SEMESTERWISE COURSE LAYOUT FOR B.Tech. (BIOTECHNOLOGY)

Semester I		
Course No.	**Course Title**	**Credit**
BOT-111/ MATH-111	Basic Botany/ Basic Mathematics – I	2+1/3+0
AGRO-111	Crop Production Technology	2+1
BT-111	Cell Biology	2+0
BT-112	Basic Genetics	2+1
BT-113	Introduction to Biotechnology	2+1
CSPD-111	Communication Skills and Personality development	1+1
ENV-111	Environmental Studies and Disaster Management	2+1
FT-111	Food Science and Processing	1+1
HD-111	Human Ethics	1+0
DEG-111	Democracy, Elections and Good Goverence	1+0 NC
NCC-111/ NSS-111	NCC/NSS	0+1 NC
	Total	**15+7 (22) +2 NC=24**

Semester II		
Course No.	**Course Title**	**Credit**
ZOO-121/ MATH-122	Basic Zoology/ Basic Mathematics-II	2+1/3+0
BT-124	Plant Tissue Culture	2+1
BT-125	Molecular Biology	2+1
BOT/ZOO-121	Biodiversity and its Conservation	2+0
MICRO-121	Microbiology	2+1
*HORT-121/ **AS-121	Production technologies for Horticultural Crops/ Anatomy and Physiology of Livestock	2+1/ 3+0
*PB -121/**AS-122	Principles of Plant Breeding/ Introduction to Animal Breeding	2+1/ 2+1
STAT-121	Basic Statistics	1+1
PHYEDN-111	Physical Education and Yoga	0+1 NC
NCC-122/ NSS-122	NCC/NSS	0+1 NC
	Total	**15+7(22)+2 NC=24**

Semester III		
Course No.	**Course Title**	**Credit**
AS -233	Livestock Production and Management	2+1
BT-236	Recombinant DNA Technology	2+1
BOT-232	Plant Physiology	2+1
MATH-233	Biomathematics	2+1
ICT-231	Information and Communication Technology	1+1
ECON-231	Economics and Marketing	2+1
*ENT./Pl.PATH- 231/ **AS-234	Fundamentals of Crop Protection/ Livestock Product Technology	2+1/ 2+1
*PB-232/ **AS 235	Breeding of Field Crops/ Animal Health Care	2+1
NCC-233/NSS-233	NCC/NSS	0+1 NC
Total	**15+8(23) +1 NC=24**	

Semester IV		
Course No.	**Course Title**	**Credit**
EDBM -241	Entrepreneurship Development and Business Management	1+1
BIOCHEM- 241	General Biochemistry	3+1
BT-247	Introductory Bioinformatics	2+1
BT-248	Plant Genetic Transformation	2+1
BT/ECE-241	Fundamentals of Electronics and Instrumentation in Biotechnology	1+1
BT-249	Classical and Molecular Cytogenetics	2+1
MICRO-242	Microbial Genetics	2+1
PHY-241	Biophysics	2+1
NCC-244/NSS-244	NCC/NSS	0+1 NC
Total	**15+8 (23)+1NC =24**	

Semester V		
Course No.	**Course Title**	**Credit**
BIOCHEM-352	Enzymology and Enzyme Technologies	2+1
BT-3510	Immunology	2+1
BT-3511	Molecular Genetics	2+0
BT-3512	Nanobiotechnology	2+0
BT-3513	Animal Biotechnology	3+1
BT-3514	Molecular Marker Technology	2+0
BT-3515	Genomics and Proteomics	3+0
BT-3516	IPR, Biosafety and Bioethics	2+0
ICT-352	Agricultural Informatics	2+1
EDNT-351	Educational Tour	0+1
Total	**20+5=25**	

Semester VI		
Course No.	**Course Title**	**Credit**
BT-3617	Computational Biology	2+1
STAT-362	Biostatistics	2+1
Optional/ Elective Courses (6) PBTEL-361 to 366 ABTEL-361 to 366 MEBTEL-361 to 366 BIFEL-361 to 366	Electives (4): Only one to be chosen (each with six courses)	18
1. Plant Biotechnology	12+6	
2. Animal Biotechnology	13+5	
3. Microbial and Environmental Biotechnology	14+4	
4. Bioinformatics	11+7	
Total	**24**	

Elective Courses in Biotechnology (one to choose), Each Elective: Total Credit Hours=18 Elective I. Plant Biotechnology		
Course No.	**Course Title**	**Credit**
PBTEL-361	Plant Tissue Culture and its Applications	2+1
PBTEL-362	Principles and Applications of Plant Genetic Transformation	2+1
PBTEL-363	Applications of Genomics and Proteomics	2+1
PBTEL-364	Molecular Breeding in Field Crops	2+1
PBTEL-365	Molecular Breeding of Horticultural Crops and Forest Trees	2+1
PBTEL-366	Epigenetics and Gene Regulation	2+1
Elective II. Animal Biotechnology		
ABTEL-361	Principles and Procedures of Animal Cell Culture	2+1
ABTEL-362	Animal Genomics	2+1
ABTEL-363	Embryo Transfer Technologies	2+1
ABTEL-364	Transgenic Animal Production	3+0
ABTEL-365	Molecular Diagnostics	2+1
ABTEL-366	Molecular Virology and Vaccine Production	2+1
Elective III. Microbial and Environmental Biotechnology		
MEBTEL-361	Microbial Biotechnology	2+1

