

**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.Sc 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
FIRST / Monsoon	FOURTH	<b>THEORY</b>						
		Programme Core (PC)	BT401	Molecular Cell Biology	3	0	0	3
			BT402	Metabolism and Bioenergetics	3	0	0	3
			BT403	Applied Microbiology	3	0	0	3
			BT404	Mathematics and Statistics for Biologists	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)	BT405	Cell Biology and Biochemistry Lab	0	0	4	2
			BT406	Microbiology Lab	0	0	4	2
		PE		Lab based on PE 1	0	0	4	2
		<b>TOTAL</b>						
SECOND/ Spring	FOURTH	<b>THEORY</b>						
		Programme Core (PC)	BT415	Molecular biology & Recombinant DNA Technology	3	0	0	3
			BT416	Enzyme and Bioprocess Technology	3	0	0	3
			BT417	Bioinformatics	3	0	0	3
			BT418	Analytical Techniques in Biotechnology	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)	BT419	Enzyme and Bioprocess Technology Lab	0	0	4	2
			BT420	Genomics and r-DNA Technology Lab	0	0	4	2
		PE		Lab Based on PE 2	0	0	4	2
		<b>TOTAL</b>						
<b>TOTAL FOR THIRD LEVEL</b>							<b>48</b>	

		<b>THEORY</b>							
<b>THIRD / Monsoon</b>	<b>FIFTH</b>	Programme Core (PC)	BT501	Immunotechnology	3	1	0	4	
			BT502	Environmental Biotechnology	3	0	0	3	
			BT503	Biosafety, Bioethics & IPR	3	0	0	3	
			BT504	Molecular Genetics & Pharmacogenomics	3	0	0	3	
		Programme Elective (PE)		PE SUBJECT 3	3	0	0	3	
		<b>LABORATORIES</b>							
		Programme Core (PC)	BT505	Immunotechnology Lab	0	0	4	2	
			BT506	Environmental Biotechnology Lab	0	0	4	2	
		Research Project (RP)	BT500	Dissertation Part I				4	
		<b>TOTAL</b>							<b>24</b>
<b>FOURTH/ Spring</b>	<b>FIFTH</b>	Research Project (RP)	BT550	Dissertation Part II			8		
		<b>TOTAL</b>							<b>8</b>
<b>TOTAL FOR FOURTH LEVEL</b>							<b>32</b>		
<b>GRAND TOTAL FOR M.Sc PROGRAMME (48 + 32)</b>							<b>80</b>		

**DEPARTMENT OF BIO-ENGINEERING**  
**PROGRAM ELECTIVES (PE) FOR M.Sc LEVEL**  
**OFFERED FOR LEVEL 4-5**

PE / LEVEL	Code no.	Name of the PE courses	Prerequisites/Corequisites courses with code	L	T	P	C
<b>Programme Elective -I</b>							
PE/4 (MO)	BT407	Genomics	NIL	3	0	0	3
PE/4 (MO)	BT408	Genomics Lab	NIL	0	0	4	2
PE/4 (MO)	BT409	Industrial Biotechnology	NIL	3	0	0	3
PE/4 (MO)	BT410	Industrial Biotechnology Lab	NIL	0	0	4	2
PE/4 (MO)	BT411	Molecular Plant Physiology	NIL	3	0	0	3
PE/4 (MO)	BT412	Molecular Plant Physiology Lab	NIL	0	0	4	2
PE/4 (MO)	BT413	Biosignal Acquisition System	NIL	3	0	0	3
PE/4 (MO)	BT414	Biosignal Acquisition System Lab	NIL	0	0	4	2
<b>Programme Elective -II</b>							
PE/4 (SP)	BT421	Proteomics	BT405	3	0	0	3
PE/4 (SP)	BT422	Proteomics Lab	NIL	0	0	4	2
PE/4 (SP)	BT423	Animal Biotechnology	NIL	3	0	0	3
PE/4 (SP)	BT424	Animal Cell Technology Lab	NIL	0	0	4	2
PE/4 (SP)	BT425	Plant Biotechnology	BT409	3	0	0	3
PE/4 (SP)	BT426	Plant Biotechnology Lab	NIL	0	0	4	2
PE/4 (SP)	BT427	Biomedical Instrumentation	BT411	3	0	0	3
PE/4 (SP)	BT428	Biomedical Instrumentation Lab	NIL	0	0	4	2
PE/4 (SP)	BT429	Concepts in Nanobiotechnology	NIL	3	0	0	3
PE/4 (SP)	BT430	Basic Nanobiotechnology lab	NIL	0	0	4	2
<b>Programme Elective -III</b>							
PE/5 (MO)	BT508	Metabolomics	BT407, BT421	3	0	0	3
PE/5 (MO)	BT509	Down Stream Processing	BT409	3	0	0	3
PE/5 (MO)	BT510	Biotechnology Entrepreneurship	NIL	3	0	0	3
PE/5 (MO)	BT511	Imaging Concept & Devices	BT413, BT427	3	0	0	3

**DEPARTMENT OF BIO-ENGINEERING**  
**OPEN ELECTIVES (OE)\* FOR M.Sc LEVEL**  
**OFFERED FOR LEVEL 4-5**

OE / LEVEL	Code no.	Name of the OE courses	Prerequisites/Corequisites courses with code	L	T	P	C
<b>OE -I</b>							
OE/4 (MO)	BT407	Genomics	NIL	3	0	0	3
OE/4 (MO)	BT409	Industrial Biotechnology	NIL	3	0	0	3
	BT417	Bioinformatics	NIL	3	0	0	3
<b>OE -II</b>							
OE/4 (SP)	BT427	Biomedical Equipment & Devices	NIL	3	0	0	3
OE/4 (SP)	BT428	Concepts in Nanobiotechnology	NIL	3	0	0	3

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