

**BIRLA INSTITUTE OF TECHNOLOGY- MESRA, RANCHI**  
**NEWCOURSE STRUCTURE - To be effective from academic session 2018- 19**  
**Based on CBCS & OBE model**

( Chemical Engineering )

Semester/ Session of Study (Recommended)	LEVEL	Category of course	Course Code	Courses	Mode of delivery & credits L-Lecture; T-Tutorial; P-Practicals			Total Credits C- Credits
					L (Periods/ week)	T (Periods/ week)	P (Periods/ week)	C
<b>GRAND TOTAL FOR FIRST YEAR</b>								<b>43.5</b>
<b>THIRD Monsoon</b>	<b>THEORY</b>							
	<b>SECOND</b>	<b>FS</b>	MA203	Numerical Methods	2	0	0	2
	<b>FIRST</b>		CE101	Environmental Sciences	2	0	0	2
	<b>SECOND</b>	<b>PC</b>	CL201	Thermodynamics	3	1	0	4
			CL203	Fluid Mechanics	3	0	0	3
			CL204	Chemical Process Calculations	2	1	0	3
			CL205	Mechanical Operations	3	0	0	3
			CL206	Chemical Principles for Chemical Engineers	2	0	0	2
	<b>LABORATORIES</b>							
	<b>SECOND</b>	<b>GE</b>	IT202	Basic IT Workshop	0	0	2	1
<b>FS</b>		MA204	Numerical Methods Lab	0	0	2	1	
<b>MC</b>		MC201/202/203/204	Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA)	0	0	2	1	
<b>TOTAL</b>								<b>22</b>
<b>FOURTH Spring</b>	<b>THEORY</b>							
	<b>SECOND</b>	<b>GE</b>	IT201	Basics of Intelligent Computing	3	0	0	3
	<b>FIRST</b>	<b>FS</b>	BE101	Biological Science for Engineers	2	0	0	2
	<b>SECOND</b>	<b>PC</b>	CL207	Process Technology & Economics - I	3	0	0	3
			CL208	Heat Transfer Operations	3	1	0	4
			CL209	Mass Transfer Operation - I	3	0	0	3
			CL210	Transport Phenomena	3	0	0	3
	<b>SECOND</b>	<b>OE</b>		Open Elective (OE-I)	3	0	0	3
	<b>LABORATORIES</b>							
	<b>FIRST</b>	<b>GE</b>	EE102	Electrical Engineering Lab	0	0	3	1.5
<b>SECOND</b>	<b>MC</b>	MC205/206/207/208	Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA)	0	0	2	1	
	<b>PC</b>	CL212	Chemical Engineering Lab -I	0	0	4	2	
<b>TOTAL</b>								<b>25.5</b>
<b>FIFTH Monsoon</b>	<b>THEORY</b>							
	<b>FIRST</b>	<b>HSS</b>	MT123	Business Communications	2	0	2	3
	<b>THIRD</b>	<b>PC</b>	CL301	Mass Transfer Operation - II	3	1	0	4
			CL302	Chemical Reaction Engineering-I	3	1	0	4
			CL303	Computer Aided Process Engineering	3	1	0	4
			<b>PE</b>		Program Elective (PE-I)	3	0	0
		<b>OE</b>		Open Elective (OE-II)	3	0	0	3
	<b>LABORATORIES</b>							
<b>THIRD</b>	<b>PC</b>	CL304	Computer Aided Process Engineering Lab.	0	0	4	2	
		CL305	Chemical Engineering Lab -II	0	0	4	2	

