


College of Biotechnology
SARDAR VALLABHBHAI PATEL UNIVERSITY OF
AGRICULTURE AND TECHNOLOGY,
MEERUT- 250 110

B.Tech (Biotechnology)

Duration	Four academic years (8 semesters)
Minimum Eligibility, Curriculum Structure & other details:	http://www.svpuat.ac.in/


PROGRAM OUTCOMES (POs)

1. The course gives student an opportunity to learn about the factors that influence our Biological systems, environment and the living conditions and learn how different biotechnological approaches are used to manage various relevant issues in diverse areas of biology.
2. The student will develop simulations to think as a biotechnological strategist and design an appropriate solution to diverse problems in areas of Agriculture, Health, and Industry etc.
3. Students will develop ethical practices and imbibe values for becoming Biotechnology professionals.
4. An Understanding of Biotechnological Functions: Expertise in learning processes and functions that operates in Biological Organisms.
5. Interpersonal Skill Development: Expertise in communication both spoken as well as written.
6. Developing Critical and Analytical Thinking Abilities: Critical thinking in academics, presentations, research and professional alliances relies heavily on one's ability to be creative.
7. Developing Entrepreneurship Acumen: Helps to prepare students for research/ managerial roles and as entrepreneurs.


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8. Developing skills to solve real-world biotechnological problems: Equips students to demonstrate the capabilities required to apply cross-functional knowledge and technologies in solving real-world biotechnological problems.
9. Appropriate techniques: Enables students to demonstrate use of appropriate techniques to effectively manage academic and research challenges.
10. Practical exposure: Providing an opportunity for the students to gain practical exposure towards the workplace of biotech laboratory and make them industry ready.
11. Decision Making: Equip students with techniques of analyzing and interpretation of the research data which is used in Decision Making.
12. To develop students with the ability to analyze various functional issues affecting the biotechnological organization and acquiring conceptual clarity of various functional areas of biotechnology.
13. The students understand the ethical challenges and choices in a biotechnological unit setting and develop ability to evolve strategies for research/ organizational benefits.
14. To inculcate in students the ability to gain multidisciplinary knowledge through seminar reports, case study analysis, Research projects and industrial training and Organizational visits.
15. Demonstrate ability to work in Groups and acquire leadership quality required in their career.


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COURSE OUTCOMES (COs)

Subject	Subject Code	Course Outcomes
Human Ethics	BAS 112	Understanding about 1. Universal human aspirations, Human values and ethics, Sensitization towards others. 2. Spirituality, positive attitude and scientific temper, 3. Rights and responsibilities, Human relations and harmony, 4. Developing personal code of conduct (SWOT Analysis); 5. Management of anger and stress.
Basic Mathematics-I	BAS 116	Learn mathematical description of 1. Number system and Complex numbers. 2. Theory of equations. 3. Geometric, harmonic and binomial series. 4. Trigonometric calculations.
Basic Botany	BAS 114	Provides study of different aspects of Botany, viz. 1. Plant kingdom and features of each group. 2. Cell structure; DNA, chromosome and genes; Cell and tissue types. 3. Plant taxonomy, systems of classification. 4. Characteristics and economic importance of different families.
Communication Skills & Personality Development	BAS 115	Development of understanding on 1. Meaning and process of communication 2. Reading and comprehension of general and technical articles. 3. Writing skills, Voice modulation and Oral presentation skills. 4. Organizing seminars and conferences. 5. Attributes of an effective leader; Stress, conflict and Time management. 6. Science of body language and Role of team work.
Environmental Studies and Disaster Management	AGE/ SAC/ AGR 114	To describe, explain, and integrate fundamental concepts underlying 1. Natural resources and its conservation for sustainable lifestyles. 2. Ecosystems, Biodiversity and its conservation; 3. Environmental issues like water, forest, land, wildlife conservation, Pollution, climate change etc., their effects, control measures and acts. 4. Disaster management - Efforts to mitigate natural disaster at national and global levels.
Food Science and Processing	AGE 113	To help the students to acquire and develop skill in various areas of Food Science and Processing, 1. Food and nutrition, 2. Causes of food spoilage, principles of processing and preservation of food, 3. Post-harvest handling and technology.
Crop Production	AGR 113	To enable the students to understand about the


