

# Birla Institute of Technology, Mesra, Ranchi

## Course Structure for B.Tech. (Bioengineering and Biotechnology)

Based on NEP-2020, CBCS and OBE, Effective from 2024-2025

Sr. No.	Semester of Study (Recommended)	Category of Course	Course Code	Subjects	Mode of Delivery & Credits L-Lecture; T-Tutorial; P-Practical			Total Credits	
					L (Periods / Week)	T (Periods/ Week)	P (Periods/ Week)		
<b>FIRST</b>					<b>THEORY</b>				
I.1	FIRST	FS	MA24101	Mathematics - I	3	1	0	4	
I.2			PH24101	Physics	3	1	0	4	
I.3			BE24101	Biological Science for Engineers	2	0	0	2	
I.4		GE	CS24101	Programming for Problem Solving	3	1	0	4	
I.5			EE24101	Basics of Electrical Engineering	2	1	0	3	
I.6		MC	BE24001	Foundation to Engineering Mathematics*	3	0	0	0	
<b>LABORATORIES</b>									
I.7			FS	PH24102	Physics Laboratory	0	0	2	1
I.8			GE	CS24102	Programming for Problem Solving Laboratory	0	0	2	1
I.9				EE24102	Electrical Engineering Laboratory	0	0	2	1
I.10			HSS	HS24131	Communication Skill - I	0	0	3	1.5
I.11		MC	MC24 101/102/103 /104/105	Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA) /Entrepreneurship	0	0	2	1	
<b>TOTAL (Theory + Labs)</b>								<b>22.5</b>	
<b>SECOND</b>					<b>THEORY</b>				
II.1	SECOND	FS	MA24103	Mathematics - II	3	1	0	4	
II.2			CH24101	Chemistry	3	1	0	4	
II.3		GE	EC24101	Basic Electronics	2	1	0	3	
II.4			ME24101	Basics of Mechanical Engineering	2	1	0	3	
II.5		FS	CE24101	Environmental Science	2	0	0	2	
<b>LABORATORIES</b>									
II.6			FS	CH24102	Chemistry Laboratory	0	0	2	1
II.7			GE	EC24102	Basic Electronics Laboratory	0	0	2	1
II.8				ME24102	Engineering Graphics	0	0	4	2
II.9				PE24102	Workshop Practice	0	0	2	1
II.10		MC	MC24 106/107/108/109 /110	Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA) /Entrepreneurship	0	0	2	1	
<b>TOTAL (Theory + Labs)</b>								<b>22</b>	
<b>GRAND TOTAL FOR FIRST YEAR</b>								<b>44.5</b>	

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THIRD		THEORY						
III.1	FS	MA24201	Numerical Methods	2	0	0	2	
III.2	HSS	MT24131	UHV-II: Understanding Harmony	3	0	0	3	
III.3	PC	BE24241	Cellular Dynamics and Molecular Biology	3	0	0	3	
III.4		BE24242	Microbiology	3	0	0	3	
III.5		BE24243	Biochemistry	2	0	0	2	
III.6		BE24244	Basics of Bioinformatics	3	0	0	3	
III.7		BE24245	Chemical Process Calculations	3	1	0	4	
<b>LABORATORIES</b>								
III.8	FS	MA24202	Numerical Methods Laboratory	0	0	2	1	
III.9	PC	BE24246	Cell Biology Lab	0	0	2	1	
III.10		BE24247	Biochemistry Lab	0	0	2	1	
III.11		BE24248	Bioinformatics Lab	0	0	2	1	
III.12	MC	MC24 201/202/2 03/204 /205	Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA) / Entrepreneurship	0	0	2	1	
<b>TOTAL (Theory + Labs)</b>							<b>25</b>	
FOURTH		THEORY						
IV.1	PC	BE24249	Biology of Immune System	2	0	0	2	
IV.2		BE24250	Fluid Mechanics & Heat Transfer	3	0	0	3	
IV.3		BE24251	Thermodynamics of Chemical & Biological Systems	3	0	0	3	
IV.4	PE	BE24XXX	Programme Elective - I	3	0	0	3	
IV.5	PE	BE24XXX	Programme Elective - II	3	0	0	3	
IV.6	OE	XX24XXX / MO24201	Open Elective - I / MOOC - I	3	0	0	3	
IV.7	HSS	HS24211	Indian Knowledge System	2	0	0	0	
<b>LABORATORIES</b>								
IV.8	PC	BE24252	Microbiology Lab	0	0	2	1	
IV.9		BE24253	Immunology Lab	0	0	2	1	
IV.10		BE24254	Computational Biology Lab	0	0	2	1	
IV.11		BE24255	Fluid Mechanics & Heat Transfer Lab	0	0	2	1	
IV.12	MC	MC24 206/207/2 08/209/21 0	Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA) / Entrepreneurship	0	0	2	1	
<b>TOTAL (Theory + Labs)</b>							<b>22</b>	
<b>GRAND TOTAL FOR SECOND YEAR</b>							<b>47</b>	

