

BIRLA INSTITUTE OF TECHNOLOGY- MESRA, RANCHI
NEWCOURSE STRUCTURE - To be effective from academic session 2018- 19
Based on CBCS & OBE model
Recommended scheme of study
B. Tech (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 <i>(Periods/ week)</i>	T <i>(Periods/ week)</i>	P <i>(Periods/ week)</i>	C
GRAND TOTAL FOR FIRST YEAR								43.5
THIRD Monsoon	THEORY							
	SECOND	FS	MA203	Numerical Methods	2	0	0	2
	FIRST		CE101	Environmental Sciences	2	0	0	2
	SECOND	PC	BE202	Cell and Molecular Biology	3	0	0	3
			BE203	Microbiology	3	0	0	3
			BE204	Biochemistry and Enzyme Technology	3	0	0	3
			BE205	Basics of Bioinformatics	3	1	0	4
			BE206	Chemical Process Calculations	3	0	0	3
	LABORATORIES							
	SECOND	GE	IT202	Basic IT Workshop	0	0	2	1
		FS	MA204	Numerical Methods Lab	0	0	2	1
		MC	MC201/202/203/204	Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA)	0	0	2	1
PC		BE207	Cell Biology and Biochemistry Lab.	0	0	3	1.5	
TOTAL								24.5
FOURTH Spring	THEORY							
	SECOND	GE	IT201	Basics of Intelligent Computing	3	0	0	3
	FIRST	FS	BE101	Biological Science for Engineers	2	0	0	2
	SECOND	PC	BE208	Biology of Immune System	3	0	0	3
			BE209	Fluid Mechanics & Heat Transfer	3	0	0	3
			BE210	Thermodynamics of Chemical & Biological Systems	3	0	0	3
		PE		Programme Elective -I	3	0	0	3
		OE		Open Elective – I	3	0	0	3
	LABORATORIES							
	FIRST	GE	EE102	Electrical Engineering Lab	0	0	3	1.5
	SECOND	MC	MC205/206/207/208	Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA)	0	0	2	1
		PC	BE211	Microbiology and Immunology Lab.	0	0	3	1.5
BE212			Fluid Mechanics & Heat Transfer Lab	0	0	3	1.5	
TOTAL								25.5

		THEORY							
FIFTH Monsoon	FIRST	HSS	MT123	Business Communications	2	0	2	3	
	THIRD	PC	BE301	Bio-analytical techniques	3	0	0	3	
			BE302	Functional Genomics and rDNA Technology	3	0	0	3	
			BE303	Mass Transfer Operations	3	0	0	3	
			BE304	Reaction Engineering	3	0	0	3	
		PE		Programme Elective -II	3	0	0	3	
		OE		Open Elective - II	3	0	0	3	
	LABORATORIES								
	THIRD	PC	BE305	Molcular Biology & rDNA Technology Lab	0	0	3	1.5	
			BE306	Bio-analytical Lab.	0	0	3	1.5	
TOTAL								24	
		THEORY							
SIXTH Spring	THIRD	PC	BE307	Bioprocess Engineering	3	0	0	3	
			BE308	Bioseparation Engineering	3	0	0	3	
			BE309	Fermentation Engineering	3	0	0	3	
		PE		Programme Elective -III	3	0	0	3	
		OE		Open Elective - III/MOOC I	3	0	0	3	
	MC	MC300	Summer Training	N/A			3		
	LABORATORIES								
THIRD	PC	BE310	Bioprocess Engineering Lab.	0	0	3	1.5		
		BE311	Mass Transfer and Bioseparation Engg. Lab	0	0	3	1.5		
TOTAL								21	
		THEORY							
SEVENTH Monsoon	FOURTH	HSS	BE401	Professional Practice, Law and Ethics	2	0	0	2	
		PC	BE402	Bioreactor and Bioprocess design	3	1	0	4	
		PC	BE403	Plant & Agriculture Biotechnology	3	0	0	3	
		PE		Programme Elective -IV	3	0	0	3	
		OE		Open Elective- IV/ MOOC II	3	0	0	3	
	SECOND	MC	MT204	Constitution of India	2	0	0	NC	
	LABORATORIES								
FOURTH	PC	BE404	Plant Cell Technology Lab.	0	0	3	1.5		
TOTAL								16.5	
EIGHT Spring	FOURTH	PC	BE400	Research Project / Industry Internship	Total			12	
GRAND TOTAL Minimum requirement for Degree award								167	