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Technology		various areas of crop production technology, 1. Study of Soil and its components, 2. Agronomy and its relation with other sciences, 3. Soil fertility and productivity.
Basic Genetics	BTM 111	To help the students focus on and analyze the issues and strategies of basic genetics, 1. History of Genetics, Mendel principles and genetic basis of evolution. 2. Multiple allelism, Linkage and crossing-over, 3. Genetic analysis in prokaryotes and eukaryotes, 4. Mutations, Hardy-Weinberg law and Quantitative inheritance.
Introduction to Biotechnology	BTO 111	To describe and introduce basic concepts of Biotechnology including, History, definitions, concepts, scope and importance of Biotechnology. 1. Understand Biotechnological applications in Plant, microbial, animal, medical, environmental, industrial, Marine, Agricultural, food and Nanobiotechnology.
Cell Biology	BTC 111	Explain the concept of the various constituents of cell biology viz. 1. Origin and evolution of cell, microscopy; 2. Sub-cellular structure of prokaryotic and eukaryotic cells; 3. Membrane structure and function, cell wall and extracellular matrix, 4. Structure and function of cytoskeleton, 5. Cell membrane transport, cell signaling, cell cycle and its control.
NCC/NSS/PEY (NG)	NCC/NSS/PEY- 111	Evoking social consciousness among students through various activities viz., 1. Working together, constructive and creative social work, 2. To be skilful in executing democratic leadership, 3. Developing skill in program development to be able for self-employment, 4. Increasing physical fitness, awareness and desire to help sections of society.
Basic Zoology	BAS 121	Students will get to know about the introduction to various aspects of Zoology, 1. Binomial Nomenclature and Classification and general survey of animal kingdom, 2. Functional organization of various systems of a mammal, 3. Study of animal cell structure and cell division.
Basic Mathematics- II	BAS 122	Learn mathematical description of 1. Functions, Limit and Continuity of algebraic, trigonometric and exponential functions. 2. Differential and Integral Calculus. 3. Mathematical operations of Matrices and Determinants.
Basic Statistics	BAS 123	To apply various concepts of statistics in analysis of


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		research data in different areas of biotechnology viz. 1. Definition of statistics, its use and limitations; 2. Frequency distribution and frequency curve. 3. Tests of significance, 4. Correlation, regression and analysis of variance.
Production Technologies for Horticultural Crops	HOR 121	To introduce students about 1. Importance and scope of fruit cultivation; Classification of fruit crops; Climatic requirement, 2. Importance of vegetable cultivation for nutritional security; Production technology of important vegetable crops, 3. Status and scope of floriculture in India and abroad; Production technology of commercial flower crops.
Anatomy and Physiology of Livestock	VAN/VPB 123	To understand the core issues and terms used in veterinary anatomy, 2. Development and physiology of the organs of digestive, urogenital, cardiovascular, nervous and endocrine glands, 3. Blood physiology; Genetic and endocrine control of reproductive system.
Basics of Plant Breeding	GPB 122	Awareness about aims and objectives of Plant breeding, 1. Floral biology of field crops 2. Methods of breeding for self-pollinated, cross pollinated and vegetatively propagated crops. 3. Hybridization and its significance in crop improvement.
Introduction to Animal Breeding	AAP 121	To introduce students with newly emerging area of Animal Breeding, 1. Mating Systems: Inbreeding, Out Breeding and Random mating, 2. Breeding strategies in different animals.
Plant Tissue Culture	BTO 121	Familiarizes the students with Concept of aseptic culture and various techniques of plant tissue culture viz. 1. Somatic cell cultures; 2. Morphogenesis: organogenesis and somatic embryogenesis; 3. Micro propagation, Protoplast culture and somatic hybridization.
Molecular Biology	BTM 121	Develops understanding of the students on the biology at molecular level. 1. Gene structure and function; 2. DNA replication; transcription; Genetic code and translation, 3. Gene regulation, 4. Tools and Role of enzymes in molecular biology.
Biodiversity and its conservation	BTC 121	Introduces students with Concepts of biodiversity, bio resource and wildlife conservation and management strategies. 1. Sustainable development, Diversification of cropping system, ecosystems and Germplasm banks. 2. Environmental impact assessment.
Microbiology	BTP 121	Ability to understand practical and theoretical


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		implementation of Microbiology-its applied areas, viz. 1. Microbial features, growth and metabolism. 2. Microorganisms and their role in fermentation, Soil and environment. 3. Beneficial microorganisms in agriculture and Plant microbe interaction, 4. Microbes in composting and biodegradation.
Biomathematics	BAS 211	To introduce the student to the field of biomathematics, 1. Ordinary differential equation of first order, linear differential equation of higher order and their applications to biological problems, 2. Numerical methods, definite integrals and its applications.
Information and Communication Technology	BAS 214	Developing understanding about IT tools, IT-enabled services and their impact on society, 1. Features of machine language, assembly language, high-level language and their advantages and disadvantages; 2. Principles of programming, 3. Introduction to WINDOWS and LINUX Operating Systems, 4. Introduction to MS Office and its applications.
Economics and Marketing	AAE 212	Students acquire knowledge of 1. Economics, the kind of markets, cost theory, various issues of demand and other major economic concepts, 2. Have developed skills in role and functions of marketing, 3. Basic guidelines for preparation of project reports for various biotechnology/ agricultural products and value added products
Fundamentals of Crop Protection	ENT/ PPA 212	Familiarization of students with Fundamentals of Crop Protection viz. 1. Importance of insects in agriculture, 2. Principles and methods of insect-pests management, 3. Importance and scope of plant pathology, 4. Nature and classification of plant disease, the Management of key diseases and nematodes of major crops.
Livestock Product Technology	LPT 211	Understanding the basics of Livestock Product Technology, 1. Composition and nutritive value of milk and meat and various factors affecting their quality, 2. Milk and meat processing techniques and guidelines.
Breeding of Field Crops	GPB 212	The students will be able to define and explain application of genetic, cytogenetic and biotechnological techniques in breeding of various field crops, 1. Classes of seed along with its production, maintenance and certification.
Animal Health Care	VMD/VMC	Introduction to various aspects of animal health; 1.