FIFTH		THEORY						
V.1	PC	BE24341	Bio-analytical Techniques	3	0	0	3	
V.2		BE24342	Functional Genomics, rDNA Technology and Genome Editing	3	0	0	3	
V.3		BE24343	Mass Transfer Operations	3	0	0	3	
V.4		BE24344	Reaction Engineering	3	1	0	4	
		PE	BE24XXX	Programme Elective - III	3	0	0	3
V.6		OE	XX24XXX / MO24301	Open Elective - II / MOOC - II	3	0	0	3
<b>LABORATORIES</b>								
V.6	PC	BE24345	Molecular Biology & rDNA Technology Lab	0	0	2	1	
V.7		BE24346	Bio-analytical Lab.	0	0	2	1	
V.8		BE24347	Mass Transfer Operation Lab	0	0	2	1	
V.9	HSS	HS24133	Communication Skill - II	0	0	3	1.5	
V.10	PC	BE24300	Project - I				2	
<b>TOTAL (Theory + Labs)</b>							<b>25.5</b>	
SIXTH		THEORY						
VI.1	PC	BE24357	Bioprocess Engineering	3	0	0	3	
VI.2		BE24358	Bioseparation Engineering	3	0	0	3	
VI.3		BE24359	Plant & Agriculture Biotechnology	3	0	0	3	
VI.4		PE	BE24XXX	Programme Elective -IV	3	0	0	3
VI.5		PE	BE24XXX	Programme Elective - V	3	0	0	3
VI.6		OE	XX24XXX / MO24303	Open Elective - III / MOOC - III	3	0	0	3
<b>LABORATORIES</b>								
VI.7	PC	BE24361	Bioprocess Engineering Lab	0	0	2	1	
VI.8		BE24362	Bioseparation Engineering Lab	1	0	2	2	
VI.9		BE24363	Plant Cell Technology Lab	0	0	2	1	
VI.10		BE24350	Project-II	0	0	2	1	
<b>TOTAL (Theory + Labs)</b>							<b>23</b>	
<b>GRAND TOTAL FOR THIRD YEAR</b>							<b>48.5</b>	



SEVENTH		THEORY						
VII.1	PC	BE24441	Bioreactor Design & Analysis	3	0	0	3	
VII.2		BE24442	Integrative Nanobiotechnology	3	0	0	3	
VII.3		PE	BE2445X	Programme Elective-VI	3	0	0	3
VII.4		OE	XX24XXX / MO24401	Open Elective-IV/ MOOC	3	0	0	3
VII.5		HSS	MT24204	Constitution of India	2	0	0	0
<b>LABORATORIES</b>								
VII.6	PC	BE24443	Bioreactor Design Lab	0	0	2	1	
VII.7		BE24444	Integrative Nanobiotechnology Lab	0	0	2	1	
VII.8	MC	MC24400	Summer Training				4	
VII.9	PC	BE24400	Project - III				3	
<b>TOTAL (Theory + Labs)</b>							<b>21</b>	
VIII.1	EIGHTH	PC	BE24450/ BE24490	Project-IV / Industry Internship			6	
VIII.2			BE24498	Comprehensive Viva			1	
<b>TOTAL (Theory + Labs)</b>							<b>7</b>	
<b>GRAND TOTAL FOR FOURTH YEAR</b>							<b>28</b>	
<b>GRAND TOTAL FOR B.TECH.</b>							<b>168</b>	

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