DEPARTMENT OF BIOENGG.
PROGRAMME ELECTIVES (PE)*B.Tech Biotechnology
OFFERED FOR LEVEL 1-4

PE / LEVEL		Code no.	Name of the PE courses	Prerequisites/Corequisites courses with code	L	T	P	C
2	PE 1	BE213	Pharmaceutical Biotechnology	BE202, BE204	3	0	0	3
		BE214	Natural Product Biotechnology	BE202, BE204	3	0	0	3
		BE215	Cellular Electrophysiology	EC101, BE202	3	0	0	3
		BE216	Enzyme Technology	BE202, BE204	3	0	0	3
3	PE 2	BE312	Biomaterials	BE204	3	0	0	3
		BE313	Metabolic Engineering	BE202, BE204	3	0	0	3
		BE314	Biosignal acquisition and analysis	EC101, BE215	3	0	0	3
		BE315	Food Science and Technology	BE204	3	0	0	3
		BE316	Bioinformatics Algorithms	BE205	3	0	0	3
3	PE 3	BE317	Stem cell and Tissue Engineering	BE202, BE204, BE302	3	0	0	3
		BE318	Bioenergy and Biofuels	BE202, BE209, BE303	3	0	0	3
		BE319	Bioelectronics–Concept & Instrumentation	BE314	3	0	0	3
		BE320	Biotreatment of Municipal and Industrial wastes	CE101, BE303	3	0	0	3
		BE321	Cheminformatics	BE204, BE205, BE304	3	0	0	3
4	PE 4	BE407	Nanobiotechnology		3	0	0	3
		BE408	Mineral Biotechnology		3	0	0	3
		BE409	Rehabilitation Engineering		3	0	0	3
		BE410	Process Measurement and Control	EC101, BE307	3	0	0	3
		BE411	Molecular Modelling and Drug Design	BE205	3	0	0	3
		BE412	Process Biotechnology	BE307	3	0	0	3

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

**DEPARTMENT OF BIO-ENGG.
OPEN ELECTIVES (OE)*
OFFERED FOR LEVEL 1-4**

OE / LEVEL	Code no.	Name of the PE courses	Prerequisites/Corequisites courses with code	L	T	P	C
OE/2	BE203	Microbiology	NIL	3	0	0	3
OE/2	BE204	Biochemistry and Enzyme Technology	NIL	3	0	0	3
OE/2	BE205	Basics of Bioinformatics	NIL	3	0	0	3
OE/2	BE213	Pharmaceutical Biotechnology	NIL	3	0	0	3
OE/3	BE316	Bioinformatics Algorithms	NIL	3	0	0	3
OE/3	BE319	Bioelectronics–Concept & Instrumentation	NIL	3	0	0	3
OE/3	BE320	Biotreatment of Municipal and Industrial wastes	NIL	3	0	0	3
OE/4	BE407	Nanobiotechnology	NIL	3	0	0	3
OE/4	BE411	Molecular Modelling and Drug Design	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- 19
Based on CBCS & OBE model
Recommended scheme of study
Biotechnology Minor to B.Tech (Other than Biotechnology)

