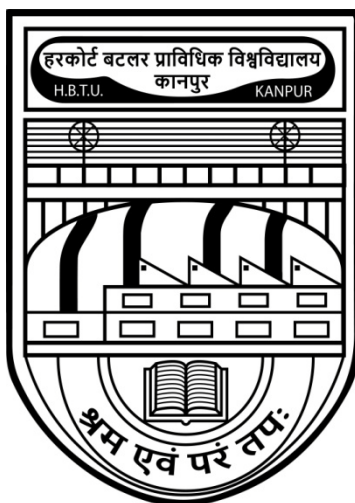


**SEMESTER WISE COURSE STRUCTURE  
&  
EVALUATION SCHEME**

**BIOCHEMICAL ENGINEERING**

**(Effective from the session 2017-18 for new entrants)**



**HARCOURT BUTLER TECHNICAL UNIVERSITY**

**KANPUR-208002 (UP) – INDIA**

**Vision**

The Department of Bio-chemical Engineering aspires to be globally recognized center to develop professionals with technical knowledge and skills, leadership qualities and strong ethical values for successful career in Biochemical and allied industries, research and development organizations.

**Mission**

- To develop state-of-the-art facilities to impart technical knowledge and skill to the graduate and post graduate students for Biochemical and allied industries and research organizations.
- To be a center of research and development for betterment of society in sustainable manner.
- To develop state-of-art the technologies for testing and consultancy for industry and society.
- To cultivate strong ethical values to be a successful professionals and to become life-long learners.

**SEMESTER WISE COURSE STRUCTURE & EVALUATION SCHEME**  
**B. TECH. BIOCHEMICAL ENGINEERING**

**SEMESTER I**

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

**SEMESTER II**

Sr. No.	Course Type	Subject Code	Course Title	Credits (LTP)	Sessional Marks				ESE	Total
					MSE	TA	Lab	Total		
1.	BSC	BPH 102	Physics	4 (3-0-2)	15	20	15	50	50	100
2.	BSC	BMA 102	Mathematics II	4 (3-1-0)	30	20	-	50	50	100
3.	ESC	EEE 102	Electrical Engineering	4 (3-0-2)	15	20	15	50	50	100
4.	ESC	EME 102	Engineering Mechanics	3 (3-0-0)	30	20	-	50	50	100
5.	HSMC	HHS 102	English Language & Composition	2 (2-0-0)	30	20	-	50	50	100
6.	HSMC	HHS 104	Professional Communication	3 (2-0-2)	15	20	15	50	50	100
<b>Total Credit</b>					<b>20</b>					

BSC- Basic Science Course; ESC-Engineering Science Course; PCC-Programme Core course; PEC-Programme Elective Course; OEC-Open Elective Course; MC-Mandatory Course; HSMC-Humanities, Social Science & Management Course

**SEMESTER III**

Sr. No.	Course Type	Subject Code	Course Title	Credits	Sessional Marks				ESE	Total
					MS E	TA	Lab	Total		
1.	BSC	BMA 201	Mathematics III	4 (3-1-0)	30	20	-	50	50	100
2.	ESC	TCH 201	Materials & Energy Balance	4 (3-1-0)	30	20	-	50	50	100
3.	PCC	TCH 211	Fluid Mechanics and Mechanical Operation	5 (3-1-3)	15	20	15	50	50	100
4.	PCC	TBE 201	Microbiology	6 (3-1-6)	15	20	15	50	50	100
5.	HSMC	HHS 203	Organisational Behaviour	3 (3-0-0)	30	20	-	50	50	100
6.	MC (Non-credit)	ECS 201	Cyber Security	2 (2-0-0)	30	20		50	50	100
<b>Total Credit</b>					<b>22</b>					

**SEMESTER IV**

Sr. No.	Course Type	Subject Code	Course Title	Credits	Sessional Marks				ESE	Total
					MSE	TA	Lab	Total		
1.	BSC	BCY 202	Modern Analytical Techniques	4 (3-0-2)	15	20	15	50	50	100
2.	BSC	BMA 202	Computer Oriented Numerical Methods	4 (3-0-2)	15	20	15	50	50	100
3.	ESC	TCH 212	Heat Transfer Operations	3 (3-0-0)	30	20	-	50	50	100
4.	PCC	TCH 214	Chemical Engineering Thermodynamics	3 (3-0-0)	30	20	-	50	50	100
5.	PCC	TBE-202	Biochemistry	5 (3-1-3)	15	20	15	50	50	100
6.	HSMC	HHS 202	Engg. Economics & Management	3 (3-0-0)	30	20	-	50	50	100
7.	MC (Non-credit)	HHS 206	Indian Constitution	2 (2-0-0)	30	20	-	50	50	100
<b>Total Credit</b>					<b>22</b>					

### SEMESTER V

Sr. No.	Course Type	Subject Code	Course Title	Credits	Sessional Marks				ESE	Total
					MSE	TA	Lab	Total		
1.	PCC	TCH 315	Mass Transfer Operations	4 (3-1-0)	30	20	-	50	50	100
2.	PCC	TCH 317	Chemical Reaction Engineering	4 (3-1-0)	30	20	-	50	50	100
3.	PCC	TBE 301	Molecular Biology & Genetic Engineering	3 (3-0-0)	30	20	-	50	50	100
4.	PCC	TBE 303	Bioprocess Engineering	5 (3-0-6)	15	20	15	50	50	100
5.	OEC (Mechanical)	EME 325	Energy Conversion Systems and Devices	3 (3-0-0)	30	20	-	50	50	100
6.	OEC (Humanities)	HHS 341	Entrepreneurship Development	3 (3-0-0)	30	20	-	50	50	100
<b>Total Credit</b>					<b>22</b>					

### SEMESTER VI

Sr. No.	Course Type	Subject Code	Course Title	Credits	Sessional Marks				ESE	Total
					MSE	TA	Lab	Total		
1.	PCC	TCH 316	Instrumentation & Process Control	5 (3-1-3)	15	20	15	50	50	100
2.	PCC	TBE- 302	Down Stream Processing	4 (3-1-0)	30	20	-	50	50	100
3.	PCC	TBE- 304	Fermentation Technology	5 (3-0-6)	15	20	15	50	50	100
4.	PCC	TBE-306	Environmental Biotechnology	5 (3-0-6)	15	20	15	50	50	100
5.	OEC (Maths)	BMA-342	Operation Research	3 (3-0-0)	30	20	-	50	50	100
<b>Total Credit</b>					<b>22</b>					

## SEMESTER VII

Sr. No.	Course Type	Course Title	Subject Code	Credits (LTP)	Sessional Marks				ESE	Total
					MSE	TA	Lab	Total		
1.	PCC	TBE 401	Enzyme Engineering & Technology	4 (3-0-3)	15	20	15	50	50	100
2.	PEC	PEC-I	PEC-I	3 (3-0-0)	30	20	-	50	50	100
3.	PEC	PEC-II	PEC-II	2 (2-0-0)	30	20	-	50	50	100
4.	PEC	PEC-III	PEC-III	2 (2-0-0)	30	20	-	50	50	100
5.	OEC	OEC-I	OEC-I	3 (3-0-0)	30	20	-	50	50	100
6.	Industrial Training	TBE 461	Industrial Training	2 (0-0-4)	-	50	-	50	50	100
7.	Seminar	TBE 471	Seminar	2 (0-0-4)	-	50	-	50	50	100
8.	Project	TBE 497	Project	4 (0-0-8)	-	50	-	50	50	100
<b>Total Credit</b>				<b>22</b>						

## VIII-SEMESTER

Sr. No.	Course Type	Subject Code	Course Title	Credits	Sessional Marks				ESE	Total
					MSE	TA	Lab	Total		
1.	PEC	PEC-IV	PEC-IV	3 (2-1-0)	30	20	-	50	50	100
2.	PEC	PEC-V	PEC-V	3 (3-0-0)	30	20	-	50	50	100
3.	PEC	PEC-VI	PEC-VI	3 (3-0-0)	30	20	-	50	50	100
4.	OEC	OEC-II	OEC-II	3 (2-1-0)	30	20	-	50	50	100
5.	Project	TBE 498	Project	10 (0-0-20)	-	50	-	50	50	100
<b>Total Credit</b>				<b>22</b>						

**Total Programme Credits : 172**

TBE 497 Project will have Internal Evaluation while TBE 498 Project will have External Evaluation.

