

## 5 year Integrated M. Tech. (Biotechnology) Degree

### FIRST SEMESTER

Sr. No.	Course Code	Course Title	Course Category	Contact Hours				Credits
				L	T	P	Total	
1	15B11MA112	Basic Mathematics-I	BSC	3	1	0	4	4
2	15B11PH112	Physics for Biotechnology	BSC	3	1	0	4	4
3	18B11CI111	Fundamentals of Computers & Programming - I	ESC	3	1	0	4	4
4	15B11HS112	English	HSC	1	0	2	3	2
5	15B17PH171	Physics Lab-1	BSC	0	0	2	2	1
6	24B45CS111	Fundamentals of Computers & Programming Lab-I	ESC	0	0	2	2	1
7	18B15GE112	Workshop	ESC	0	0	3	3	1.5
8	24B11EC112	Basic Electronics for Biotechnology	ESC	3	1	0	4	4
9	24B15EC112	Basic Electronics for Biotechnology Lab	ESC	0	0	2	2	1
		TOTAL					28	22.5

### SECOND SEMESTER

Sr. No.	Course Code	Course Title	Course Category	Contact Hours				Credits
				L	T	P	Total	
1.	15B11MA212	Basic Mathematics-2	BSC	3	1	0	4	4
2.	15B11PH212	Biophysical Techniques	BSC	3	1	0	4	4
3	18B11CI121	Fundamentals of Computers & Programming - II	ESC	3	1	0	4	4
4.	18B15BT111	Basic Bioscience Lab	BSC	0	0	2	2	1
5	18B15CI121	Computer Programming Lab-II	ESC	0	0	2	2	1
6.	24B16HS111	Life Skills & Professional Communication Lab	HSC	0	0	2	2	Qualifying
7.	18B15GE111	Engineering Drawing & Design	ESC	0	0	3	3	1.5
8	24B11HS111	Universal Human Values (UHV)	HSC	2	1	0	3	3
		TOTAL					24	18.5

### THIRD SEMESTER

Sr. No.	Course Code	Course Title	Course Category	Contact Hours				Credits
				L	T	P	Total	
1.	15B11MA302	Probability and Statistics	BSC	3	1	0	4	4
2.	15B11BT211	Biochemistry	PCC	3	1	0	4	4
3.	15B11BT311	Thermodynamics and Chemical Processes	PCC	3	1	0	4	4

4.	15B11BT313	Genetics and Developmental Biology	PCC	3	1	0	4	4
5	15B17BT271	Biochemical Techniques Lab	PCC	0	0	2	2	1
6.	15B17BT371	Thermodynamics and Chemical Processes Lab	PCC	0	0	2	2	1
7.	15B17BT373	Genetics and Developmental Biology Lab	PCC	0	0	2	2	1
8.	15B11HS211	Economics	HSC	2	1	0	3	3
9	24B17BT211	Summer Training-I (4 weeks)	PRC	0	0	0	0	2
10#	19B13BT211	Environmental Studies	OMC	3	0	0	3	Qualifying
		TOTAL					28	24

#### FOURTH SEMESTER

Sr. No.	Course Code	Course Title	Course Category	Contact Hours				Credits
				L	T	P	Total	
1.	xxxxxxx	HSS Elective – 1	HSC	2	1	0	3	3
2.	24B11BT211	Molecular biology	PCC	3	1	0	4	4
3.	15B11BT411	Introduction to Bioinformatics	PCC	3	1	0	4	4
4.	15B11BT312	Microbiology	PCC	3	1	0	4	4
5.	15B11BT414	Immunology	PCC	3	0	0	3	3
6.	15B17BT372	Microbiology Lab	PCC	0	0	2	2	1
7	15B17BT471	Bioinformatics Lab	PCC	0	0	2	2	1
8	15B17BT474	Immunology Lab	PCC	0	0	2	2	1
9	xxxxxxxxx	Discipline Elective-1*	PEC	3	0	0	3/4	3
		TOTAL					27	24

\* Discipline electives may run in 3 0 0 or 2 0 2 (L T P ) mode as per requirement of subject

