

**BIRLA INSTITUTE OF TECHNOLOGY- MESRA, RANCHI**  
**NEW COURSE STRUCTURE - To be effective from academic session 2018- 19**  
*Based on CBCS & OBE model*  
**Recommended scheme of study for M.Tech Programme in Biotechnology**

Semester / Session of Study (Recommended)	Level	Category of course	Course Code	Course	Mode of delivery & credits <i>L-Lecture; T-Tutorial; P-Practicals</i>			Total Credits <i>C- Credits</i>		
					L (Periods/ week)	T (Periods/ week)	P (Periods/ week)	C		
<b>THEORY</b>										
<b>FIRST / Monsoon</b>	<b>FIFTH</b>	Programme Core (PC)	BE501	Advanced Bioprocess Engineering	3	0	0	3		
			BE502	r-DNA Tech. & Genetic Engineering	3	0	0	3		
			BE503	Advanced Reaction Engineering	3	0	0	3		
		Programme Elective (PE)		PE SUBJECT 1	3	0	0	3		
		Open elective (OE)		OE SUBJECT 1	3	0	0	3		
		<b>LABORATORIES</b>								
		Programme Core (PC)	BE504	Bioprocess Engineering Lab	0	0	4	2		
			BE505	r-DNA Technology Lab	0	0	4	2		
<b>TOTAL</b>								<b>19</b>		
<b>THEORY</b>										
<b>SECOND/ Spring</b>	<b>FIFTH</b>	Programme Core (PC)	BE506	Bioprocess Plant Design	3	0	0	3		
			BE507	Advanced Bioseparation Engineering	3	0	0	3		
			BE508	Biophysics	3	0	0	3		
		Programme Elective (PE)		PE SUBJECT 2	3	0	0	3		
		Open Elective (OE)		OE SUBJECT 2	3	0	0	3		
		<b>LABORATORIES</b>								
		Programme Core (PC)	BE509	Bioprocess Plant Design Lab	0	0	4	2		
			BE510	Bioseparation Engineering Lab	0	0	4	2		
<b>TOTAL</b>								<b>19</b>		
<b>TOTAL FOR FIFTH LEVEL</b>								<b>38</b>		
<b>THEORY</b>										
<b>THIRD / Monsoon</b>	<b>SIXTH</b>	Programme Core (PC)	BE601	IPR, Biosafety & Bioethics	3	0	0	3		
			BE600	Thesis Part I				8		
		Programme Elective (PE)		Programme Elective 3	3	0	0	3		
		<b>LABORATORIES</b>								
		Programme Core (PC)		(Based on Elective Specialization)	0	0	4	2		
<b>TOTAL</b>								<b>16</b>		
<b>FOURTH/ Spring</b>		Programme Core (PC)	BE650	Thesis Part II				16		
		<b>TOTAL</b>								<b>16</b>
<b>TOTAL FOR SIXTH LEVEL</b>								<b>32</b>		
<b>GRAND TOTAL FOR M.TECH PROGRAMME (38 + 32)</b>								<b>70</b>		

**DEPARTMENT OF BIO-ENGG.**  
**PROGRAMME ELECTIVES (PE) for M.Tech Biotechnology**  
**OFFERED FOR LEVEL 5-6**

PE / LEVEL	Code no.	Name of the PE courses	Prerequisites/Corequisites courses with code	L	T	P	C
<b>Programme Elective - I</b>							
PE/5 (MO)	BE511	Environmental Biotechnology	NIL	3	0	0	3
PE/5 (MO)	BE512	Modern Methods of Instrumentation	NIL	3	0	0	3
PE/5 (MO)	BE513	Animal Cell Culture	NIL	3	0	0	3
PE/5 (MO)	BE514	Cell signaling and Electrophysiology	NIL	3	0	0	3
<b>Programme Elective - II</b>							
PE/5 (SP)	BE515	Process Biotechnology	BE501	3	0	0	3
PE/5 (SP)	BE516	Stem Cells & Tissue Engineering	BE502	3	0	0	3
PE/5 (SP)	BE517	Protein Engineering	BE502	3	0	0	3
PE/5 (SP)	BE518	Biomedical Instrumentation	BE514	3	0	0	3
<b>Programme Elective - III</b>							
PE/6 (MO)	BE602	Advances in Nanobiotechnology	NIL	3	0	0	3
PE/6 (MO)	BE603	Metabolic Engineering	NIL	3	0	0	3
PE/6 (MO)	BE604	Biosimulation and Modelling	NIL	3	0	0	3
PE/6 (MO)	BE605	Neuromuscular Rehabilitation Engineering	NIL	3	0	0	3
PE/6 (MO)	BE606	Process Biotechnology Lab	BE515	3	0	0	3
PE/6 (MO)	BE607	Animal Cell Technology Lab	BE513	3	0	0	3
PE/6 (MO)	BE608	Biomedical Instrumentation Lab	BE518	3	0	0	3

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

**DEPARTMENT OF BIO-ENGINEERING**  
**OPEN ELECTIVES (OE)\* FOR M.TECH/M.Pharm/M.Sc LEVEL**  
**OFFERED FOR LEVEL 5-6**

<b>OE / LEVEL</b>	<b>Code no.</b>	<b>Name of the OE courses</b>	<b>Prerequisites/Corequisites courses with code</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
OE/5 (MO)	BE508	Biophysics	NIL	3	0	0	3
OE/5 (MO)	BE511	Environmental Biotechnology	NIL	3	0	0	3
OE/5 (MO)	BE514	Cell signalling and Electrophysiology	NIL	3	0	0	3
			NIL				
OE/5 (SP)	BE515	Process Biotechnology	NIL	3	0	0	3
OE/5 (SP)	BE516	Stem Cells & Tissue Engineering	NIL	3	0	0	3
OE/5 (SP)	BE518	Biomedical Instrumentation	NIL	3	0	0	3
OE/6 (MO)	BE602	Advanced Nanobiotechnology	NIL	3	0	0	3
OE/6 (MO)	BE604	Biosimulation and Modelling	NIL	3	0	0	3

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