**Department of Bio-Chemical Engineering**  
**(to be offered in VII & VIII Semester)**

**Programme Elective-I**

S. No.	Course Code	Course Name	Credits
1	TBE 403	Bioreactor Design	3 (3-0-0)
2	TBE 405	Bioprocess Modelling and Simulation	3 (3-0-0)

**Programme Elective-II**

1	TBE 407	Plant Cell Biotechnology	2 (2-0-0)
2	TBE 409	Bioreaction Engineering	2 (2-0-0)

**Programme Elective-III**

1	TBE 411	Novel Bioproducts	2 (2-0-0)
2	TBE 413	Food Biotechnology	2 (2-0-0)

**Programme Elective-IV**

1	TCH 422	Process Modeling & Simulation	3 (2-1-0)
2	TCH 424	Process Equipment Design	3 (2-1-0)

**Programme Elective-V**

1	TBE 402	IPR & Biosafety Regulation	3 (3-0-0)
2	TBE 404	Instrumentation And Control Bioprocesses	3 (3-0-0)

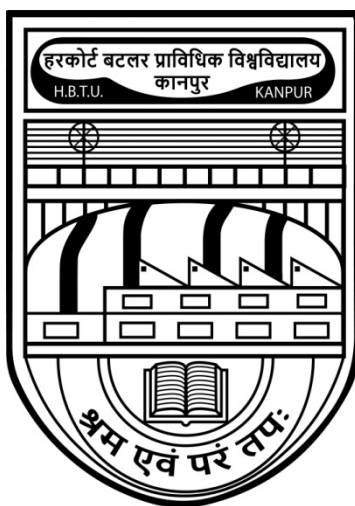
**Programme Elective-VI**

1	TBE 406	Bioprocess Equipment Design	3 (3-0-0)
2	TBE 408	Biomaterial Science & Engineering	3 (3-0-0)

**SEMESTER WISE COURSE STRUCTURE  
&  
EVALUATION SCHEME**

**CHEMICAL ENGINEERING**

**(Effective from the session 2017-18 for new entrants)**



**HARCOURT BUTLER TECHNICAL UNIVERSITY**

**KANPUR-208002 (UP) – INDIA**



## **Vision**

To emerge as a global leader in the areas of education and research in Chemical Engineering to handle the technological challenges in Chemical Engineering & allied fields and catering the requirement of present and future stakeholders and society.

## **Mission**

- To provide state-of-art technical education to the undergraduate and post graduate students.
- To create a conducive and supportive environment for the overall growth of our students.
- To cultivate awareness of social responsibilities in students to serve the society.
- To groom students with leadership skills helpful in Startups, professional ethics and accountability along with technical knowledge to face the changing needs of industry and environment.
- To impart consultancy services to the Chemical and Allied industries of the local region and state.

## **Program Educational Outcomes (PEOs)**

1. Graduates from our department will be proficient in varied areas of Chemical Engineering that are industrially and academically significant such as Petroleum Refining, Process Control, Fertilizer Manufacturing, Molecular Modeling and Simulation and Nanotechnology.
2. Graduates will exhibit entrepreneurship, leadership and high professional skills while still maintaining ethical and moral values.
3. Graduates will continuously strive and align their activities for the betterment of the society.

**SEMESTER WISE COURSE STRUCTURE & EVALUATION SCHEME**  
**B.TECH. CHEMICAL ENGINEERING**

**SEMESTER I**

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

**SEMESTER II**

Sr. No.	Course Type	Subject Code	Course Title	Credits (L-T-P)	Sessional Marks				ESM	Total Mark	
					MSE	TA	Lab	Total			
1.	BSC	BMA-102	Mathematics-II	4 (3-1-0)	30	20	-	50	50	100	
2.	BSC	BPH- 102	Physics	4 (3-0-2)	15	20	15	50	50	100	
3.	ESC	EEE- 102	Electrical Engineering	4 (3-0-2)	15	20	15	50	50	100	
4.	ESC	EME- 102	Engineering Mechanics	3 (3-0-0)	30	20	-	50	50	100	
5.	HSMC	HHS- 104	Professional Communication	3 (2-0-2)	15	20	15	50	50	100	
6.	HSMC	HHS- 102	English Language and Composition	2 (2-0-0)	30	20	-	50	50	100	
<b>Total Credits</b>					<b>20</b>						

BSC- Basic Science Course; ESC-Engineering Science Course; PCC-Programme Core course; PEC-Programme Elective Course; OEC-Open Elective Course; MC-Mandatory Course; HSMC-Humanities, Social Science & Management Course

### SEMESTER III

Sr. No.	Course Type	Subject Code	Course Title	Credits (L-T-P)	Sessional Marks				ESM	Total Mark	
					MSE	TA	Lab	Total			
1.	BSC	BMA 201	Mathematics III	4 (3-1-0)	30	20	-	50	50	100	
2.	PCC	TCH 201	Material and Energy Balance	4 (3-1-0)	30	20	-	50	50	100	
3.	PCC	TCH 203	Fluid Mechanics	3 (3-0-0)	30	20	-	50	50	100	
4.	PCC	TCH 205	Particle & Fluid Particle Processing	3 (3-0-0)	30	20	-	50	50	100	
5.	PCC	TCH 207	Heat Transfer Operation	3 (3-0-0)	30	20	-	50	50	100	
6.	PCC	TCH 209	Chemical Engg. Lab -I	2 (0-0-6)	-	20	30	50	50	100	
7.	HSMC	HHS 203	Organisational Behaviour	3 (3-0-0)	30	20	-	50	50	100	
8.	MC (Non-credit)	ECS 205	Cyber Security	2(2-0-0)	30	20	-	50	50	100	
<b>Total Credits</b>					<b>22</b>						

### SEMESTER IV

Sr. No.	Course Type	Subject Code	Course Title	Credits (L-T-P)	Sessional Marks				ESM	Total Mark	
					MSE	TA	Lab	Total			
1.	BSC	BCY 202	Modern Analytical Techniques	4 (3-0-2)	15	20	15	50	50	100	
2.	BSC	BMA 206	Computer Oriented Numerical Methods	4 (3-0-3)	15	20	15	50	50	100	
3.	PCC	TCH-202	Chemical Engineering Thermodynamics-I	3 (3-0-0)	30	20	-	50	50	100	
4.	PCC	TCH 204	Mass Transfer Operation-I	3 (2-1-0)	30	20	-	50	50	100	
5.	PCC	TCH 206	Process Utility	3(3-0-0)	30	20	-	50	50	100	
6.	PCC	TCH 208	Chemical Engg. Lab-II	2 (0-0-6)	-	20	30	50	50	100	
7.	HSMC	HHS 202	Engineering Economics & Management	3 (3-0-0)	30	20	-	50	50	100	
8.	MC (Non-credit)	HHS206	Indian Constitution	2(2-0-0)	30	20	-	50	50	100	
<b>Total Credits</b>					<b>22</b>						

## SEMESTER V

Sr. No.	Course Type	Subject Code	Course Title	Credits (L-T-P)	Sessional Marks				ESM	Total Mark
					MSE	TA	Lab	Total		
1.	PCC	TCH 301	Chemical Technology-I	3 (3-0-0)	30	20	-	50	50	100
2.	PCC	TCH 303	Chemical Reaction Engineering-I	4 (3-1-0)	30	20	-	50	50	100
3.	PCC	TCH 305	Mass Transfer Operation -II	4 (3-1-0)	30	20	-	50	50	100
4.	PCC	TCH 307	Process Instrumentation	3 (3-0-0)	30	20	-	50	50	100
5.	PCC	TCH 309	Chemical Engineering Thermodynamics-II	4 (3-1-0)	30	20	-	50	50	100
6.	PCC	TCH 311	MTO –II Lab	1(0-0-3)	-	20	30	50	50	100
7.	HSMC (Humanities)	HHS 341	Entrepreneurship Development	3 (3-0-0)	30	20	-	50	50	100
<b>Total Credits</b>				<b>22</b>						

## SEMESTER VI

Sr. No.	Course Type	Subject Code	Course Title	Credits (L-T-P)	Sessional Marks				ESM	Total Mark
					MSE	TA	Lab	Total		
1.	PCC	TCH 302	Process Control	3 (2-1-0)	30	20	-	50	50	100
2.	PCC	TCH 304	Chemical Reaction Engineering -II	3 (2-1-0)	30	20	-	50	50	100
3.	PCC	TCH 306	Computer Aided Equipment Design	3 (2-1-0)	30	20	-	50	50	100
4.	PCC	TCH 308	Transport Phenomena	3 (2-1-0)	30	20	-	50	50	100
5.	PCC	TCH 310	Chemical Technology-II	2 (2-0-0)	30	20	-	50	50	100
6.	PCC	TCH 312	Plant Design and Economics	3 (2-1-0)	30	20	-	50	50	100
7.	PCC	TCH 314	Reaction Engg. & Instrumentation Control Lab	2 (0-0-6)	-	20	30	50	50	100
8.	BSC (Maths)	BMA 342	Operation Research	3 (3-0-0)	30	20	-	50	50	100
<b>Total Credits</b>				<b>22</b>						

## SEMESTER VII

Sr. No.	Course Type	Subject Code	Course Title	Credits (L-T-P)	Sessional Marks				ESM	Total Mark
					MSE	TA	Lab	Total		
1.	PCC	TCH 401	Process Modeling and Simulation	3 (2-1-0)	30	20	-	50	50	100
2.	PEC	PEC-I	PEC-I	3 (3-0-0)	30	20	-	50	50	100
3.	PEC	PEC-II	PEC-II	3 (3-0-0)	30	20	-	50	50	100
4.	OEC	OEC-I	OEC-I	3 (3-0-0)	30	20	-	50	50	100
5.	PCC	TCH 403	Design & Simulation Lab	2 (1-0-3)	-	20	30	50	50	100
6.	Seminar	TCH 451	Seminar	2 (0-0-4)	-	50	-	50	50	100
7.	Industrial Project	TCH 453	Industrial Project	2 (0-0-4)	-	50	-	50	50	100
8.	Project	TCH 497	Project	4 (0-0-8)	-	50	-	50	50	100
<b>Total Credits</b>				<b>22</b>						

## SEMESTER VIII

Sr. No.	Course Type	Subject Code	Course Title	Credits (L-T-P)	Sessional Marks				ESM	Total Mark
					MSE	TA	Lab	Total		
1.	PEC	PEC-III	PEC-III	4 (3-1-0)	30	20	-	50	50	100
2.	PEC	PEC-IV	PEC-IV	4 (3-1-0)	30	20	-	50	50	100
3.	OEC	OEC-II	OEC-II	4 (3-1-0)	30	20	-	50	50	100
4.	Project	TCH 498	Project	10 (0-0-20)	-	50	-	50	50	100
<b>Total Credits</b>				<b>22</b>						

**Total Programme Credits : 172**

TCH 497 Project will have Internal Evaluation while TCH 498 Project will have External Evaluation.

