

Name of the Programme: B. Tech. Biotechnology with Multidisciplinary Minor Programme Type: UG

Duration: 04 Years

Note: All Students will have to choose one Multidisciplinary Minor from the different disciplines of the engineering faculty or it can be different faculty all together. List of Multidisciplinary Minor courses is given in Annexure A

Students who are eligible (having CGPA ≥ 7.5 at first year) can opt for Honors degree, where they will have to take 5 to 6 additional courses of 18- 20 credits in the same engineering / Technology discipline, distributed over semester 3rd to 8th . List of Honor Courses is given in Annexure B.

Students who are eligible (having CGPA ≥ 7.5 at first year) can opt for Specialization Minor, where they take 5 to 6 additional courses of 18-20 credits in another engineering / Technology discipline / Emerging area specialization distributed over semester 3rd to 8th. List of Specialization Minor Courses is given in Annexure C.

The maximum number of credits earned by the student should not exceed 194

Name of the Programme: B. Tech. Biotechnology with IBM ICE

Programme Type: UG

Duration: 04 Years

First Year (Semester I)																		
Course Category	Course Code	Course Title	Nature of Course	No. of Credits	Teaching period per week (Hrs /week)		Evaluation (Marks)			Scheme			Minimum (Marks)			Passing		
					L	P	Internal	External	Total	Internal	External	Total	Internal	External	Total			
BSC	BBT42BSL101	Basic Biology Cell	Lecture	3	3		60	40	100	-	16	40						
BSC	BBT42BSL102	General Biochemistry	Lecture	3	3	-	60	40	100	-	16	40						
ESC	BBT42ESL104	Python programming	Lecture	2	2	-	60	40	100	-	16	40						
ESC	BBT42ESL102	Microbial Physiology	Lecture	2	2	-	60	40	100	-	16	40						
AEC	MGM54AEL101	Communicative English	Lecture	2	2	-	30	20	50	-	8	20						
VSEC	BBT42VSP102	Python	Practical	2	-	4	30	20	50	-	8	20						

		Programming Lab										
BSC	BBT42BSP101	Biochemistry Lab	Practical	2	-	4	30	20	50	-	8	20
ESC	BBT42ESP101	Cell Bio Lab	Practical	2	-	4	30	20	50	-	8	20
ESC	BBT42MMP102	Microbiology Lab	Practical	2	-	4	30	20	50	-	8	20
CCA	MGM82CCP101/ MGM82CCP102/ MGM82CCP103	NCC / Yoga / Sports	Practical	2		4	50	-	50	20	-	20
		Total		22	12	20	440	260	700	-	-	-

Note:

Nature of Course: L- Lecture, P-Practical, S- Seminar, J- Project, I- Internship, D-Dissertation,

Course Category: PCC-Program Core Course, PEC-Program Elective Course, MDM-Multidisciplinary Minor, OE-Open Elective, EEMC Entrepreneurship/ Economic/ Management Course, VSEC- Vocational Skill and Skill Enhancement Course, AEC-Ability Enhancement Course, IKS-Indian Knowledge System, VEC-Value Education Course, OJT-On Job Training / Internship / Apprenticeship, FP-Field Project, CEP-Community Engagement and Service, CC-Co curricular course, RM-Research Methodology, RP- Research Project, HSSM- Humanities, Social Science and Management

First Year (Semester II)															
Course Category	Course Code	Course Title	Nature of Course	No. of Credits	Teaching period per week (Hrs)		Evaluation (Marks)			Scheme			Minimum Passing (Marks)		
					L	P	Internal	External	Total	Internal	External	Total			
BSC	BBT42BSL103	Enzymology	Lecture	3	3	-	60	40	100	-	16	40			
BSC	BBT42BSL104	Molecular Biology of Gene	Lecture	3	3	-	60	40	100	-	16	40			
ESC	BBT42ESL103	Numerical and Computational Fundamentals-I	Lecture	2	2	-	60	40	100	-	16	40			
PCC	BBT42PCL101	Design Thinking and Innovation	Lecture	2	2	-	60	40	100	-	16	40			
VSEC*	BBT42VSP103	Design Thinking and Innovation Lab	Practical	2	-	4	30	20	50	-	8	20			
ESC	BBT42ESP103	Immuno Lab	Practical	2	-	4	30	20	50	-	8	20			
ESC	BBT42ESP104	Computational Lab	Practical	2	-	4	60	40	100	-	16	40			
BSC	BBT42BSP102	Enzymo Lab	Practical	2	-	4	60	40	100	-	16	40			

