

BIRLA INSTITUTE OF TECHNOLOGY- MESRA, RANCHI
NEWCOURSE STRUCTURE - To be effective from academic session 2021- 22
Based on CBCS system & OBE model
Recommended scheme of study
(For Non-Circuit Branches)

Course Level	Semester of Study (Recommended)	Course Code	Subjects	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/w eek)</i>	P <i>(Periods/w eek)</i>	C
FIRST	FS	MA103	Mathematics - I	3	1	0	4
		PH113	Physics	3	1	0	4
		BE101	Biological Science for Engineers	2	0	0	2
	GE	EE101	Basic Electrical Engineering	3	1	0	4
		CS101	Programming for Problem Solving	3	1	0	4
	HSS	MT132	Communication Skills - I	0	0	3	1.5
	LABORATORIES						
	FS	PH114	Physics Lab	0	0	3	1.5
	GE	CS102	Programming for Problem Solving Lab	0	0	3	1.5
		PE101	Workshop Practice	0	0	3	1.5
	MC	MC101/102 /103/104	Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA)	0	0	2	1
25							
SECOND	FS	MA107	Mathematics - II	3	1	0	4
		CH101	Chemistry	3	1	0	4
		CE101	Environmental Science	2	0	0	2
	GE	ME101	Basics of Mechanical Engineering	3	1	0	4
		EC101	Basics of Electronics and Communication Engineering	3	1	0	4
	LABORATORIES						
	FS	CH102	Chemistry Lab	0	0	3	1.5
	GE	EC102	Electronics and Communication Lab	0	0	3	1.5
		ME102	Engineering Graphics	0	0	4	2
	MC	MC105/106 /107/108	Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA)	0	0	2	1
24							

THIRD	THEORY						
	FS	MA203	Numerical Methods	2	0	0	2
	HSS	MT131	UHV2: Understanding Harmony	3	0	0	3
	PC	BE202	Cell and Molecular Biology	3	0	0	3
		BE203	Microbiology	3	0	0	3
		BE204R1	Biochemistry and Enzyme Technology	3	0	0	3
		BE205	Basics of Bioinformatics	3	0	0	3
		BE206	Chemical Process Calculations	3	0	0	3
	LABORATORIES						
	PC	BE207	Cell Biology and Biochemistry Lab	0	0	3	1.5
	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	
TOTAL						23.5	
FOURTH	THEORY						
	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
			Programme Elective -II	3	0	0	3
	OE		Open Elective-I/ MOOC	3	0	0	3
	LABORATORIES						
	PC	BE211	Microbiology and Immunology Lab.	0	0	3	1.5
		BE212	Fluid Mechanics & Heat Transfer Lab	0	0	3	1.5
	GE	EE102	Electrical Engg. Laboratories	0	0	3	1.5
MC	MC205/206 /207/208	Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA)	0	0	2	1	
TOTAL						23.5	

FIFTH			THEORY				
	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 -III	3	0	0	3
	HSS	MT133	Communication Skills - II	0	0	3	1.5
	OE		Open Elective-II/ MOOC	3	0	0	3
	LABORATORIES						
	PC	BE305	Molecular Biology & rDNA Technology Lab.	0	0	3	1.5
BE306		Bio-analytical Lab.	0	0	3	1.5	
TOTAL						22.5	
SIXTH			THEORY				
	PC	BE307	Bioprocess Engineering	3	0	0	3
		BE308	Bioseparation Engineering	3	0	0	3
		BE403	Plant & Agriculture Biotechnology	3	0	0	3
	PE		Programme Elective -IV	3	0	0	3
			Programme Elective -V	3	0	0	3
	OE		Open Elective-III/ MOOC	3	0	0	3
	LABORATORIES						
	PC	BE310	Bioprocess Engineering Lab.	0	0	3	1.5
		BE311	Mass Transfer and Bioprocess Engg. Lab.	0	0	3	1.5
BE404		Plant Cell Technology Lab.	0	0	3	1.5	
PROJ	MC300	Summer Training				2	
TOTAL						24.5	
SEVENTH			THEORY				
	PC	BE402	Bioreactor and Bioprocess design	3	0	0	3
		BE 407	Nanobiotechnology	3	0	0	3
	PE		Programme Elective VI	3	0	0	3
	HSS	MT204	Constitution of India	2	0	0	NC
	OE		Open Elective-IV/ MOOC	3	0	0	3
	LABORATORIES						
PROJ	BE400M	Minor Project				3	
TOTAL						15	
EIGHTH	PROJ	BE400	Research project / Industry Internship				10
TOTAL						168.0	