**Department of Chemical Engineering  
(to be offered in VII & VIII Semester)**

**Programme Elective-I**

S. No.	Course Code	Course Name	Credits
1	TCH-405	Nano Technology	3 (3-0-0)
2	TCH-407	Colloids & Interface Science and Engineering	3 (3-0-0)
3	TCH-409	Corrosion Science and Engineering	3 (3-0-0)
4	TCH-411	Chemical Plant Safety and Risk Assessment	3 (3-0-0)
5	TCH-413	Non Conventional Energy	3 (3-0-0)

**Programme Elective-II**

1	TCH-415	Petroleum Refining Engineering	3 (3-0-0)
2	TCH-417	Principles of Polymer Engineering	3 (3-0-0)
3	TCH-421	Biochemical Conversion Processes	3 (3-0-0)
4	TCH-423	Petro Chemical Technology	3 (3-0-0)
5.	TCH-425	Material Science & Technology	3 (3-0-0)

**Programme Elective-III**

1	TCH-402	Optimization : Theory and Practices	4 (3-1-0)
2	TCH-404	Advanced Process Control	4 (3-1-0)
3	TCH-406	Mathematical Methods in Chemical Engineering	4 (3-1-0)
4	TCH-408	Statistical Design of Experiments	4 (3-1-0)

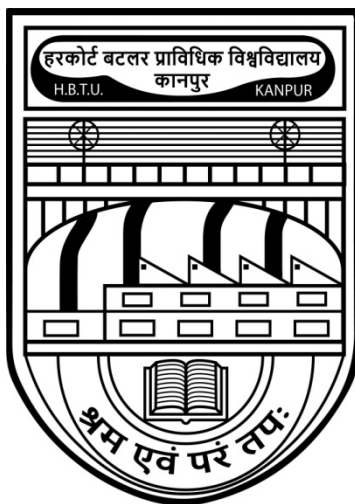
**Programme Elective-IV**

1	TCH-410	Advanced Separation Processes	4 (3-1-0)
2	TCH-412	Process Integration	4 (3-1-0)
3	TCH-414	CFD	4 (3-1-0)
4	TCH-416	Industrial Pollution Control and Waste Management	4 (3-1-0)
5.	TCH-418	R&D Management	4 (3-1-0)

**SEMESTER WISE COURSE STRUCTURE  
&  
EVALUATION SCHEME**

**FOOD TECHNOLOGY**

**(Effective from the session 2017-18 for new entrants)**



**HARCOURT BUTLER TECHNICAL UNIVERSITY**

**KANPUR-208002 (UP) – INDIA**

**Vision**

To develop technically sound technologist who can make difference in the field of Food Technology and to cater the needs of industry, research & development organization and society.

**Mission**

- To assist and promote the growth of food industry of the region through technology and technical services.
- To add value and utility to agro-resources through R&D
- To develop state-of-art technologies for testing and consultancy for industry and society.
- To develop human resource for the food industry



**SEMESTER WISE COURSE STRUCTURE & EVALUATION SCHEME**  
**B. TECH. FOOD TECHNOLOGY**

**SEMESTER I**

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

**SEMESTER II**

Sr. No.	Course Type	Subject Code	Course Title	Credits (LTP)	Sessional Marks				ESE	Total
					MSE	TA	Lab	Total		
1.	BSC	BPH 102	Physics	4 (3-0-2)	15	20	15	50	50	100
2.	BSC	BMA 102	Mathematics II	4 (3-1-0)	30	20	-	50	50	100
3.	ESC	EEE 102	Electrical Engineering	4 (3-0-2)	15	20	15	50	50	100
4.	ESC	EME 102	Engineering Mechanics	3 (3-0-0)	30	20	-	50	50	100
5.	HSMC	HHS 102	English Language & Composition	2 (2-0-0)	30	20	-	50	50	100
6.	HSMC	HHS 104	Professional Communication	3 (2-0-2)	15	20	15	50	50	100
<b>Total Credit</b>					<b>20</b>					

BSC- Basic Science Course; ESC-Engineering Science Course; PCC-Programme Core course; PEC-Programme Elective Course; OEC-Open Elective Course; MC-Mandatory Course; HSMC-Humanities, Social Science & Management Course

### SEMESTER III

Sr. No.	Course Type	Subject Code	Course Title	Credits	Sessional Marks				ESE	Total
					MSE	TA	Lab	Total		
1.	BSC	BMA 201	Mathematics III	4 (3-1-0)	30	20	-	50	50	100
2.	ESC	TCH 201	Materials & Energy Balance	4 (3-1-0)	30	20	-	50	50	100
3.	PCC	TCH 211	Fluid Mechanics & Mechanical Operation	5 (3-1-3)	15	20	15	50	50	100
4.	PCC	TFT 201	Introduction to Food Technology	6 (3-1-6)	15	20	15	50	50	100
5.	HSMC	HHS 203	Organisational Behaviour	3 (3-0-0)	30	20	-	50	50	100
6.	MC (Non-credit)	ECS 205	Cyber Security	2 (2-0-0)	30	20	-	50	50	100
<b>Total Credit</b>					<b>22</b>					

### SEMESTER IV

Sr. No.	Course Type	Subject Code	Course Title	Credits	Sessional Marks				ESE	Total
					MSE	TA	Lab	Total		
1.	BSC	BCY 202	Modern Analytical Techniques	4 (3-0-2)	15	20	15	50	50	100
2.	BSC	BMA 202	Computer Oriented Numerical Methods	4 (3-0-3)	15	20	15	50	50	100
3.	ESC	TCH 212	Heat Transfer Operations	3 (3-0-0)	30	20	-	50	50	100
4.	ESC	TCH 214	Chemical Engineering Thermodynamics	3 (3-0-0)	30	20	-	50	50	100
5.	PCC	TFT 202	Food Microbiology	5 (3-1-3)	15	20	15	50	50	100
6.	HSMC	HHS 202	Engg Economics & Management	3 (3-0-0)	30	20	-	50	50	100
7.	MC (Non-credit)	HHS 206	Indian Constitution	2 (2-0-0)	30	20		50	50	100
<b>Total Credit</b>					<b>22</b>					

### SEMESTER V

Sr. No.	Course Type	Subject Code	Course Title	Credits	Sessional Marks				ESE	Total
					MSE	TA	Lab	Total		
1.	PCC	TCH 315	Mass Transfer Operations	4 (3-1-0)	30	20	-	50	50	100
2.	PCC	TCH 317	Chemical Reaction Engineering	4 (3-1-0)	30	20	-	50	50	100
3.	PCC	TFT 301	Food Biochemistry	3 (3-0-0)	30	20	-	50	50	100
4.	PCC	TFT 303	Food Chemistry	5 (3-0-6)	15	20	15	50	50	100
5.	OEC (Mechanical)	EME 325	Energy Conversion Systems and Devices	3 (3-0-0)	30	20	-	50	50	100
6.	OEC (Humanities)	HHS 341	Entrepreneurship Development	3 (3-0-0)	30	20	-	50	50	100
<b>Total Credit</b>					<b>22</b>					

### SEMESTER VI

Sr. No.	Course Type	Subject Code	Course Title	Credits	Sessional Marks				ESE	Total
					MSE	TA	Lab	Total		
1.	PCC	TCH 316	Instrumentation & Process Control	5 (3-1-3)	15	20	15	50	50	100
2.	PCC	TFT 302	Principles of Food preservation	4 (3-1-0)	30	20	-	50	50	100
3.	PCC	TFT 304	Technology of Cereals, Pulses & Oilseeds	5 (3-0-6)	15	20	15	50	50	100
4.	PCC	TFT 306	Fruits, Vegetables and Plantation Products	5 (3-0-6)	15	20	15	50	50	100
5.	OEC (Maths)	BMA 342	Operation Research	3 (3-0-0)	30	20	-	50	50	100
<b>Total Credit</b>					<b>22</b>					

