		Bioprocess Modelling and Simulation	TBE 405
2.	Programme Elective Course II	Plant Cell Biotechnology	TBE 407
		Bioreaction Engineering	TBE 409
3.	Programme Elective Course III	Novel Bioproducts	TBE 411
		Food Biotechnology	TBE 413
4.	Programme Elective Course IV	Process Modeling & Simulation	TCH 402
		Process Equipment Design	TCH 404
5.	Programme Elective Course V	IPR & Biosafety Regulation	TBE 402
		Instrumentation And Control Bioprocesses	TBE 404
6.	Programme Elective Course VI	Bioprocess Equipment Design	TBE 406
		Biomaterial Science & Engineering	TBE 408