***Requirement of Programme Elective courses (Theory/ Lab) : 18 credit or above**

Sem		CODE	SUBJECT	L	T	P	C
4th	PE 1	BE215R1	Cellular Electrophysiology	3	0	0	3
		BE216	Enzyme Technology	3	0	0	3
	PE 2	BE214R1	Natural Product Biotechnology	3	0	0	3
		BE318	Bioenergy and Biofuels	3	0	0	3
5th	PE 3	BE317	Stem cell and Tissue Engineering	3	0	0	3
		BE213	Pharmaceutical Biotechnology	3	0	0	3
6th	PE 4	BE309	Fermentation Engineering	3	0	0	3
		BE312	Biomaterials	3	0	0	3
		BE321	Cheminformatics	3	0	0	3
	PE5	BE315	Food Science and Technology	3	0	0	3
		BE319	Bioelectronics–Concept & Instrumentation	3	0	0	3
7th	PE6	BE313	Metabolic Engineering	3	0	0	3
		BE316	Bioinformatics Algorithms	3	0	0	3
		BE412	Process Biotechnology	3	0	0	3

4th	OE 1	BE 205	Basics of Bioinformatics	3	0	0	3
		BE 213	Pharmaceutical Biotechnology	3	0	0	3
5th	OE 2	BE 319	Bioelectronics–Concept & Instrumentation	3	0	0	3
		BE320	Biotreatment of Municipal and Industrial wastes	3	0	0	3
6th	OE 3	BE 316	Bioinformatics Algorithms	3	0	0	3
		BE 318	Bioenergy and Biofuels	3	0	0	3
7th	OE 4	BE 407	Nanobiotechnology	3	0	0	3
		BE411	Molecular Modelling and Drug Design	3	0	0	3

In-depth Specialization in Computational Biotechnology with B. Tech (Biotechnology)

S.No	Semester of Study (Recommended)	Course Code (TBD)	Subjects	Mode of delivery & credits			Total Credits
				L (Periods/ week)	T (Periods/w eek)	P (Periods/w eek)	
1	5TH	BE328	Molecular Simulation of Biomolecules	3	1	0	4
2		BE329	Perl & Bioperl Programming	3	1	0	4
3	6TH	BE330	Biosequence analysis and Programming lab	2	0	2	3
4		BE331	Advanced algorithmic techniques & Communication	3	0	0	3
5	7TH	BE415 R1	System Biology	3	0	0	3
6		BE417	Molecular modelling & Drug Design Lab	2	0	2	3
TOTAL							20

BIRLA INSTITUTE OF TECHNOLOGY- MESRA, RANCHI

Semester/ Session of Study (Recommended)	Category of Course	Course Code	Courses	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/w eek)</i>	P <i>(Periods/w eek)</i>	C
THEORY							
Fifth Monsoon	PC	BE202	Cell & Molecular Biology	3	0	0	3
	PC	BE332	Biochemistry & Microbiology	3	1	0	4
TOTAL							7
Sixth Spring	PC	BE213	Pharmaceutical	3	1	0	4
	PC	BE307	Bioprocess Engineering	3	0	0	3
TOTAL							7
Seventh Monsoon	PC	BE412	Process Biotechnology	3	0	0	3
	PC	BE405	Basic Biotechnology Lab	0	0	3	1.5
	PC	BE416	Process Biotechnology Lab	0	0	3	1.5
TOTAL							6
GRAND TOTAL CREDITS							20

BIRLA INSTITUTE OF TECHNOLOGY- MESRA, RANCHI

Minor in Biotechnology offered for B.Tech Programme (for other than B.Tech Biotechnology students) To be effective from academic session 2021-22

Semester/ Session of Study (Recommended)	Course Level	Category of Course	Course Code	Courses	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
THEORY								
Fifth Monsoon	Second	PC	BE202	Cell & Molecular Biology	3	0	0	3
	Third	PC	BE332	Biochemistry & Microbiology	3	1	0	4
TOTAL								7
Sixth Spring	Second	PC	BE213	Pharmaceutical Biotechnology	3	1	0	4
	Third	PC	BE307	Bioprocess Engineering	3	0	0	3
TOTAL								7
Seventh Monsoon	Fourth	PC	BE412	Process Biotechnology	3	0	0	3
	Fourth	PC	BE405	Basic Biotechnology Lab	0	0	3	1.5
	Fourth	PC	BE416	Process Biotechnology Lab	0	0	3	1.5
TOTAL								6
GRAND TOTAL CREDITS								20