## SEMESTER VII

Sr. No.	Course Type	Subject Code	Course Title	Credits (LTP)	Sessional Marks				ESE	Total	
					MSE	TA	Lab	Total			
1.	PCC	TFT 401	Food Safety and Quality Control	4 (3-0-3)	15	20	15	50	50	100	
2.	PEC	PEC-I	PEC-I	3 (3-0-0)	30	20	-	50	50	100	
3.	PEC	PEC-II	PEC-II	2 (2-0-0)	30	20	-	50	50	100	
4.	PEC	PEC-III	PEC-III	2 (2-0-0)	30	20	-	50	50	100	
5.	OEC	OEC-I	OEC-I	3 (3-0-0)	30	20	-	50	50	100	
6.	Industrial Training	TFT 461	Industrial Training	2 (0-0-4)	-	50	-	50	50	100	
7.	Seminar	TFT 471	Seminar	2 (0-0-4)	-	50	-	50	50	100	
8.	Project	TFT 497	Project	4 (0-0-8)	-	50	-	50	50	100	
<b>Total Credit</b>					<b>22</b>						

## SEMESTER VIII

Sr. No.	Course Type	Subject Code	Course Title	Credits	Sessional Marks				ESE	Total	
					MSE	TA	Lab	Total			
1.	PEC	PEC-IV	PEC-IV	3 (2-1-0)	30	20	-	50	50	100	
2.	PEC	PEC-V	PEC-V	3 (3-0-0)	30	20	-	50	50	100	
3.	PEC	PEC-VI	PEC-VI	3 (3-0-0)	30	20	-	50	50	100	
4.	OEC	OEC-II	OEC-II	3 (2-1-0)	30	20	-	50	50	100	
5.	Project	TFT 498	Project	10 (0-0-20)	-	50	-	50	50	100	
<b>Total Credit</b>					<b>22</b>						

**Total Programme Credits: 172**

TFT 497 Project will have Internal Evaluation while TFT 498 Project will have External Evaluation.

**Department of Food Technology**  
**(to be offered in VII & VIII Semester)**

**Programme Elective-I**

<b>S. No.</b>	<b>Course Code</b>	<b>Course Name</b>	<b>Credits</b>
1	TFT 403	Traditional & Fermented Foods	3 (3-0-0)
2	TFT 405	Food Products and Process Development	3 (3-0-0)

**Programme Elective-II**

1	TFT 407	Food Processing Waste Management	2 (2-0-0)
2	TFT 409	Quality Management of Frozen Foods	2 (2-0-0)

**Programme Elective-III**

1	TFT 411	Technology of Animal Foods	2 (2-0-0)
2	TFT 413	Nutraceutical& Functional Foods	2 (2-0-0)

**Programme Elective-IV**

1	TCH 422	Process Modeling & Simulation	3 (2-1-0)
2	TCH 424	Process Equipment Design	3 (2-1-0)

**Programme Elective-V**

1	TFT 402	Innovative Techniques in Food Processing	3 (3-0-0)
2	TFT 404	Computer Applications in Food Processing	3 (3-0-0)

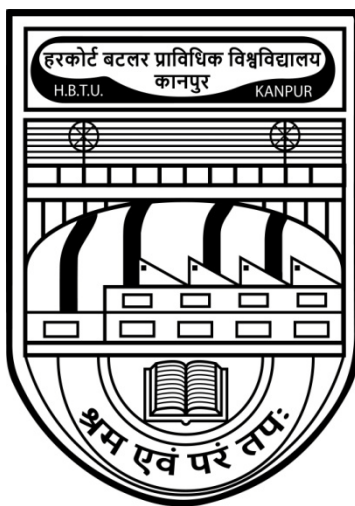
**Programme Elective-VI**

1	TFT 406	Food Packaging & Storage Engineering	3 (3-0-0)
2	TFT 408	Rheological and Sensory Analysis of Foods	3 (3-0-0)

**SEMESTER WISE COURSE STRUCTURE  
&  
EVALUATION SCHEME**

**LEATHER TECHNOLOGY**

**(Effective from the session 2017-18 for new entrants)**



**HARCOURT BUTLER TECHNICAL UNIVERSITY**

**KANPUR-208002 (UP) – INDIA**

## **Vision**

The Department of Leather Technology at HBTU aims at being a leader of innovation in the area of Leather to produce quality technologists of world standards to deliver the benefits of the developed technologies to the people.

## **Mission**

- To achieve academic excellence and practical knowledge in the fields of Leather, Leather Application, and allied areas.
- To inculcate technical competence in students for formulation, manufacture and application of advanced Leather with eco-friendly and sustainable approach.
- To develop state-of-art facilities for testing and consultancy for industry to make the department a center of excellence in the field of Leather at global level.
- To develop indigenous and adaptable technologies related to Leather for small scale production and to develop entrepreneurial skills, towards betterment of society.
- To cultivate strong ethical values to be a successful professional and to become life - long learners.

## **Program Educational Objectives (PEOs)**

1. To produce graduates and post graduates who will be able to meet the requirements and challenges at national & international levels in the field of formulation, manufacture and application of Leather and allied products.
2. To inculcate in students the fundamental concepts related to Leather Production & applications to enable them to develop novel technologies to meet the global standards of eco-friendliness & sustainability.
3. To produce technologists with high moral values and professional ethics, who can work with industry hand-in-hand for mutual benefits and to sensitize them for job creation for the society, specially the rural community.

**SEMESTER WISE COURSE STRUCTURE & EVALUATION SCHEME  
B. TECH. LEATHER TECHNOLOGY**

**SEMESTER I**

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

**SEMESTER II**

Sr. No.	Course Type	Subject Code	Course Title	Credits (LTP)	Sessional Marks				ESE	Total
					MSE	TA	Lab	Total		
1.	BSC	BPH 102	Physics	4 (3-0-2)	15	20	15	50	50	100
2.	BSC	BMA 102	Mathematics II	4 (3-1-0)	30	20	-	50	50	100
3.	ESC	EEE 102	Electrical Engineering	4 (3-0-2)	15	20	15	50	50	100
4.	ESC	EME 102	Engineering Mechanics	3 (3-0-0)	30	20	-	50	50	100
5.	HSMC	HHS 102	English Language & Composition	2 (2-0-0)	30	20	-	50	50	100
6.	HSMC	HHS 104	Professional Communication	3 (2-0-2)	15	20	15	50	50	100
<b>Total Credit</b>					<b>20</b>					

BSC- Basic Science Course; ESC-Engineering Science Course; PCC-Programme Core course; PEC-Programme Elective Course; OEC-Open Elective Course; MC-Mandatory Course; HSMC-Humanities, Social Science & Management Course



### SEMESTER III

Sr. No.	Course Type	Subject Code	Course Title	Credits	Sessional Marks				ESE	Total
					MSE	TA	Lab	Total		
1.	BSC	BMA 201	Mathematics III	4 (3-1-0)	30	20	-	50	50	100
2.	ESC	TCH 201	Materials & Energy Balance	4 (3-1-0)	30	20	-	50	50	100
3.	PCC	TCH 211	Fluid Mechanics and Mechanical operation	5 (3-1-3)	15	20	15	50	50	100
4.	PCC	TLT 201	Leather Microscopy and Bacteriology	6 (3-1-6)	15	20	15	50	50	100
5.	HSMC	HHS 203	Organisational Behavior	3 (3-0-0)	30	20	-	50	50	100
6.	MC (Non-credit)	ECS 205	Cyber Security	2 (2-0-0)	30	20	-	50	50	100
<b>Total Credit</b>					<b>22</b>					

### SEMESTER IV

Sr. No.	Course Type	Subject Code	Course Title	Credits	Sessional Marks				ESE	Total
					MSE	TA	Lab	Total		
1.	BSC	BCY 202	Modern Analytical Techniques	4 (3-0-2)	15	20	15	50	50	100
2.	BSC	BMA 202	Computer Oriented Numerical Methods	4 (3-0-3)	15	20	15	50	50	100
3.	ESC	TCH 212	Heat Transfer Operation	3 (3-0-0)	30	20	-	50	50	100
4.	ESC	TCH 214	Chemical Engineering Thermodynamics	3 (3-0-0)	30	20	-	50	50	100
5.	PCC	TLT 202	Skin Protein and Pre-Tannages	5 (3-1-3)	15	20	15	50	50	100
6.	HSMC	HHS 202	Engg Economics & Management	3 (3-0-0)	30	20	-	50	50	100
7.	MC (Non-credit)	HHS 206	Indian Constitution	2 (2-0-0)	30	20		50	50	100
<b>Total Credit</b>					<b>22</b>					

### SEMESTER V

Sr. No.	Course Type	Subject Code	Course Title	Credits	Sessional Marks				ESE	Total
					MSE	TA	Lab	Total		
1.	PCC	TCH 315	Mass Transfer Operation	4 (3-1-0)	30	20	-	50	50	100
2.	PCC	TCH 317	Chemical Reaction Engineering	4 (3-1-0)	30	20	-	50	50	100
3.	PCC	TLT 301	Inorganic Tannages	3 (3-0-0)	30	20	-	50	50	100
4.	PCC	TLT 303	Analysis of Materials of Leather Manufacture	5 (3-0-6)	15	20	15	50	50	100
5.	OEC (Mechanical)	EME 325	Energy Conversion Systems and Devices	3 (3-0-0)	30	20	-	50	50	100
6.	OEC (Humanities)	HHS 341	Entrepreneurship Development	3 (3-0-0)	30	20	-	50	50	100
<b>Total Credit</b>				<b>22</b>						