CCA	MGM85CCP107/ MGM82CCP104/ MGM73CCP105/ MGM73CCP106	Cultural Activities/ NSS/ Fine Art/ Visual Art	Practical	2	-	4	50	-	50	20	-	20
IKS	APS21IKL101	Indian knowledge system	Lecture	2	2	-	60	40	100	-	16	40
Total				22	12	20	530	320	850	-	-	-

Note: All Students will have to choose one Multidisciplinary Minor from the different disciplines of the engineering faculty, or it can be different faculty all together. List of Multidisciplinary Minor courses is given in Annexure A.

Students who are eligible (having CGPA \geq 7.5 at first year) can opt for Honors degree, where they will have to take 5 to 6 additional courses of 18-20 credits in the same engineering / Technology discipline, distributed over semester 3rd to 8th. The list of Honor Courses is given in Annexure B.

Students who are eligible (having CGPA \geq 7.5 at first year) can opt for Specialization Minor, where they take 5 to 6 additional courses of 18-20 credits in another engineering / Technology discipline / Emerging area specialization distributed over semester 3rd to 8th. List of Specialization Minor Courses is given in Annexure C.

Second Year (Semester III)												
Course Category	Course Code	Course Title	Nature of Course	No of Credits	Teaching (Contact hrs./ week)		Evaluation Scheme (Marks)			Minimum Passing (Marks)		
					L	P	Internal	External	Total	Internal	External	Total
PCC	BBT42PCL201	Microbe Infection and Immunity	Lecture	2	2	-	60	40	100	-	16	40
PCC	BBT42PCL202	Genetics and Evolution	Lecture	2	2	-	60	40	100	-	16	40
PCC	BBT42PCL203	Numerical and Computational Fundamentals-II	Lecture	2	2	-	60	40	100	-	16	40
PCC	BBT42PCL207	AI and ML Essentials	Lecture	2	2	-	60	40	100	-	16	40
MDM		Refer MDM Basket (Annexure A)	Lecture	2	2	-	60	40	100	-	16	40
OE	OE-1	Refer MGMU Basket of Open Electives	Lecture	2	2	-	30	20	50	-	8	20
OE	OE-2	Refer MGMU Basket of Open Electives	Practical	2	-	4	30	20	50	-	8	20

EEMC	BBT42HSL201	Entrepreneurship Management-I	Lecture	2	2	-	60	40	100	-	16	40
VEC	MGM56VEL102	Constitution of India	Lecture	2	2	-	30	20	50	-	8	20
FP	BBT42FPJ202	Mini Project I	Practical	2	-	4	50	-	50	20	-	20
PCC	BBT42PCP201	Genetics Lab	Practical	1	-	2	30	20	50	-	8	20
PCC	BBT42PCP202	Evolution Lab	Practical	1	-	2	30	20	50	-	8	20
TOTAL				22	16	12	560	340	900			

For Honor course (Please refer the Annexure B.)

For Specialization Minor course (Please refer the Annexure C.)

Second Year (Semester IV)												
Course Category	Course Code	Course Title	Nature of Course	No. of Credits	Teaching (Contact hrs./ week)		Evaluation Scheme (Marks)			Minimum Passing (Marks)		
					L	P	Internal	External	Total	Internal	External	Total
PCC	BBT42PCL204	Recombinant DNA Technology	Lecture	2	2	-	60	40	100	-	16	40
PCC	BBT42PCL205	Genomics And Proteomics	Lecture	2	2	-	60	40	100	-	16	40
PCC	BBT42PCL206	Numerical And Computational Fundamentals-III	Lecture	2	2	-	60	40	100	-	16	40
PCC	BBT42PCL208	Machine Learning Engineering	Lecture	2	2	-	60	40	100	-	16	40
PCC	BBT42PCP203	RDT, Genomics and Indus lab	Practical	1	-	2	30	20	50	-	08	20
PCC	BBT42PCP204	Bio-Computational lab	Practical	1	-	2	30	20	50	-	08	20
MDM		Refer MDM Basket (Annexure A)	Lecture	2	2	-	60	40	100	-	16	40
OE	OE-3	Refer MGMU Basket of Open Electives	Lecture	2	2	-	30	20	50	-	08	20
AEC	MGM54AEL103	Refer MGMU Basket of AEC	Lecture	2	2	-	30	20	50	-	08	20
VSEC	BBT42VSP202	Mini project II	Practical	2	-	4	30	20	50	-	08	20
EEMC	BBT42HSL202	Entrepreneurship Management-II	Lecture	2	2	-	60	40	100	-	16	40
VEC	MGM21VEL101	Environmental studies	Lecture	2	2	-	30	20	50	-	08	20
Total				22	18	8	540	360	900	-	-	-