Semester/ Session of Study (Recommended)	Course Level	Category of Course	Course Code	Courses	Prerequisite/ Corequisite	Mode of delivery & credits <i>L-Lecture; T-Tutorial; P-Practicals</i>			Total Credits <i>C- Credits</i>
						L <i>(Periods/w eek)</i>	T <i>(Periods/w eek)</i>	P <i>(Periods/w eek)</i>	C
THEORY									
Fifth Monsoon	Second	PC	BE202	Cell & Molecular Biology		3	0	0	3
	Third	PC	BE322	Biochemistry & Microbiology		3	1	0	4
TOTAL									7
Sixth Spring	Second	PC	BE213	Pharmaceutical Biotechnology	BE202	3	1	0	4
	Third	PC	BE307	Bioprocess Engineering	BE322	3	0	0	3
TOTAL									7
Seventh Monsoon	Fourth	PC	BE412	Process Biotechnology	BE307	3	0	0	3
	Fourth	PC	BE415	Basic Biotechnology Lab	BE322	0	0	3	1.5
	Fourth	PC	BE416	Process Biotechnology Lab	BE322	0	0	3	1.5
TOTAL									6
GRAND TOTAL CREDITS (Minimum requirement for minor degree award)									20

BIRLA INSTITUTE OF TECHNOLOGY- MESRA, RANCHI
NEWCOURSE STRUCTURE - To be effective from academic session 2018- 19
Based on CBCS & OBE model, Recommended scheme of study for
In-depth Specialization in Computational Biotechnology with B. Tech (Biotechnology)

Level (Recommended)	Course Code	Course	Prerequisite/ Corequisite	Mode of delivery & credits <i>L-Lecture; T-Tutorial; P-Practicals</i>			Total Credits <i>C- Credits</i>
				L <i>(Periods/ week)</i>	T <i>(Periods/ week)</i>	P <i>(Periods/ week)</i>	C
THIRD	THEORY						
	BE316	Bioinformatics Algorithms		3	0	0	3
	BE328	Molecular Simulation of Biomolecules		3	1	0	4
	BE329	Perl & Bioperl Programming		3	1	0	4
	BE321	Cheminformatics	BE205	3	0	0	3
BE330	Biosequence analysis and Programming lab	BE328, BE329	0	0	3	1.5	
FOURTH	BE415	System Biology	BE204, BE205	3	0	0	3
	BE417	Molecular modelling & Drug Design Lab	BE321, BE328	0	0	3	1.5
TOTAL CREDITS							20

BIRLA INSTITUTE OF TECHNOLOGY- MESRA, RANCHI
NEW COURSE STRUCTURE - To be effective from academic session 2018- 19
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Recommended scheme of study

Biomedical Medical Instrumentation Minor to B.Tech (Other than Biotechnology)

Semester/ Session of Study (Recommended)	Course Level	Category of Course	Course Code	Courses	Prerequisite/ Corequisite	Mode of delivery & credits <i>L-Lecture; T-Tutorial; P-Practicals</i>			Total Credits <i>C- Credits</i>
						L <i>(Periods/w week)</i>	T <i>(Periods/w week)</i>	P <i>(Periods/w week)</i>	C
THEORY									
Fifth Monsoon	Third	PC	BE322	Biosignal Acquisition and Analysis	NIL	3	0	0	3
		PC	BE323	Applied Anatomy and Physiology	NIL	3	0	0	3
	Third	PC	BE324	Electrophysiology Lab	NIL	0	0	3	1.5
TOTAL									7.5
Sixth Spring	Third		BE325	Medical Electronics and Device	BE322	3	0	0	3
	Third	PC	BE326	Imaging techniques in healthcare	BE322	3	0	0	3
	Third	PC	BE327	Signal Processing Lab	BE324	0	0	3	1.5
TOTAL									7.5
Seventh Monsoon	Fourth	PC	BE413	Biomechanical systems and Rehabilitation Engineering	BE325	3	0	0	3
	Fourth	PC	BE414	Health Informatics and Telemedicine	NIL	3	0	0	3
TOTAL									6
GRAND TOTAL CREDITS									21
(Minimum requirement for minor degree award)									