### SEMESTER VI

Sr. No.	Course Type	Subject Code	Course Title	Credits	Sessional Marks				ESE	Total
					MSE	TA	Lab	Total		
1.	PCC	TCH 316	Instrumentation & Process Control	5 (3-1-3)	15	20	15	50	50	100
2.	PCC	TLT 302	Post Tanning and Finishing Operation	4 (3-1-0)	30	20	-	50	50	100
3.	PCC	TLT 304	Processing of Leather-I	5 (3-0-6)	15	20	15	50	50	100
4.	PCC	TLT 306	Leather Analysis and Quality Control	5 (3-0-6)	15	20	15	50	50	100
5.	OEC (Maths)	BMA342	Operation Research	3 (3-0-0)	30	20	-	50	50	100
<b>Total Credit</b>				<b>22</b>						

### SEMESTER VII

Sr. No.	Course Type	Subject Code	Course Title	Credits (LTP)	Sessional Marks				ESE	Total	
					MSE	TA	Lab	Total			
1.	PCC	TLT 401	Processing of Leather-II	4 (3-0-3)	15	20	15	50	50	100	
2.	PEC	PEC-I	PEC-I	3 (3-0-0)	30	20	-	50	50	100	
3.	PEC	PEC-II	PEC-II	2 (2-0-0)	30	20	-	50	50	100	
4.	PEC	PEC-III	PEC-III	2 (2-0-0)	30	20	-	50	50	100	
5.	OEC	OEC-I	OEC-I	3 (3-0-0)	30	20	-	50	50	100	
6.	Industrial Training	TLT 461	Industrial Training	2 (0-0-4)	-	50	-	50	50	100	
7.	Seminar	TLT 471	Seminar	2 (0-0-4)	-	50	-	50	50	100	
8.	Project	TLT 497	Project	4 (0-0-8)	-	50	-	50	50	100	
<b>Total Credit</b>					<b>22</b>						

### SEMESTER VIII

Sr. No.	Course Type	Subject Code	Course Title	Credits	Sessional Marks				ESE	Total	
					MSE	TA	Lab	Total			
1.	PEC	PEC-IV	PEC-IV	3 (2-1-0)	30	20	-	50	50	100	
2.	PEC	PEC-V	PEC-V	3 (3-0-0)	30	20	-	50	50	100	
3.	PEC	PEC-VI	PEC-VI	3 (3-0-0)	30	20	-	50	50	100	
4.	OEC	OEC-II	OEC-II	3 (2-1-0)	30	20	-	50	50	100	
5.	Project	TLT 498	Project	10 (0-0-20)	-	50	-	50	50	100	
<b>Total Credit</b>					<b>22</b>						

**Total Programme Credits :172**

TLT 497 Project will have Internal Evaluation while TLT 498 Project will have External Evaluation.

**Department of Leather Technology**  
**(to be offered in VII & VIII Semester)**

**Programme Elective-I**

<b>S. No.</b>	<b>Course Code</b>	<b>Course Name</b>	<b>Credits</b>
1	TLT 403	Leather Auxialaries Technology	3 (3-0-0)
2	TLT 405	Leather biotechnology	3 (3-0-0)

**Programme Elective-II**

1	TLT 407	Organic Tannages	2 (2-0-0)
2	TLT 409	Animal and Tannery by Products	2 (2-0-0)

**Programme Elective-III**

1	TLT 411	Footwear Technology	2 (2-0-0)
2	TLT 413	Footwear materials and Components	2 (2-0-0)

**Programme Elective-IV**

1	TCH 422	Process Modeling & Simulation	3 (2-1-0)
2	TCH 424	Process Equipment Design	3 (2-1-0)

**Programme Elective-V**

1	TLT 402	Tannery Effluent Treatment	3 (3-0-0)
2	TLT 404	Leather Products Technology	3 (3-0-0)

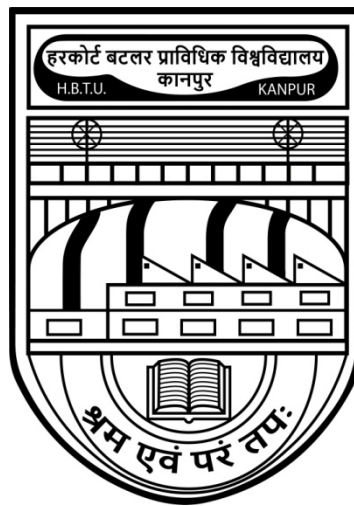
**Programme Elective-VI**

1	TLT 406	Leather Trades Engineering	3 (3-0-0)
2	TLT 408	Computer Aided Leather Product Design	3 (3-0-0)

**SEMESTER WISE COURSE STRUCTURE  
&  
EVALUATION SCHEME**

**OIL TECHNOLOGY**

**(Effective from the session 2017-18 for new entrants)**



**HARCOURT BUTLER TECHNICAL UNIVERSITY**

**KANPUR-208002 (UP) – INDIA**

## **Vision**

Transforming the individuals into globally competent Chemical Technologists-Oil Technologists to fulfill technological needs of industry and society.

## **Mission**

- Provide quality education through innovation in teaching and learning practices meeting the global standards.
- Encourage faculty and students to carry out innovative, socially relevant and eco-efficient research.
- Offer consultancy services using state of the art facilities fulfilling the needs of the industry and society in the area of expertise.
- Enable our students, faculty and staff to play leadership roles for the betterment of the society in a sustainable manner

## **Program Educational Objectives (PEOs)**

1. Graduates of the program will contribute to the development of sustainable growth of engineering and Oil Technology sector for the betterment of society.
2. Graduates of the program, as an employee of an organization or as an employer, will continuously update their domain knowledge for continuous professional development with focus on research & development and industry interaction.
3. Graduates of the program will accept and create innovations in providing solution for sustainable technological development.
4. Graduates of the program will discharge their duties as professional engineer and Oil Technologist with quality and ethics

**SEMESTER WISE COURSE STRUCTURE & EVALUATION SCHEME**  
**B. TECH. OIL TECHNOLOGY**

**SEMESTER I**

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

**SEMESTER II**

Sr. No.	Course Type	Subject Code	Course Title	Credits (LTP)	Sessional Marks				ESE	Total
					MSE	TA	Lab	Total		
1.	BSC	BPH 102	Physics	4 (3-0-2)	15	20	15	50	50	100
2.	BSC	BMA 102	Mathematics II	4 (3-1-0)	30	20	-	50	50	100
3.	ESC	EEE 102	Electrical Engineering	4 (3-0-2)	15	20	15	50	50	100
4.	ESC	EME 102	Engineering Mechanics	3 (3-0-0)	30	20	-	50	50	100
5.	HSMC	HHS 102	English Language & Composition	2 (2-0-0)	30	20	-	50	50	100
6.	HSMC	HHS 104	Professional Communication	3 (2-0-2)	15	20	15	50	50	100
<b>Total Credit</b>				<b>20</b>						

BSC- Basic Science Course; ESC-Engineering Science Course; PCC-Programme Core course; PEC-Programme Elective Course; OEC-Open Elective Course; MC-Mandatory Course; HSMC-Humanities, Social Science & Management Course

### SEMESTER III

Sr. No.	Course Type	Subject Code	Course Title	Credits	Sessional Marks				ESE	Total
					MSE	TA	Lab	Total		
1.	BSC	BMA 201	Mathematics III	4 (3-1-0)	30	20	-	50	50	100
2.	ESC	TCH 201	Materials & Energy Balance	4 (3-1-0)	30	20	-	50	50	100
3.	PCC	TCH 211	Fluid Mechanics and Mechanical Operation	5 (3-1-3)	15	20	15	50	50	100
4.	PCC	TOT 201	Chemistry of Oils & Allied Products	6 (3-1-6)	15	20	15	50	50	100
5.	HSMC	HHS 203	Organisational Behaviour	3 (3-0-0)	30	20	-	50	50	100
6.	MC (Non-credit)	ECS 205	Cyber Security	2 (2-0-0)	30	20	-	50	50	100
<b>Total Credit</b>				<b>22</b>						

### SEMESTER IV

Sr. No.	Course Type	Subject Code	Course Title	Credits	Sessional Marks				ESE	Total
					MSE	TA	Lab	Total		
1.	BSC	BCY 202	Modern Analytical Techniques	4 (3-0-2)	15	20	15	50	50	100
2.	BSC	BMA 202	Computer Oriented Numerical Methods	4 (3-0-3)	15	20	15	50	50	100
3.	ESC	TCH 212	Heat Transfer Operations	3 (3-0-0)	30	20	-	50	50	100
4.	PCC	TCH 214	Chemical Engineering Thermodynamics	3 (3-0-0)	30	20	-	50	50	100
5.	PCC	TOT 202	Sources, Composition, Characterization of Oils, Fats & Waxes	5 (3-1-3)	15	20	15	50	50	100
6.	HSMC	HHS 202	Engg Economics & Management	3 (3-0-0)	30	20	-	50	50	100
7.	MC (Non-credit)	HHS 206	Indian Constitution	2 (2-0-0)	30	20	-	50	50	100
<b>Total Credit</b>				<b>22</b>						