For Honor course (Please refer the Annexure B.)

For Specialization Minor course (Please refer the Annexure C.)

Third Year (Semester V)												
Course Category	Course Code	Course Title	Nature of Course	No. of Credits	Teaching period per week (Hrs /week)		Evaluation Scheme (Marks)			Minimum Passing (Marks)		
					L	P	Internal	External	Total	Internal	External	Total
PCC	BBT42PCL301	Plant Tissue Engineering	Lecture	2	2	-	60	40	100	-	16	40
PCC	BBT42PCL302	Cell Signaling	Lecture	2	2	-	60	40	100	-	16	40
PCC	BBT42PCL303	Numerical And Computational Fundamentals-IV	Lecture	2	2	-	60	40	100	-	16	40
PCC	BBT42PCL307	Deep Learning	Lecture	2	2	-	60	40	100	-	16	40
PCC	BBT42PCP305	Mini Project III	Practical	2	-	4	30	20	50	-	8	20
PCC	BBT42PCP302	Plant Lab	Practical	2	-	4	30	20	50	-	8	20
Program Elective - I												
PEC	BBT42PEL301	Protein engineering and design	Lecture	2	2	-	60	40	100	-	16	40
		BBT42PEL302										
PEC	BBT42PEP301	Protein engineering lab	Practical	2	-	4	30	20	50	-	8	20
		BBT42PEP302										
OE	OE-4	Refer MGMU Basket of Open Electives	Lecture	2	2	-	30	20	50	-	8	20
MDM		Refer MDM Basket (Annexure A)	Lecture	4	4	-	60	40	100	-	16	40
Total				22	16	12	480	320	800	-	-	-

For Honor course (Please refer the Annexure B.)

For Specialization Minor course (Please refer the Annexure C.)

Third Year (Semester VI)												
Course Category	Course Code	Course Title	Nature of Course	No. of Credits	Teaching period per week (Hrs /week)		Evaluation Scheme (Marks)			Minimum Passing (Marks)		
					L	P	Internal	External	Total	Internal	External	Total
PCC	BBT42PCL308	Computer Vision	Lecture	2	2		60	40	100	-	16	40
PCC	BBT42PCP306	Computer Vision lab	Practical	2	2	-	60	40	100	-	16	40
PCC	BBT42PCL306	Molecular Cytogenetic	Lecture	2	2	-	60	40	100	-	16	40
PCC	BBT42PCP303	Molecular Biology Lab	Practical	2	-	4	30	20	50	-	8	20
PCC	BBT42PCP304	Animal Tissue Lab	Practical	2	-	4	30	20	50	-	8	20
PEC	BBT42PEL 303	Cancer cell biology	Lecture	3	3		60	40	100	-	16	40
	BBT42PEL 304	Membrane Biophysics										
PEC	BBT42PEP 303	Stem Cell Lab	Practical	2	-	4	30	20	50	-	8	20
	BBT42PEP 304	Nano-biotech Lab										
PEC	BBT42PEL 305	Nano-biotechnology	Lecture	3	3	-	60	40	100	-	16	40
	BBT42PEL 306	Human Physiology										
MDM		Refer MDM Basket (Annexure A)	Lecture	2	2	-	60	40	100	-	16	40
VSEC	BBT42VSP301	Micro Project	Practical	2	-	4	30	20	50	-	8	20
Total				22	14	16	480	320	800	-	-	

Students who are eligible (having CGPA ≥ 7.5 at Third year) can opt for Honors with Research degree, where the students will have to work on a research project or dissertation for 18 credits in the fourth year in the same engineering / Technology discipline, distributed over semester 7th and 8th. List of Honors with Research Courses is given in Annexure D.