								<b>25</b>
<b>SIXTH Spring</b>	<b>THEORY</b>							
	<b>THIRD</b>	<b>PC</b>	CL306	Chemical Reaction Engineering - II	3	0	0	3
			CL307	Process Technology & Economics - II	3	0	0	3
			CL308	Process Control & Instrumentation	3	0	0	3
			CL309	Material Science & Engineering	3	0	0	3
	<b>PE</b>		Program Elective (PE-II)	3	0	0	3	
<b>MC</b>	MC300	Summer Training - Mandatory	N/A			3		
<b>LABORATORIES</b>								
	<b>THIRD</b>	<b>PC</b>	CL310	Design Lab	0	0	3	1.5
			CL311	Chemical Engineering Lab - III	0	0	4	2
<b>TOTAL</b>								<b>21.5</b>
<b>THEORY</b>								
<b>SEVENTH Monsoon</b>	<b>FOURTH</b>	<b>HSS</b>	CL406	Professional Practice, Law and Ethics	2	0	0	2
		<b>PE</b>		Program Elective (PE-III)	3	0	0	3
				Program Elective (PE-IV)	3	0	0	3
		<b>OE</b>		Open Elective (OE-III)/MOOC-I	3	0	0	3
			Open Elective (OE-IV)/MOOC - II	3	0	0	3	
<b>SECOND</b>	<b>MC</b>	MT204	Constitution of India	2	0	0	NC	
<b>LABORATORIES</b>								
	<b>FOURTH</b>	<b>PC</b>	CL401	Process Control & Instrumentation Lab	0	0	3	1.5
			CL403	Plant Design	0	0	4	2
<b>TOTAL</b>								<b>17.5</b>
<b>EIGHTH Spring</b>	<b>FOURTH</b>	<b>PC</b>	CL 400	Research Project / Industry Internship	<b>Total</b>			<b>12</b>
<b>GRAND TOTAL</b>								<b>167</b>

DEPARTMENT OF CHEMICAL ENGINEERING PROGRAMME ELECTIVES (PE)** OFFERED FOR LEVEL 1-4								
PE / LEVEL		Code no.	Name of the PE courses	Prerequisites courses with code	L	T	P	C
3	PE 1	CL321	Petroleum Refinery Engineering & Petrochemicals	CH101, PH101, CL209	3	0	0	3
3		CL322	Energy Engineering	CL201, CL311	3	0	0	3
3		CL323	Pollution Control Equipment Design	CL209, CL208, CL203	3	0	0	3
3		CL324	Analytical Instrumental Methods	CH101, PH101	3	0	0	3
3		CL325	Fibre Science and Technology	CH101, PH101				
3		CL326	Environment and Plastics	CH101, PH101	3	0	0	3
3		CL327	Introduction to Microelectronics Fabrication	CH101, PH101	3	0	0	3
3	PE 2	CL331	Process Modelling, Simulation & Optimization	CH101, PH101, MA103, CL210	3	0	0	3
3		CL332	Safety & Hazards in Process Industries	CL322 ,CH 101, PH101	3	0	0	3
3		CL333	Fluid-Solid Operation	CH101 PH101, CL205 , CL203	3	0	0	3
3		CL334	Reservoir Engineering	CL203	3	0	0	3
3		CL335	Biomaterials	CH101, PH101	3	0	0	3
3		CL336	Rubber Product Technology	CH101, PH101	3	0	0	3
4	PE 3	CL411	Polymer Technology	CH101, PH101	3	0	0	3
4		CL412	Colloid & Interfacial Science	CH101, PH101, CL209	3	0	0	3
4		CL413	Fundamentals of Molecular Simulation	CH101, PH101, CS101, MA117	3	0	0	3
4		CL414	Fertilizer Technology	CH101, PH101	3	0	0	3
4		CL415	Polymer Blends and Alloys	CH101, PH101	3	0	0	3
4		CL416	Paints and Surface Coating Technology	CH101, PH101	3	0	0	3
4	PE 4	CL421	Fine Chemicals	CH101, PH101	3	0	0	3
4		CL422	Polymer Composite	CH101, PH101	3	0	0	3
4		CL423	Membrane Science & Technology	CH101, PH101, CL209, CL203	3	0	0	3
4		CL424	Microfluidics	CL203	3	0	0	3
4		CL425	Plastic Packaging Technology	CH101, PH101	3	0	0	3

