ACADEMIC PROGRAMMES

Four-Year B. Tech. Biotechnology

Semester-Wise Course Distribution

Semester I

Sl.No.	Course Title	Credit Hours	Total Credit hours
First Year			
Semester I			
1.	Molecular Biology	3(3+0)	**21(14+7) +2 Non-gradial**
2.	Introductory Cell Biology	3(3+0)	
3.	Fundamentals of Genetics	3(3+0)	
4.	Basic Mathematics/Basic Botany/Basic Zoology	2(2+0)	
5.	Farming Based Livelihood Systems	3(2+1)	
6.	National Cadet Corps I/ National Service Scheme I	1(0+1)	
7.	Communication Skill	2(1+1)	
8.	SEC 1: Practices in Plant Tissue Culture/ Practices in Animal Cell Culture	2(0+2)	
9.	SEC 2: Laboratory Management and Instrumentation	2(0+2)	
10.	Deeksharambh (Foundation Course)	2(0+2) NG	
Semester II			
1.	Introduction to Biotechnology	3(3+0)	**21(11+10)**
2.	Introduction to Plant Breeding	3(2+1)	
3.	Elementary Microbiology	2(1+1)	
4.	Entrepreneurship Development and Business Management	3(2+1)	
5.	Environmental Studies and Disaster Management	3(2+1)	
6.	National Cadet Corps II/ National Service Scheme II	1(0+1)	
7.	Personality Development	2(1+1)	
8.	SEC 3: Basic Techniques of Molecular Biology and Biotechnology	2(0+2)	
9.	SEC 4: Bioinformatics and Biocomputation	2(0+2)	
Second Year			
Semester III			
1.	Livestock Production and Management	3(2+1)	
2.	Recombinant DNA Technology	2(2+0)	

3.	Classical and Molecular Cytogenetics	3(2+1)	**20(12+8)**
4.	Plant Physiology/Anatomy and Physiology of Livestock	3(2+1)	
5.	Fundamentals of Crop Protection/ Livestock Product Technology	3(2+1)	
6.	Biomathematics	2(2+0)	
7.	Physical Education, First Aid and Yoga Practice	2(0+2)	
8.	SEC 5: Methods in Recombinant DNA Technology	2(0+2)	
Semester IV			
1.	Introductory Bioinformatics	4(3+1)	**21(15+6)**
2.	Molecular Marker Technology	2(2+0)	
3.	Biodiversity and Its Conservation	2(2+0)	
4.	Basic Biochemistry	4(3+1)	
5.	Human Ethics	1(1+0)	
6.	Agriculture Marketing and Trade	3(2+1)	
7.	Agriculture Informatics	3(2+1)	
8.	SEC 6: Practices in Molecular Marker Technology	2(0+2)	
Third Year			
Semester V			
1.	Microbial Genetics	4(3+1)	**23(18+5) +2(Non-gradial)**
2.	Molecular Genetics	3(3+0)	
3.	Nanobiotechnology	4(3+1)	
4.	Animal Biotechnology	3(2+1)	
5.	Genomics and Proteomics	3(3+0)	
6.	Enzymology and Enzyme Technologies	3(2+1)	
7.	Immunology	3(2+1)	
8.	Educational Tour	2(0+2) NG	
Semester VI			
1.	Molecular Diagnostics	3(2+1)	**20 (15+5)**
2.	Industrial Biotechnology	3(3+0)	
3.	Epigenetics and Gene Regulation	2(2+0)	
4.	IPR, Biosafety and Bioethics	2(2+0)	
5.	Computational Biology	3(2+1)	
6.	Introduction to Animal Breeding	3(2+1)	
7.	Biostatistics	2(1+1)	
8.	Food Science and Processing	3(2+1)	
Fourth Year			
Semester VII			

	Elective I. Plant Biotechnology		
1.	Applications of Genomics and Proteomics	4(3+1)	**20(14+6)**
2.	Principles of Molecular Breeding	4(3+1)	
3.	Molecular Breeding of Horticultural Crops and Forest Trees	3(2+1)	
4.	Molecular Breeding in Field Crops	3(2+1)	
5.	Seed Biology, Production and Management	3(2+1)	
6.	Plant Genetic Transformation	3(2+1)	
	Elective II. Animal Biotechnology		
1.	Principles and Procedures of Animal Cell Culture	4(3+1)	**20(15+5)**
2.	Animal Genomics	4(3+1)	
3.	Transgenic Animal Production	3(3+0)	
4.	Molecular Virology and Vaccine Production	3(2+1)	
5.	Embryo Transfer Technologies	3(2+1)	
6.	Animal Reproductive Biotechnology	3(2+1)	
	Elective III. Microbial and Environmental Biotechnology		
1.	Fundamentals of Molecular Pharming and Biopharmaceuticals	4(3+1)	**20(16+4)**
2.	Microbial Biotechnology	4(3+1)	
3.	Bioprospecting of Genes and Molecules	3(3+0)	
4.	Molecular Ecology and Evolution	3(3+0)	
5.	Food Biotechnology	3(2+1)	
6.	Green Biotechnology	3(2+1)	
	Elective IV. Bioinformatics		
1.	Programming in Bioinformatics	4(2+2)	**20(13+7)**
2.	Bioinformatics Tools and Biological Databases	3(2+1)	
3.	Structural Bioinformatics	3(2+1)	
4.	Pharmacogenomics	3(2+1)	
5.	Metabolomics and Systems Biology	4(3+1)	
6.	Computational Methods for Data Analysis	3(2+1)	
	Semester VIII		
1.	Student READY (RAWE/industry attachment/experiential learning/hands on training/project work/internship) in the area of Plant Biotechnology, Animal Biotechnology, Microbial and Environmental Biotechnology and Bioinformatics	20(0+20)	**20(0+20)**