Fourth Year (Semester VII)												
Course Category	Course Code	Course Title	Nature of Course	No. of Credits	Teaching period per week (Hrs /week)		Evaluation Scheme (Marks)			Minimum Passing (Marks)		
					L	P	Internal	External	Total	Internal	External	Total
PCC	BBT42PCL401	Post Genomic Biology	Lecture	3	3	-	60	40	100	-	16	40
PCC	BBT42PCP401	Genome Lab	Practical	3	-	6	60	40	100	-	16	40
PCC	BBT42PCL403	Applied Large Language Model Development and Deployment	Lecture	3	3	-	60	40	100	-	16	40
PCC	BBT42PCP403	Applied Large Language Model Development and Deployment Lab	Practical	3	-	6	60	40	100	-	16	40
RM		Research Methodology	Lecture	4	4	-	60	40	100	-	16	40
MDM		Refer MDM Basket (Annexure A)	Lecture	2	2	-	60	40	100	-	16	40
MDM		Refer MDM Basket (Annexure A)	Lecture	2	2	-	60	40	100	-	16	40
RP	BBT42RPJ402	Capstone Project	Project	4	-	8	60	40	100	-	16	40
		Total		24	14	20	480	320	800	-	-	-

For Honor course (**Please refer the Annexure B.**)

For Specialization Minor course (Please refer the Annexure C.)

For Honors with Research (Please refer the Annexure D.)

Fourth Year (Semester VIII)

Course Category	Course Code	Course Title	Nature of Course	No. of Credits	Teaching period per week(Hrs /week)		Evaluation Scheme (Marks)			Minimum Passing (Marks)		
					L	P	Internal	External	Total	Internal	External	Total
PEC	BBT42PEL401	Molecular Pharming and Biopharmaceuticals	Lecture	4	4	-	60	40	100	-	16	40
	BBT42PEL405	Explainable AI (XAI)										
PEC	BBT42PEL403	Gene, Marker, and Omics Technology	Lecture	4	4	-	60	40	100	-	16	40
	BBT42PEL406	Environmental Biology										
JT	BBT42JTI401	Internship	Internship	12	-	24	90	60	150	-	24	60
	BBT42JTI402	Major Project	Project									
		Total		20	8	24	210	140	350	-	-	-

For Honor course (**Please refer the Annexure B.**)

For Specialization Minor course (Please refer the Annexure C.)

For Honors with Research (Please refer the Annexure D.)

Exit Options after FY

One Year UG certificate in (Biotechnology)

Course Category	Course Code	Course Title	Nature of Course	No of Credits	Teaching (Contact hrs/ week)		Evaluation Scheme (Marks)			Minimum Passing (Marks)		
					L	P	Internal	External	Total	Internal	External	Total
OJT	BBT42JTI101	In-Plant Training (8 weeks)	Practical	8	-	16	60	40	100	-	16	40
		Total		8	-	16	60	40	100			

Exit Options after SY

UG Diploma in Biotechnology with Multidisciplinary Minor.

Course Category	Course Code	Course Title	Nature of Course	No of Credits	Teaching (Contact hrs/ week)		Evaluation Scheme (Marks)			Minimum Passing (Marks)		
					L	P	Internal	External	Total	Internal	External	Total
Project	BBT42RPJ201	Mini Project (8 weeks)	Practical	8	-	16	60	40	100	-	16	40
		Total		8	-	16	60	40	100			

Exit Options after TY

B.Voc. In Biotechnology

Course Category	Course Code	Course Title	Nature of Course	No of Credits	Teaching (Contact hrs/ week)		Evaluation Scheme (Marks)			Minimum Passing (Marks)		
					L	P	Internal	External	Total	Internal	External	Total
OJT	BBT42JTI301	In-Plant Training (8 weeks)	Practical	6	-	16	60	40	100	-	16	40
		Total		6	-	16	60	40	100			