### SEMESTER V

Sr. No.	Course Type	Subject Code	Course Title	Credits	Sessional Marks				ESE	Total
					MSE	TA	Lab	Total		
1.	PCC	TCH 315	Mass Transfer Operations	4 (3-1-0)	30	20	-	50	50	100
2.	PCC	TCH 317	Chemical Reaction Engineering	4 (3-1-0)	30	20	-	50	50	100
3.	PCC	TOT 301	Expression & Extraction Techniques of Oil Bearing Materials	3 (3-0-0)	30	20	-	50	50	100
4.	PCC	TOT 303	Technology of Soaps & Fat Splitting	5 (3-0-6)	15	20	15	50	50	100
5.	OEC (Mechanical)	EME 325	Energy Conversion Systems and Devices	3 (3-0-0)	30	20	-	50	50	100
6.	OEC (Humanities)	HHS 341	Entrepreneurship Development	3 (3-0-0)	30	20	-	50	50	100
<b>Total Credit</b>				<b>22</b>						

### SEMESTER VI

Sr. No.	Course Type	Subject Code	Course Title	Credits	Sessional Marks				ESE	Total
					MSE	TA	Lab	Total		
1.	PCC	TCH 316	Instrumentation & Process Control	5 (3-1-3)	15	20	15	50	50	100
2.	PCC	TOT 302	Refining of Oils	4 (3-1-0)	30	20	-	50	50	100
3.	PCC	TOT 304	Quality Assurance of Oils & Allied Products	5 (3-0-6)	15	20	15	50	50	100
4.	PCC	TOT 306	Essential Oils & Cosmetics	5 (3-0-6)	15	20	15	50	50	100
5.	OEC (Maths)	BMA 342	Operation Research	3 (3-0-0)	30	20	-	50	50	100
<b>Total Credit</b>				<b>22</b>						

### SEMESTER VII

Sr. No.	Course Type	Subject Code	Course Title	Credits (LTP)	Sessional Marks				ESE	Total
					MSE	TA	Lab	Total		
1.	PCC	TOT-401	Hydrogenation & Modification of Oils	4 (3-0-3)	15	20	15	50	50	100
2.	PEC	PEC-I	PEC-I	3 (3-0-0)	30	20	-	50	50	100
3.	PEC	PEC-II	PEC-II	2 (2-0-0)	30	20	-	50	50	100
4.	PEC	PEC-III	PEC-III	2 (2-0-0)	30	20	-	50	50	100
5.	OEC	OEC-I	OEC-I	3 (3-0-0)	30	20	-	50	50	100
6.	Industrial Training	TOT-461	Industrial Training	2 (0-0-4)	-	50	-	50	50	100
7.	Seminar	TOT-471	Seminar	2 (0-0-4)	-	50	-	50	50	100
8.	Project	TOT-497	Project	4 (0-0-8)	-	50	-	50	50	100
<b>Total Credit</b>					<b>22</b>					

### SEMESTER VIII

Sr. No.	Course Type	Subject Code	Course Title	Credits	Sessional Marks				ESE	Total
					MSE	TA	Lab	Total		
1.	PEC	PEC-IV	PEC-IV	3 (2-1-0)	30	20	-	50	50	100
2.	PEC	PEC-V	PEC-V	3 (3-0-0)	30	20	-	50	50	100
3.	PEC	PEC-VI	PEC-VI	3 (3-0-0)	30	20	-	50	50	100
4.	OEC	OEC-II	OEC-II	3 (2-1-0)	30	20	-	50	50	100
5.	Project	TOT 498	Project	10 (0-0-20)	-	50	-	50	50	100
<b>Total Credit</b>					<b>22</b>					

**Total Programme Credits : 172**

TOT 497 Project will have Internal Evaluation while TOT 498 Project will have External Evaluation.

**Department of Oil Technology**  
**(to be offered in VII & VIII Semester)**

**Programme Elective-I**

<b>S. No.</b>	<b>Course Code</b>	<b>Course Name</b>	<b>Credits</b>
1	TOT 403	Technology of Surfactants & Synthetic Detergents	3 (3-0-0)

**Programme Elective-II**

1	TOT 405	Advance Oil Chemistry & Oleo Chemicals	2 (2-0-0)
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**Programme Elective-III**

1	TOT 407	Commerce & process economics, Food safety & environmental aspects of Oil Industry	2 (2-0-0)
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**Programme Elective-IV**

1	TCH 422	Process Modeling & Simulation	3 (2-1-0)
2	TCH 424	Process Equipment Design	3 (2-1-0)

**Programme Elective-V**

1	TOT 402	Bio Technology of Oil seeds & Oils	3 (3-0-0)
2	TOT 404	Packaging of Oils, Fats & Allied Industries*	3 (3-0-0)

**Programme Elective-VI**

1	TOT 406	Environmental Aspects of Oils & Allied Industries	3 (3-0-0)
2	TOT 408	Petroleum Products & Petrochemicals	3 (3-0-0)
3	TOT 410	Fuel & Green Lubricant	3 (3-0-0)

**SEMESTER WISE COURSE STRUCTURE  
&  
EVALUATION SCHEME**

**PAINT TECHNOLOGY**

**(Effective from the session 2017-18 for new entrants)**



**HARCOURT BUTLER TECHNICAL UNIVERSITY**

**KANPUR-208002 (UP) – INDIA**

## **Vision**

The department of paint technology aspires to achieve excellence in teaching-learning, research and innovation in Paint and allied areas.

## **Mission**

- To develop state of the art facilities to impart technical knowledge and skill to the graduate students for paint and allied industries and research organizations.
- To be a center of research and innovation for betterment of society in sustainable manner.
- To develop state-of-the-art technologies for testing, training and consultancy for industry and society.
- To cultivate strong ethical values to be a successful professionals and to become life-long learners.

## **Program Educational Objectives (PEOs)**

1. Be globally competent in the field of pigments, resins, paints and additives processing and allied areas to cater the need of country.
2. Develop innovative designs, production of materials and processes for sustainable development of society.
3. Serve the industry to meet the challenges in terms of quality assurance and standardization to withstand the global competitiveness.
4. Discharge duties with professional attitudes and ethics.

**SEMESTER WISE COURSE STRUCTURE & EVALUATION SCHEME**  
**B. TECH. PAINT TECHNOLOGY**

**SEMESTER I**

Sr. No.	Course Type	Subject Code	Course Title	Credits (LTP)	Sessional Marks				ESE	Total
					MSE	TA	Lab	Total		
1.	BSC	BCY 101	Engineering Chemistry	4 (3-0-2)	15	20	15	50	50	100
2.	BSC	BMA 101	Mathematics I	4 (3-1-0)	30	20	-	50	50	100
3.	ESC	EET 101	Electronics Engineering	3 (3-0-0)	30	20	-	50	50	100
4.	ESC	ECE 101	Engineering Graphics	3 (0-0-6)	30	20	-	50	50	100
5.	ESC	ECS 101	Computer Concept & Programming	4 (3-0-2)	15	20	15	50	50	100
6.	ESC	EWS 101	Workshop Practice	2 (0-0-4)	-	20	30	50	50	100
7.	MC (Non-credit)	ECE 103	Environment & Ecology	2 (2-0-0)	30	20	-	50	50	100
<b>Total Credit</b>					<b>20</b>					

**SEMESTER II**

Sr. No.	Course Type	Subject Code	Course Title	Credits (LTP)	Sessional Marks				ESE	Total
					MSE	TA	Lab	Total		
1.	BSC	BPH 102	Physics	4 (3-0-2)	15	20	15	50	50	100
2.	BSC	BMA 102	Mathematics II	4 (3-1-0)	30	20	-	50	50	100
3.	ESC	EEE 102	Electrical Engineering	4 (3-0-2)	15	20	15	50	50	100
4.	ESC	EME 102	Engineering Mechanics	3 (3-0-0)	30	20	-	50	50	100
5.	HSMC	HHS 102	English Language & Composition	2 (2-0-0)	30	20	-	50	50	100
6.	HSMC	HHS 104	Professional Communication	3 (2-0-2)	15	20	15	50	50	100
<b>Total Credit</b>					<b>20</b>					

BSC- Basic Science Course; ESC-Engineering Science Course; PCC-Programme Core course; PEC-Programme Elective Course; OEC-Open Elective Course; MC-Mandatory Course; HSMC-Humanities, Social Science & Management Course

### SEMESTER III

Sr. No.	Course Type	Subject Code	Course Title	Credits	Sessional Marks				ESE	Total
					MSE	TA	Lab	Total		
1.	BSC	BMA 201	Mathematics III	4 (3-1-0)	30	20	-	50	50	100
2.	ESC	TCH 201	Materials & Energy Balance	4 (3-1-0)	30	20	-	50	50	100
3.	PCC	TCH 211	Fluid Mechanics & Mechanical Operations	5 (3-1-3)	15	20	15	50	50	100
4.	PCC	TPT 201	Introduction to Surface Coatings and their Components	6 (3-1-6)	15	20	15	50	50	100
5.	HSMC	HHS 203	Organizational Behaviour	3 (3-0-0)	30	20	-	50	50	100
6.	MC (Non-credit)	ECS 205	Cyber Security	2 (2-0-0)	30	20	-	50	50	100
<b>Total Credit</b>					<b>22</b>					

