Integrated M.Tech. in Biotechnology (B.Tech + M.Tech) programme

Semester 1

S.No.	Course	L	T	P	Credits
THEORY					
CY101/PH102	Engineering Chemistry/ Engineering Physics	3	1	0	4
MA103	Basic Mathematics	3	1	0	4
CS101	Computer Programming-I	2	0	0	2
BT101	Evolutionary biology and biodiversity	3	0	0	3
BT103	Life sciences -I	3	0	0	3
HU101	English Proficiency	2	0	0	2
SS101	Human values and Buddhist ethics	2	0	0	2
PRACTICALS					
CY103/PH104	Chemistry Lab/ Physics Lab	0	0	2	1
CS181	Computer Programming Lab-I	0	0	3	2
GP101	General Proficiency	0	0	0	1
	Total	**18**	**2**	**5**	**24**

Note: The students of batch 2010 will study the following papers genetic biodiversity and taxonomy (BT 101), basic cell biology and genetics (BT 103) and cell biology lab (BT 105) in place of Evolutionary biology and biodiversity, Life Sciences and Life Science lab.

Semester 2

S.No.	Course	L	T	P	Credits
THEORY					
CY101/PH102	Engineering Chemistry/ Engineering Physics	3	1	0	4
MA104	Mathematics	3	1	0	4
BT102	Life sciences -II	3	0	0	3
CS102	Computer Programming-II	2	0	0	2
MG102	Professional Communication	2	0	0	2
SS102	History of Science & Technology	2	0	0	2
CE106	Ecology and Environment	2	1	0	3
PRACTICALS					
BT104	Life sciences Lab	0	0	3	2
PH104/CY103	Physics Lab/Chemistry Lab	0	0	2	1
CS182	Computer Lab-II	0	0	2	1
GP102	General Proficiency				1
	Total	**17**	**4**	**7**	**25**

Semester 3

S.No.	Course	L	T	P	Credits
THEORY					
MA201	Quantitative Techniques	3	1	0	4
BT201	Introductory Microbiology	3	0	0	3
BT203	Basic Cell Biology	3	0	0	3
BT205	Fundamentals of Biochemistry	3	0	0	3
BT207/CY201	Organic chemistry	3	1	0	4
BT209	Fundamentals of Genetics	3	0	0	3
PRACTICALS					
BT211	Cell Biology Lab	0	0	3	2
BT213	Fundamental Biochemistry lab	0	0	3	2
GP201	General Proficiency	0	0	0	1
	Total	**18**	**2**	**6**	**25**

Semester 4

S.No.	Course	L	T	P	Credits
THEORY					
BT202	Introduction to Molecular biology	3	0	0	3
BT204	Principles of Immunology	3	0	0	3
BT206	Principles of biochemical engineering	3	1	0	4
BT208	Bioenergetics	3	1	0	4
BT 214	Enzyme technology	3	0	0	3
BT216	Molecular modeling	3	1	0	4
EE202	Measurements and Instrumentation	2	0	0	2
PRACTICALS					
BT210	Immunology and enzyme technology lab	0	0	3	2
EE212	Measurements and Instrumentation Lab	0	0	2	1
GP202	General Proficiency	0	0	0	1
	Total	**20**	**3**	**5**	**27**

Semester 5

S.No.	Course	L	T	P	Credits

THEORY					
BT301	Cell Biology	3	0	0	3
BT303	Genetics	3	0	0	3
BT305	Principles of Physiology	4	0	0	4
CE305	Environmental engineering- II	2	1	0	3
BT307	Microbiology	3	0	0	3
BT309	Information Technology for Biologists	2	0	0	2
	Seminar	3	0	0	2
PRACTICALS					
BT311	Cell Biology lab	0	0	3	2
BT313	Microbiology lab	0	0	3	2
BT315	Information Technology lab	0	0	3	2
GP301	General Proficiency	0	0	0	1
	Total	**19**	**1**	**9**	**27**

Semester 6

S.No.	Course	L	T	P	Credits
THEORY					
BT302	Molecular Biology	4	0	0	4
BT304	Principles of Biochemistry	3	0	0	3
BT306	Developmental biology	3	0	0	3
BT308	Environmental biotechnology	3	0	0	3
BT310	Introduction to Bioinformatics	2	1	0	3
BT312	Principles of management and entrepreneurship	2	0	0	2
BT320	Molecular virology	3	0	0	3
PRACTICAL					
BT314	Molecular Biology lab	0	0	3	2
BT316	Biochemistry lab	0	0	3	2
BT318	Bioinformatics lab	0	0	3	2
GP302	General Proficiency	0	0	0	1
	Total	**20**	**1**	**9**	**28**