Semester VII		
Course No.	**Course Title**	**Credit**
ET-472	Educational Tour	0+1
Plant Biotechnology*		
READY-PB-471	Micro-propagation of field, horticultural and Medicinal plants	0+20
or		
READY-PB-472	DNA Fingerprinting and hybridity testing	0+20
Animal Biotechnology		
READY-AB-471	Dissemination of *Elite* germplasm of any species by frozenSemen technology	0+20
READY-AB-472	Molecular diagnostics for diseased/disordered animals	0+20
Microbial and Environmental Biotechnology		
READY-MEB-471	Production of Probiotics/ Fermented Milk Products	0+20

READY-MEB-472	Mushroom Production and Processing Technology	0+20
READY-MEB-473	Liquid Biofertilizer Production Technology	0+20
Bioinformatics		
READY-BIF-471	Biological database creation and its management	0+20
READY-BIF-472	Bioinformatics: Gene to genome	0+20

Semester VIII		
Course No.	**Course Title**	**Credit**
READY-482	Student READY- Project Formulation, Execution and Presentation	0+10
READY-483	Student READY- Entrepreneurial Development in Biotechnology (On-campus/Off Campus)	0+10
Total	**0+20 =20**	

SEMESTERWISE COURSE LAYOUT FOR B.Sc. (AGRIL.BIOTECHNOLOGY)

Semester I

Bio-111 Basic Biochemistry 2+1=3
PB-111 Fundamentals of Genetics 2+1=3
CS-111 Principles of Plant Physiology 2+1=3
CS-112 Field Crop Production 2+1=3
CS-113 Introductory Entomology 1+1=2

Total 9+5=14

Non Credit Courses
LANG-111 Comprehension and Communication Skills in English 1+1=2
PHY EDN-111 Physical Education 0+1=1

Deficiency Course
MATH-111 Mathematics 1 + 1= 2
Total 2+3=5

Grand Total 11+8 = 19

Semester II

Bio-122 Enzymology 2+1=3
Bio-123 Microbial Genetics 2+1=3
PB-122 Cell Biology 2+1=3
PB-123 Introduction to Plant Biotechnology 2+1=3
FB-121 Human Nutrition 1+1=2
CS-124 Fundamentals of Plant Pathology 1+1=2
CS-125 Agricultural Microbiology 1+1=2
CS-126 Horticultural Crop Production 2+1=3

Total 13+8=21

Non Credit Courses
NCC/NSS-121 National Cadet Corps / National Service Scheme (NCC/NSS) 0+1=1

Grand Total 13+9=22

Semester III

Bio-234 Molecular Biology 2+1=3
Bio-235 PlantMetabolic Pathways 2+1=3
Bio-236 Elements of Immunology 1+1=2
PB-234 Plant Breeding Techniques 2+1=3
PB-235 Molecular Markers in Plant Breeding 1+1=2
FB-232 Industrial Microbiology and Fermentation Technology 2+2=4

AB-231 Basics in Animal Biotechnology 2+1=3
CS 237 Greenhouse Technology and Protected Cultivation 1+1=2
Total 13+9=22

Semester IV

Bio-247 Techniques in Biochemistry and Molecular Biology 2+2=4
PB-246 Plants Cell and Tissue Culture 2+1=3
FB-243 Enzyme Biotechnology in Food Processing 2+1=3
FB-244 Post-harvest Biotechnology of Food Grains 2+1=3
AB-242 Animal Cell Culture 2+1=3
AB-243 Biotechnology of Ruminant Feed Utilization 2+1=3
CS 248 Bio-Statistics 1+1=2
CS-249 Intellectual Property Right 1+0=1
Total 14+8=22

Semester V

Bio-358 Recombinant DNA Technology 2+1=3
PB-357 Biotechnology of Biotic and Abiotic Stress Tolerance 2+1=3
PB-358 Biodiversity Conservation 2+1=3
FB-355 Technological Applications in Food Processing 1+1=2
AB-354 Dairy Process Biotechnology 2+1=3
AB-355 Livestock Genome 2+1=3
CS-3510 Computer Applications in Biotechnology 1+2=3
Total 12+8=20

Semester VI

Bio-369 Molecular Plant Virology 2+1=3
PB-369 Introduction to Bioinformatics 1+2=3
PB-3610 Biosafety Issues 2+0=2
FB-366 Post-harvest Biotechnology of Horticultural Crops 2+1=3
FB-367 Food and Nutrition Security of GM Food crops 1+1=2
AB-366 Animal Genetic Engineering 2+1=3
CS-3611 Management of Major Insect Pests and Diseases of Field and Horticultural Crops 1+1=2
CS 3612 Marketing and Export of Biotechnological Products 1+1=2
Total 12+8=20

Semester VII

CS 4713 Seminar 0+1=1
Cafeteria Courses of major departments 4+6=10
Cafeteria Courses of minor department(I) 2+3=5
Cafeteria Courses of minor department (II) 2+3=5
Total 8+13=21

Semester VIII

HOT481 Hands on training 0+20 Total 0+20=20

1) Each Department should create the facilities required for the above training and experiential learning.
2) Equal students should be allotted to four major departments immediately after the registration of the semester.

3) Each Department should prepare at least two equal batches and allot the project work to the students.