### SEMESTER IV

Sr. No.	Course Type	Subject Code	Course Title	Credits	Sessional Marks				ESE	Total
					MSE	TA	Lab	Total		
1.	BSC	BCY 202	Modern Analytical Techniques	4 (3-0-2)	15	20	15	50	50	100
2.	BSC	BMA 202	Computer Oriented Numerical Methods	4 (3-0-2)	15	20	15	50	50	100
3.	ESC	TCH 212	Heat Transfer Operations	3 (3-0-0)	30	20	-	50	50	100
4.	PCC	TCH 214	Chemical Engineering Thermodynamics	3 (3-0-0)	30	20	-	50	50	100
5.	PCC	TPT 202	Technology of Inorganic Pigments and Extenders	5 (3-1-3)	15	20	15	50	50	100
6.	HSMC	HHS 202	Engg Economics & Management	3 (3-0-0)	30	20	-	50	50	100
7.	MC (Non-credit)	HHS 206	Indian Constitution	2 (2-0-0)	30	20		50	50	100
<b>Total Credit</b>					<b>22</b>					

### SEMESTER V

Sr. No.	Course Type	Subject Code	Course Title	Credits	Sessional Marks				ESE	Total
					MSE	TA	Lab	Total		
1.	PCC	TCH 315	Mass Transfer Operations	4 (3-1-0)	30	20	-	50	50	100
2.	PCC	TCH 317	Chemical Reaction Engineering	4 (3-1-0)	30	20	-	50	50	100
3.	PCC	TPT 301	Technology of Natural Resins, Alkyds and Polyesters	3 (3-0-0)	30	20	-	50	50	100
4.	PCC	TPT 303	Technology of Synthetic Resins and Polymers	5 (3-0-6)	15	20	15	50	50	100
5.	OEC (Mechanical)	EME 325	Energy Conversion Systems and Devices	3 (3-0-0)	30	20	-	50	50	100
6.	OEC (Humanities)	HHS 341	Entrepreneurship Development	3 (3-0-0)	30	20	-	50	50	100
<b>Total Credit</b>				<b>22</b>						

### SEMESTER VI

Sr. No.	Course Type	Subject Code	Course Title	Credits	Sessional Marks				ESE	Total
					MSE	TA	Lab	Total		
1.	PCC	TCH 316	Instrumentation & Process Control	5 (3-1-3)	15	20	15	50	50	100
2.	PCC	TPT 302	Technology of Organic, Functional and Effect Pigments	4 (3-1-0)	30	20	-	50	50	100
3.	PCC	TPT 304	Characterization, Analysis and Evaluation of Coatings	5 (3-0-6)	15	20	15	50	50	100
4.	PCC	TPT 306	Technology of Formulation and Manufacture of Coatings	5 (3-0-6)	15	20	15	50	50	100
5.	OEC (Maths)	BMA 342	Operations Research	3 (3-0-0)	30	20	-	50	50	100
<b>Total Credit</b>				<b>22</b>						



## SEMESTER VII

Sr. No.	Course Type	Subject Code	Course Title	Credits (LTP)	Sessional Marks				ESE	Total	
					MSE	TA	Lab	Total			
1.	PCC	TPT 401	Technology of Surface Preparation, Treatments and Coating Applications	4 (3-0-3)	15	20	15	50	50	100	
2.	PEC	PEC-I	PEC-I	3 (3-0-0)	30	20	-	50	50	100	
3.	PEC	PEC-II	PEC-II	2 (2-0-0)	30	20	-	50	50	100	
4.	PEC	PEC-III	PEC-III	2 (2-0-0)	30	20	-	50	50	100	
5.	OEC	OEC-I	OEC-I	3 (3-0-0)	30	20	-	50	50	100	
6.	Industrial Training	TPT 461	Industrial Training	2 (0-0-4)	-	50	-	50	50	100	
7.	Seminar	TPT 471	Seminar	2 (0-0-4)	-	25	-	25	25	50	
8.	Project	TPT 497	Project	4 (0-0-8)	-	50	-	50	50	100	
<b>Total Credit</b>					<b>22</b>						

## SEMESTER VIII

Sr. No.	Course Type	Subject Code	Course Title	Credits	Sessional Marks				ESE	Total	
					MSE	TA	Lab	Total			
1.	PEC	PEC-IV	PEC-IV	3 (2-1-0)	30	20	-	50	50	100	
2.	PEC	PEC-V	PEC-V	3 (3-0-0)	30	20	-	50	50	100	
3.	PEC	PEC-VI	PEC-VI	3 (3-0-0)	30	20	-	50	50	100	
4.	OEC	OEC-II	OEC-II	3 (2-1-0)	30	20	-	50	50	100	
5.	Project	TPT 498	Project	10 (0-0-20)	-	50	-	50	-	100	
<b>Total Credit</b>					<b>22</b>						

**Total Programme Credits : 172**

TPT 497 Project will have Internal Evaluation while TPT 498 Project will have External Evaluation.

**Department of Paint Technology**  
**(to be offered in VII & VIII Semester)**

**Programme Elective-I**

<b>S. No.</b>	<b>Course Code</b>	<b>Course Name</b>	<b>Credits</b>
1	TPT 403	Technology of Printing Inks	3 (3-0-0)
2	TPT 405	Technology of Industrial and Automotive Coatings	3 (3-0-0)

**Programme Elective-II**

1	TPT 407	Technology of Industrial and Specialty Coatings	2 (2-0-0)
2	TPT 409	Technology of Paint Additives	2 (2-0-0)

**Programme Elective-III**

1	TPT 411	Technology of Architectural and Eco-friendly Coatings	2 (2-0-0)
2	TPT 413	Instrumentation in Coating Industry	2 (2-0-0)

**Programme Elective-IV**

1	TCH 422	Process Modeling & Simulation	3 (2-1-0)
2	TCH 424	Process Equipment Design	3 (2-1-0)

**Programme Elective-V**

1	TPT 402	Technology Of Packaging And Waste Management	3 (3-0-0)
2	TPT 404	High Polymeric Engineering	3 (3-0-0)

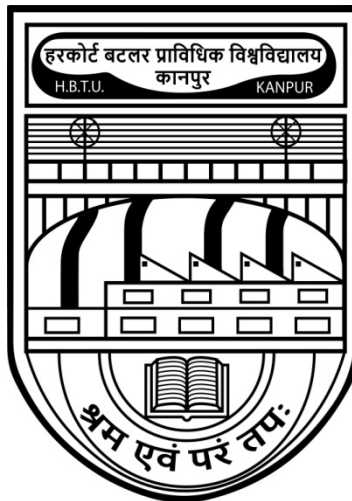
**Programme Elective-VI**

1	TPT 406	Corrosion Control Technology	3 (3-0-0)
2	TPT 408	Nanotechnology in Surface Coatings	3 (3-0-0)

**SEMESTER WISE COURSE STRUCTURE  
&  
EVALUATION SCHEME**

**PLASTIC TECHNOLOGY**

**(Effective from the session 2017-18 for new entrants)**



**HARCOURT BUTLER TECHNICAL UNIVERSITY**

**KANPUR-208002 (UP) – INDIA**

**Vision**

The department of plastic technology aspires to achieve excellence in technical knowledge & skill, research and innovation on Plastics and Allied areas.

**Mission**

- To develop state of the art facilities to impart technical knowledge and skill to the graduate and post graduate students for plastic and allied industries and research organizations
- To be a center of research and innovation for betterment of society in sustainable manner.
- To develop state-of-the-art technologies for testing and consultancy for industry and society.
- To cultivate strong ethical values to be a successful professionals and to become life-long learners.

**Program Educational Objectives (PEOs)**

1. Graduates will be technically competent in the field of polymers, resins, processing and allied areas to cater the need of country.
2. Graduates will be able to innovate in designs, production of materials and processes for sustainable development of society.
3. Graduates will serve the industry to meet the challenges in terms of quality assurance and standardization to withstand the global competitiveness.
4. Graduates will discharge duties with professional attitudes and ethics.

**SEMESTER WISE COURSE STRUCTURE & EVALUATION SCHEME**  
**B. TECH. PLASTIC TECHNOLOGY**

**SEMESTER I**

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

**SEMESTER II**

Sr. No.	Course Type	Subject Code	Course Title	Credits (LTP)	Sessional Marks				ESE	Total Mark
					MSE	TA	Lab	Total		
1.	BSC	BPH 102	Physics	4 (3-0-2)	15	20	15	50	50	100
2.	BSC	BMA 102	Mathematics II	4 (3-1-0)	30	20	-	50	50	100
3.	ESC	EEE 102	Electrical Engineering	4 (3-0-2)	15	20	15	50	50	100
4.	ESC	EME 102	Engineering Mechanics	3 (3-0-0)	30	20	-	50	50	100
5.	HSMC	HHS 102	English Language & Composition	2 (2-0-0)	30	20	-	50	50	100
6.	HSMC	HHS 104	Professional Communication	3 (3-0-2)	15	20	15	50	50	100
<b>Total Credit</b>					<b>20</b>					

BSC- Basic Science Course; ESC-Engineering Science Course; PCC-Programme Core course; PEC-Programme Elective Course; OEC-Open Elective Course; MC-Mandatory Course; HSMC-Humanities, Social Science & Management Course