#### FIFTH SEMESTER

Sr. No.	Course Code	Course Title	Course Category	Contact Hours				Credits
				L	T	P	Total	
1.	24B11BT311	Genetic Engineering	PCC	3	1	0	4	4
2.	24B11BT311	Bioprocess Engineering	PCC	3	1	0	4	4
3	24B15BT311	Genetic Engineering Lab	PCC	0	0	2	2	1
4.	18B15BT311	Industrial Biotechnology Lab-1	PCC	0	0	2	2	1
5.	xxxxxxxxx	Discipline Elective– 2*	PEC	3/2	0	0/2	3/4	3
6	xxxxxxxxx	Discipline Elective– 3*	PEC	3/2	0	0/2	3/4	3
7	xxxxxxxxx	Science Elective	BSC	3		0	3	3
8	18B12HS311	Indian Constitution & Traditional Knowledge	OMC	3	0	0	3	Qualifying
9	24B17BT311	Summer Training-II (6 weeks)	PRC	0	0	0	0	2

		TOTAL					24	21
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### SIXTH SEMESTER

Sr. No.	Course Code	Course Title	Course Category	Contact Hours				Credits
				L	T	P	Total	
1.	24B11BT312	Biocomputing and Applications	PCC	3	0	0	3	3
2.	15B11BT511	Cell Culture Technology	PCC	3	0	0	3	3
3.	24B11BT313	Food and Agribiotechnology	PCC	3	0	0	3	3
4.	xxxxxxxx	Discipline Elective – 4*	PEC	3	0	0	3	3
5	xxxxxxxx	Discipline Elective - 5*	PEC	3	0	0	3	3
6	xxxxxxxx	Open Elective - 1	OEC	2	0	0	2	2
	xxxxxxxx	Selected Value-Added Course	Value added	2	0	0	2	Audit
8	16B17BT571	IT Practice Lab	PCC	0	0	2	2	1
9	15B17BT571	Cell Culture Lab	PCC	0	0	2	2	1
10	24B15HS311	Soft Skill For Employability	HSC	0	0	2	2	1
11	24B17BT311	Minor Project	PRC	0	0	4	4	2
		TOTAL					29	22

### SEVENTH SEMESTER

Sr. No.	Course Code	Course Title	Course Category	Contact Hours				Credits
				L	T	P	Total	
1.	xxxxxxxx	Discipline Elective – 6*	PEC	3/2	0	0/2	3/4	3
2.	xxxxxx	Discipline Elective-7 (as in M Tech DE-III)	PEC	3/2	0	0/2	3/4	3
3.	xxxxxx	Discipline Elective-8 (as in M Tech DE-IV)	PEC	3/2	0	0/2	3/4	3
4.	xxxxxxxx	Open Elective - 2	OEC	3	0	0	3	3
5.	15B19 EC791	Major Project Part-1	PRC	0	0	8	8	4
6.	24B17BT411	Summer Training-III (6 weeks)	PRC	0	0	0	0	4
7.	17M11BT111	Bio molecules and Cell Communication (M.Tech I Sem Core )	PCC	3	0	0	3	3
8.	17M12BT115	Environmental Biotechnology (M.Tech I Sem Core )	PCC	3	0	0	3	3
		TOTAL					26	26

### EIGHTH SEMESTER

Sr. No.	Course Code	Course Title	Course Category	Contact Hours				Credits
				L	T	P	Total	

1.	xxxxxxxx	Open Elective -3	OEC	3	0	0	3	3
2.	24B17BT411	Major Project Part-2	PRC	0	0	16	16	8
3.	17M11BT113	Bioprocess and Industrial Biotechnology(M.Tech II Sem Core)	PCC	3	0	0	3	3
4.	17M11BT114	Disease & Healthcare (M.Tech II Sem Core)	PCC	3	0	0	3	3
5.	xxxxxx	Discipline Elective-9 (as in M Tech DE-V)	PEC	3/2	0	0/2	3/4	3
6.	xxxxxx	Discipline Elective-10 (as in M Tech DE-VI)	PEC	3/2	0	0/2	3/4	3
7.	xxxxxx	Discipline Elective-11 (as in M Tech DE-VII)	PEC	3/2	0	0/2	3/4	3
8.	Xxxxxxx	M. Tech. Audit – I	Audit	2	0	0	2	Qualifying
		TOTAL					34	26