Semester 7

S.No.	Course	L	T	P	Credits
THEORY					
BT561/BT401	Recombinant DNA technology	3	0	0	3
BT563/BT403	Biophysical Chemistry	3	0	0	3
BT565/BT405	Immunotechnology	3	0	0	3
BT567/BT407	Nanobiotechnology	3	0	0	3
BT409	Molecular Carcinogenesis and Therapy	2	0	0	2
BT571/BT411	Microbial Biotechnology	3	0	0	3
	Open Elective-1	2			2
GP501	General Proficiency	0	0	0	1
PRACTICAL					
BT573/BT413	Recombinant DNA technology lab	0	0	3	2
BT575/BT415	Biophysical Chemistry lab	0	0	3	2
	Microbial Biotechnology and Immunotechnology lab	0	0	3	2
	Total	**19**		**9**	**26**

Semester 8

S.No.	Course	L	T	P	Credits
THEORY					
BT562/BT402	Genomics and Proteomics	4	0	0	4
BT564/BT404	Bio analytical techniques	3	0	0	3
BT566/BT406	Bioprocess Technology	3	0	0	3
BT568/BT408	Regulation, Ethics and patenting in Biotechnology	2	0	0	2
	Elective Paper-I	3	0	0	3
	Elective Paper-II (Specialization)	3	0	0	3
	Open Elective-2	2			2
PRACTICAL					
BT570/BT410	Genomics and Proteomics lab	0	0	3	2
BT572/BT412	Bioprocess Technology lab	0	0	3	2
PROJECTS					
GP502	General Proficiency	0	0	0	1
	Total	**20**		**6**	**24**

Summer Semester (After 8th Semester)

S.No.	Course	L	T	P	Credits
BT500	Minor Research Project				11
	Total		**11**		

Semester 9

S.No.	Course	L	T	P	Credits
THEORY PAPER (Genetic Eng./Bioinformatics/Food Technology)					
	Specialization Paper-I	3	0	0	3
	Specialization Paper-II	3	0	0	3
	Specialization Paper-III	3	0	0	3
	Specialization Paper-IV	3	0	0	3
	Specialization Paper-V	2	0	0	2
PRACTICAL					
	Specialization Paper Lab-I	0	0	6	4
	Specialization Paper Lab-2	0	0	3	2
PROJECTS					
BT691	Special Problem and Research Project (Preliminary)	0	0	3	2
GP601	General Proficiency	0	0	0	1
	Total	**14**	**0**	**12**	**23**

Semester 10

S.No.	Course	L	T	P	Credits
MAJOR PROJECT					
BT600	Research Project	0	0	0	21
GP602	General Proficiency	0	0	0	1
	Total				**22**

Total Credits: 264

SEMESTER 8

Code	Course name
Elective Paper- I	
BT576/BT416	Data structure and database management system
BT578/BT418	Introduction to food technology
BT586	Downstream processing
Elective Paper- II (Specialisation)	
BT574/BT414	Cell and Tissue Culture Techniques
BT582/BT422	Computational Biology
BT584/BT424	Chemistry for Food Technology

SEMESTER 9

Code	Course name
SPECILIZATION PAPER IN GENETIC ENGINEERING	
BT601/BT501	Genetic engineering in animals
BT603/BT503	Genetic engineering for crop improvement
BT605/BT505	Cellular and molecular medicine
BT607/BT507	Protein engineering
BT609/BT509	Vaccine Design and Development
PRACTICALS	
BT611	Genetic Engineering Lab -1 (6 hrs) (Animal biotech, cellular medicine and vaccine)
BT613	Genetic Engineering Lab-2 (3 hours) (Plant biotechnology)

SEMESTER 9

Code	Course name
SPECILIZATION PAPER IN BIOINFORMATICS	
BT615/BT515	Computer programming
BT617/BT517	Computational genomics
BT619/BT519	Algorithms for bioinformatics
BT621/BT521	Molecular modelling and Drug design
BT623/BT523	Systems Biology and Neural Networks
PRACTICALS	
BT625/BT525	Programming Lab (6 hours)
BT627/BT527	Computational biology and Molecular modeling Lab (3 hours)

SEMESTER 9

Code	Course name
SPECILIZATION PAPER IN FOOD TECHNOLOGY	
BT629/BT529	Food Engineering and Technology-I
BT631/BT531	Food microbiology
BT633/BT533	Food Engineering and Technology-II
BT635/BT535	Food analysis
BT637/BT537	Quality control and sanitation
PRACTICALS	
BT639/BT539	Food Engineering and Technology Lab (6 hrs)
BT641/BT541	Food microbiology Lab (3 hrs)