\*\* PROGRAMME ELECTIVES TO BE OPTED ONLY BY THE DEPARTMENT STUDENTS

**DEPARTMENT OF CHEMICAL ENGINEERING  
OPEN ELECTIVES (OE)\*  
OFFERED FOR LEVEL 1-4**

<b>OE / LEVEL</b>	<b>Code no.</b>	<b>Name of the PE courses</b>	<b>Pre-requisites</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
OE/3	CL322	Energy Engineering	NIL	3	0	0	3
OE/3	CL332	Safety & Hazards in Process Industries	NIL	3	0	0	3
OE/3	CL335	Biomaterials	NIL	3	0	0	3
OE/3	CL327	Introduction to Microelectronics Fabrication	NIL	3	0	0	3
OE/4	CL422	Polymer Composite	NIL	3	0	0	3
OE/4	CL421	Fine Chemicals	NIL	3	0	0	3
OE/4	CL411	Polymer Technology	NIL	3	0	0	3

**\* OPEN ELECTIVES TO BE OPTED ONLY BY OTHER DEPARTMENT STUDENTS**

**BIRLA INSTITUTE OF TECHNOLOGY - MESRA, RANCHI**  
**NEW COURSE STRUCTURE - To be effective from academic session 2018-2019**  
**Based on CBCS & OBE model**  
**Recommended scheme of study for**  
***In-depth Specialization in Process Engineering, Modelling and Optimization***

Students who have registered for **B. Tech in Chemical Engineering** should complete 20 credits opting courses listed below. The credits shall be over and above minimum requirement for degree award. Courses shall be selected from single specialization area only.

Semester/Session of Study (Recommended)	Course Level	Category of course	Course Code	Courses	Mode of delivery & credits			Total Credits C - Credits		
					L- Lecture; T-Tutorial; P-Practical					
					L	T	P			
<b>THEORY</b>										
FIFTH Monsoon	Third	DS	CL361	Multiphase flow	3	0	0	3		
			CL363	Advanced Molecular Simulation	3	0	0	3		
		<b>LABORATORY</b>								
		DS	CL364	Chemical Technology Lab	0	0	3	1.5		
<b>TOTAL</b>										
<b>7.5</b>										
<b>THEORY</b>										
SIXTH Spring	Third	DS	CL507	Advanced Process Modelling, Simulation & Optimization	3	0	0	3		
			CL514	Computational Fluid Dynamics	3	0	0	3		
		<b>LABORATORY</b>								
		DS	CL365	Energy Engineering Lab	0	0	3	1.5		
<b>TOTAL</b>										
<b>7.5</b>										
<b>THEORY</b>										
SEVENTH Monsoon	Fourth	DS	CL614	Process Integration	3	0	0	3		
		<b>LABORATORY</b>								
		DS	CL426	Mini Project	0	0	4	2		
<b>TOTAL</b>										
<b>5</b>										
<b>GRAND TOTAL</b>										
<i>Minimum requirement for in-depth specialization award</i>										
<b>20</b>										

**BIRLA INSTITUTE OF TECHNOLOGY - MESRA, RANCHI**  
**NEW COURSE STRUCTURE - To be effective from academic session 2018-2019**  
**Based on CBCS & OBE model**  
**Recommended scheme of study for**  
***In-depth Specialization in Polymer Processing***

Students who have registered for **B. Tech in Chemical Engineering** should complete 20 credits opting courses listed below. The credits shall be over and above minimum requirement for degree award. Courses shall be selected from single specialization area only.