### NINTH SEMESTER Integrated (Summer)

Sr. No.	Course Code	Course Title	Course Category	Contact Hours				Credits
				L	T	P	Total	
1.	17M15BT112	M Tech Lab –II (Biotechniques Lab-II)	PCC	0	0	6	6	3
2.	18M11GE111	Research Methodology and Intellectual Property Rights	PCC	2	0	0	2	2
3.	xxxxxx	DE-12	PEC	3	0	0	3	3
4.	xxxxxx	DE-13	PEC	3	0	0	3	3
		TOTAL					11	11

### TENTH SEMESTER Integrated

Sr. No.	Course Code	Course Title	Course Category	Contact Hours				Credits
				L	T	P	Total	
1.	xxxxxx	M Tech open Elective	OEC	3	0	0	3	3
2.	17M17BT112	PBL-II	PRC	0	0	8	8	4
3.	17M15BT111	M Tech Lab –I (Biotechniques Lab – I)	PCC	0	0	6	6	3
4.	17M17BT211	Seminar and Term paper	PRC	0	0	0	0	4
5.	xxxxxx	M Tech Audit-II	Audit	2	0	0	2	Qualifying
		TOTAL					19	14

### Eleventh Semester Integrated

Sr. No.	Course Code	Course Title	Course Category	Contact Hours				Credits
				L	T	P	Total	
1.	17M17BT216/ 17M17BT 217/17M17BT 218	Dissertation/ Industrial project/ Entrepreneurial project	PRC	0	0	40	40	20
2.	17M17BT111	PBL-I	PRC	0	0	4	4	2
		TOTAL					44	22

**Total Credits for B. Tech. –228**

### **Mandatory Internships/Summer Trainings**

#### **Summer Training -I (4 weeks) (In summer vacation after second semester )**

Sr. No.	Course		Course Category	Contact Hours				Credits
	No.	Title		L	T	P	Total	
1.	24B17BT211	Inter/Intra institutional activities (Training with higher Institutions; Soft skill training organized by Training and Placement Cell of the respective institutions; contribution at incubation/ innovation /entrepreneurship cell of the institute; participation in conferences/ workshops/ competitions etc.; Learning at Departmental Lab/ Tinkering Lab/ Institutional workshop; Working for consultancy/ research project within the institutes and Participation in all the activities of Institute's Innovation Council for eg: IPR workshop/ Leadership Talks/ Idea/Design/ Innovation/ Business Completion/ Technical Expos etc.)	PRC1	0	0	6	6	2
		TOTAL					6	2

#### **Summer Training -II (6 weeks) (In summer vacation after fourth semester )**

Sr. No.	Course		Course Category	Contact Hours				Credits
	No.	Title		L	T	P	Total	
1.	24B17BT311	Industrial/Govt./ NGO/MSME/Rural Internship/ Innovation /Entrepreneurship (Students may choose either to work on innovation or entrepreneurial activities resulting in start-up or undergo internship with industry/ NGO's/ Government organizations/ Micro/ Small/Medium	PRC1	0	0	6	6	2

		enterprises to make themselves ready for the industry. In case student want to pursue their family business and don't want to undergo internship, a declaration by a parent may be submitted directly to the TPO.)						
		TOTAL					6	2

**Summer Training -III (6 weeks) (In summer vacation after sixth semester )**

Sr. No.	Course		Course Category	Contact Hours				Credits
	No.	Title		L	T	P	Total	
1.	24B17BT411	Industrial/Govt./ NGO/MSME/Rural Internship/ Innovation /Entrepreneurship (Students may choose either to work on innovation or entrepreneurial activities resulting in start-up or undergo internship with industry/ NGO's/ Government organizations/ Micro/ Small/Medium enterprises to make themselves ready for the industry. In case student want to pursue their family business and don't want to undergo internship, a declaration by a parent may be submitted directly to the TPO.)	PRC1	0	0	8	8	4
		TOTAL					8	4