### SEMESTER III

Sr. No.	Course Type	Subject Code	Course Title	Credits	Sessional Marks				ESE	Total Mark
					MSE	TA	Lab	Total		
1.	BSC	BMA 201	Mathematics III	4 (3-1-0)	30	20	-	50	50	100
2.	ESC	TCH 201	Materials & Energy Balance	4 (3-1-0)	30	20	-	50	50	100
3.	PCC	TCH 211	Fluid Mechanics and Mechanical Operation	5 (3-1-3)	15	20	15	50	50	100
4.	PCC	TPL 201	Polymer Chemistry	6 (3-1-6)	15	20	15	50	50	100
5.	HSMC	HHS 203	Organisational Behaviour	3 (3-0-0)	30	20	-	50	50	100
6.	MC (Non-credit)	ECS 205	Cyber Security	2 (2-0-0)	30	20		50	50	100
<b>Total Credit</b>					<b>22</b>					

### SEMESTER IV

Sr. No.	Course Type	Subject Code	Course Title	Credits	Sessional Marks				ESE	Total Mark
					MSE	TA	Lab	Total		
1.	BSC	BCY 202	Modern Analytical Techniques	4 (3-0-2)	15	20	15	50	50	100
2.	BSC	BMA 202	Computer Oriented Numerical Methods	4 (3-0-3)	15	20	15	50	50	100
3.	ESC	TCH 212	Heat Transfer Operations	3 (3-0-0)	30	20	-	50	50	100
4.	PCC	TCH 214	Chemical Engineering Thermodynamics	3 (3-0-0)	30	20	-	50	50	100
5.	PCC	TPL 202	Polymerization Engineering I	5 (3-1-3)	15	20	15	50	50	100
6.	HSMC	HHS 202	Engg Economics & Management	3 (3-0-0)	30	20	-	50	50	100
7.	MC (Non-credit)	HHS 206	Indian Constitution	2 (2-0-0)	30	20	-	50	50	100
<b>Total Credit</b>					<b>22</b>					

### SEMESTER V

Sr. No.	Course Type	Subject Code	Course Title	Credits	Sessional Marks				ESE	Total Mark
					MSE	TA	Lab	Total		
1.	PCC	TCH 315	Mass Transfer Operations	4 (3-1-0)	30	20	-	50	50	100
2.	PCC	TCH 317	Chemical Reaction Engineering	4 (3-1-0)	30	20	-	50	50	100
3.	PCC	TPL 301	Polymer Processing I	3 (3-0-0)	30	20	-	50	50	100
4.	PCC	TPL 303	Rheology & Testing of Polymers	5 (3-0-6)	15	20	15	50	50	100
5.	OEC (Mechanical)	EME 325	Energy Conversion Systems and Devices	3 (3-0-0)	30	20	-	50	50	100
6.	OEC (Humanities)	HHS 341	Entrepreneurship Development	3 (3-0-0)	30	20	-	50	50	100
<b>Total Credit</b>				<b>22</b>						

### SEMESTER VI

Sr. No.	Course Type	Subject Code	Course Title	Credits	Sessional Marks				ESE	Total Mark
					MSE	TA	Lab	Total		
1.	PCC	TCH 316	Instrumentation & Process Control	5 (3-1-3)	15	20	15	50	50	100
2.	PCC	TPL 302	Structure & Property of Polymer	4 (3-1-0)	30	20	-	50	50	100
3.	PCC	TPL 304	Polymer Processing II	5 (3-0-6)	15	20	15	50	50	100
4.	PCC	TPL 306	Polymerization Engineering II	5 (3-0-6)	15	20	15	50	50	100
5.	OEC (Maths)	BMA 342	Operation Research	3 (3-0-0)	30	20	-	50	50	100
<b>Total Credit</b>				<b>22</b>						

### SEMESTER VII

Sr. No.	Course Type	Subject Code	Course Title	Credits (LTP)	Sessional Marks				ESE	Total	
					MSE	TA	Lab	Total			
1.	PCC	TPL 401	Advanced Polymer Materials	4 (3-0-3)	15	20	15	50	50	100	
2.	PEC	PEC-I	PEC-I	3 (3-0-0)	30	20	-	50	50	100	
3.	PEC	PEC-II	PEC-II	2 (2-0-0)	30	20	-	50	50	100	
4.	PEC	PEC-III	PEC-III	2 (2-0-0)	30	20	-	50	50	100	
5.	OEC	OEC-I	OEC-I	3 (3-0-0)	30	20	-	50	50	100	
6.	Industrial Training	TPL 461	Industrial Training	2 (0-0-4)	-	50	-	50	50	100	
7.	Seminar	TPL 471	Seminar	2 (0-0-4)	-	50	-	50	50	100	
8.	Project	TPL 497	Project	4 (0-0-8)	-	50	-	50	50	100	
<b>Total Credit</b>					<b>22</b>						

### SEMESTER VIII

Sr. No.	Course Type	Subject Code	Course Title	Credits	Sessional Marks				ESE	Total	
					MSE	TA	Lab	Total			
1.	PEC	PEC-IV	PEC-IV	3 (2-1-0)	30	20	-	50	50	100	
2.	PEC	PEC-V	PEC-V	3 (3-0-0)	30	20	-	50	50	100	
3.	PEC	PEC-VI	PEC-VI	3 (3-0-0)	30	20	-	50	50	100	
4.	OEC	OEC-II	OEC-II	3 (2-1-0)	30	20	-	50	50	100	
5.	Project	TPL 498	Project	10 (0-0-20)	-	50	-	50	50	100	
<b>Total Credit</b>					<b>22</b>						

**Total Programme Credits :172**

TPL 497 Project will have Internal Evaluation while TPL 498 Project will have External Evaluation.



**Department of Plastic Technology**  
**(to be offered in VII & VIII Semester)**

**Programme Elective-I**

S. No.	Course Code	Course Name	Credits
1	TPL 403	Plastic Product & Mould Design	3 (3-0-0)
2	TPL 405	Polymer Product Technology	3 (3-0-0)

**Programme Elective-II**

1	TPL 407	Technology of Elastomers	2 (2-0-0)
2	TPL 409	Technology of Fibers	2 (2-0-0)

**Programme Elective-III**

1	TPL 411	Polymer Composite	2 (2-0-0)
2	TPL 413	Polymer Blends & Alloys	2 (2-0-0)

**Programme Elective-IV**

1	TCH 422	Process Modeling & Simulation	3 (2-1-0)
2	TCH 424	Process Equipment Design	3 (2-1-0)

**Programme Elective-V**

1	TPL 402	Plastic Packaging & waste Management	3 (3-0-0)
2	TPL 404	Polymer Coating Technology	3 (3-0-0)

**Programme Elective-VI**

1	TPL 406	Polymeric Adhesives & Foams	3 (3-0-0)
2	TPL 408	Polymer Nanocomposites	3 (3-0-0)

**List of Open Electives offered  
by Various Departments in VII & VIII Semester**

**School of Engineering**

<b>Name of Departments</b>	<b>OEC I</b>			<b>OEC II</b>		
Computer Science & Engineering (CS / IT)	OCS 433	Machine Learning	3(3-0-0)	OIT 444	Human Computer Interaction	4(3-1-0)
Electronics Engineering	OET 433	Mobile Communication	3(3-0-0)	OET 444	Image Processing	4(3-1-0)
	OET 435	Biomedical Electronics	3(3-0-0)	OET 446	Fuzzy logic with Electronics Engineering applications	4(3-1-0)
Electrical Engineering	OEE 433	Non-Conventional Energy Sources	3(3-0-0)	OEE 444	Industrial Measurements	4(3-1-0)
	OEE 435	Power Plant Engineering	3(3-0-0)	OEE 446	Industrial Control Systems	4(3-1-0)
Civil Engineering	OCE 433	Environmental Pollution and Management	3(3-0-0)	OCE 444	Introduction to RS and GIS	4(3-1-0)
	OCE 435	Disaster Management	3(3-0-0)	OCE 446	Introduction to Infrastructure Engineering	4(3-1-0)
Mechanical Engineering	OME 433	Solar Energy	3(3-0-0)	OME 444	Alternative Energy Resources	4(3-1-0)
	OME 435	Composite Materials	3(3-0-0)	OME 446	Industrial Engineering & Automation	4(3-1-0)

**School of Chemical Technology**

<b>Name of Departments</b>	<b>OEC I</b>			<b>OEC II</b>		
Chemical Engineering	OCH 433	Energy Resources and Utilization	3(3-0-0)	OCH 446	Air Pollution Monitoring and Control	4(3-1-0)
Bio-Chemical Engineering	OBE 433	Principal of Biochemical Engineering	3(3-0-0)	OCH 444	Transport Phenomenon	3(2-1-0)
Oil Technology	OOT 433	Technology of Oil, Oil Seeds & Surfactants	3(3-0-0)	OCH 444	Transport Phenomenon	3(2-1-0)
Plastic Technology	OPL 433	Introduction to Polymer Technology	3(3-0-0)	OCH 444	Transport Phenomenon	3(2-1-0)
Food Technology	OFT 433	Nutritional aspects of Natural & Processed Foods	3(3-0-0)	OCH 444	Transport Phenomenon	3(2-1-0)
Leather Technology	OLT 433	Introduction to Leather Technology	3(3-0-0)	OCH 444	Transport Phenomenon	3(2-1-0)
Paint Technology	OPT 433	Basic Paint Technology	3(3-0-0)	OCH 444	Transport Phenomenon	3(2-1-0)