Semester/Session of Study (Recommended)	Course Level	Category of course	Course Code	Courses	Mode of delivery & credits			L- C - Credits		
					Lecture	T-Tutorial	P-Practical			
					L	T	P	C		
<b>THEORY</b>										
FIFTH Monsoon	Third	DS	CL632	Polymer Physics	3	0	0	3		
			CL633	Polymer Product Manufacturing Technology	3	0	0	3		
		<b>LABORATORY</b>								
		DS	CL374	Polymer Rheology Lab	0	0	3	1.5		
<b>TOTAL</b>										
<b>7.5</b>										
<b>THEORY</b>										
SIXTH Spring	Third	DS	CL373	Adhesive Technology	3	0	0	3		
		<b>LABORATORY</b>								
		DS	CL375	Polymer Synthesis Lab	0	0	3	1.5		
<b>TOTAL</b>										
<b>4.5</b>										
<b>THEORY</b>										
SEVENTH Monsoon	Fourth	DS	CL634	Polymer Rheology	3	0	0	3		
			CL635	Die and Mould Design	3	0	0	3		
		<b>LABORATORY</b>								
		DS	CL427	Mini Project	0	0	4	2		
<b>TOTAL</b>										
<b>8</b>										
<b>GRAND TOTAL</b>										
<i>Minimum requirement for in-depth specialization award</i>										
<b>20</b>										

**BIRLA INSTITUTE OF TECHNOLOGY - MESRA, RANCHI**  
**NEW COURSE STRUCTURE - To be effective from academic session 2018-2019**  
**Based on CBCS & OBE model**  
**Recommended scheme of study for**  
**Minor in Chemical Engineering**  
*(Offered ONLY to OTHER department students)*

Students who have registered for **B. Tech Minor in Chemical Engineering** should complete 20 credits and shall opt for courses listed below. Courses shall be selected from single specialisation area only.

Semester/Session of Study (Recommended)	Course Level	Category of course	Course Code	Courses	Mode of delivery & credits			Total Credits C - Credits
					Lecture; T-Tutorial; P-Practical	L	T	
<b>THEORY</b>								
FIFTH Monsoon	Second	PC	CL216	Unit Operation-I	3	0	0	3
	Third	PE*	CL321	Petroleum Refinery Engineering & Petrochemicals	3	0	0	3
			CL322	Energy Engineering	3	0	0	3
			CL323	Pollution Control Equipment Design	3	0	0	3
<b>TOTAL</b>								<b>9</b>
<b>THEORY</b>								
SIXTH Spring	Second	PC	CL217	Unit Operation-II	3	1	0	4
	Third	PE	CL332	Safety & Hazards in Process Industries	3	0	0	3
<b>TOTAL</b>								<b>7</b>
<b>THEORY</b>								
SEVENTH Monsoon	Second	PC	CL218	Unit Operation-III	3	1	0	4
<b>TOTAL</b>								<b>4</b>
<b>GRAND TOTAL</b>								<b>20</b>
<i>Minimum requirement for minor degree award</i>								

\* Two courses out of three are compulsory.

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**NEW COURSE STRUCTURE - To be effective from academic session 2018-2019**  
**Based on CBCS & OBE model**  
**Recommended scheme of study for**  
**Minor in Polymer Engineering**  
*(Offered ONLY to OTHER department students)*

Students who have registered for *B. Tech Minor in Polymer Engineering* should complete 20 credits and shall opt for courses listed below. Courses shall be selected from single specialisation area only.

Semester/Session of Study (Recommended)	Course Level	Category of course	Course Code	Courses	Mode of delivery & credits			Total Credits C - Credits
					Lecture; T-Tutorial; P-Practical	L	T	
<b>THEORY</b>								
FIFTH Monsoon	Third	PC	CL312	Polymer Processing	4	0	0	4
	Second		CL219	Polymer Synthesis and Reaction Engineering	3	0	0	3
<b>TOTAL</b>								7
<b>THEORY</b>								
SIXTH Spring	Third	PE	CL335	Biomaterials	3	0	0	3
			CL336	Rubber Product Technology	3	0	0	3
<b>TOTAL</b>								6
<b>THEORY</b>								
SEVENTH Monsoon	Fourth	PE	CL411	Polymer Technology	4	0	0	4
			CL415	Polymer Blends and Alloys	3	0	0	3
		PE*	CL422	Polymer Composite	3	0	0	3
			CL425	Plastic Packaging Technology	3	0	0	3
<b>TOTAL</b>								7
<b>GRAND TOTAL</b>								20
<i>Minimum requirement for minor degree award</i>								

\* One course out of three are compulsory.