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	212	Introduction to important diseases of domestic animals, 2. History of disease diagnosis and medicine; 3. Animal vaccinations and disease management.
Livestock Production and Management	LPM 212	Introduction to Livestock Production and Management concepts, 1. Animal husbandry and Breeds of livestock, 3. General management and feeding practices of animals, 4. Common farm management practices 5. Diseases, parasite & hygiene control.
Recombinant DNA Technology	BTR 211	Understanding the basics of Recombinant DNA technology; 1. Structure and function of nucleic acids, 2. Introduction to enzymes used in the technology, 3. Cloning through PCR and Host-vector system, 4. Methods of Transformation.
Plant Physiology	BTB 211	Student will be able to understand and correlate concepts of Plant physiology and its scope in agriculture, viz. 1. Water absorption, water translocation and transpiration; 2. Stomata mechanisms and photosynthesis, 3. Dynamics of growth and Stress physiology, 4. Plant growth regulators, seed germination & seed dormancy.
Biophysics	BAS 221	Provides an insight into application of Biophysics in biotechnology, for e.g. 1. Quantum mechanics, Electronic Structure of atoms and law of thermodynamics, 2. Application of various instrumentation techniques used in biotechnology research
Entrepreneurship Development and Business Management	AEC/ AAE 222	Basic understanding and awareness of different opportunities and successful growth stories. 1. Learn how to start an enterprise and design business plans those are suitable for funding by considering all dimensions of business. 3. Understand entrepreneurial process and assessment of entrepreneurship skills; SWOT analysis and achievement motivation, 4. Opportunities and challenges to Indian agribusiness, Management, Project planning, formulation and report preparation.
Electronics and Instrumentation in Biotechnology	BTB/ AGE 221	Use of various facets of Electronics and instrumentation in biotechnology, eg. 1. Use of PN junction diode, temperature measurement using thermometer and thermocouple, Force measurement using the strain gauge. 2. Concept of generalized instrumentation system, principles and working of




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		laboratory equipment's.
General Biochemistry	BTB 222	Understanding the basics of Cell structure and biochemical functions e.g. 1. Bio molecules- primary, Secondary metabolites and their applications in food and pharmaceutical industries.2. Bioenergetics and basic Metabolism.
Introductory Bioinformatics	BTI/ BTR 221	To develop a basic understanding of bioinformatics processes viz. 1. Databases: Nucleotide, protein sequence and Secondary databases, 2. Introduction to sequence alignment and its applications.
Plant Genetic Transformation	BTM 221	Students will be able to define Application of genetic transformation: for quality, yield, biotic, and abiotic stresses, 1. Generation of gene construct and Genetic transformation, 2. Selection and characterization of transgenic plants using selectable and reportable markers and Biosafety aspects.
Classical and Molecular Cytogenetics	BTC 221	Developing an understanding of application of Cytogenetics in Locating genes on chromosome and Genome analysis, 1.Cell division,2. Study of Structure of chromatin and Chromosome by differential staining, 3. Changes in chromosome number and their structural aberrations.
Microbial Genetics	BTP 221	Students will be able to understand the characteristics, components and concept of Microorganisms as tools for genetic studies using 1. Recombination and chromosomal mapping; 2. Complementation testing,3. Genetic analysis of representative groups of bacteria, fungi and viruses.
Agricultural Informatics	BAS 311	Student will be Introduced to computers along with, 1. Uses of DBMS in Agriculture Computer programming, 2. Computer models in agriculture e.g. statistical, weather analysis and crop simulation models. 3. Application of innovative ways to use information and communication technologies (IT) in agriculture and Decision support systems.
Animal Biotechnology	VMC 312	To introduce students with Basic techniques in animal cell culture and Embryo transfer technology, viz. 1. Marker assisted breeding of livestock and Introduction to animal genomics, 2. Rumen, its environment and manipulation of its microbes, 3. Manipulation of lactation by biotechnological tools; 4. Application of biotechnology in meat and meat products. 5. Genome


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		and protein based diagnostics of important animal diseases.
Immunology	BTI 311	Provides an insight into application of components of immune system, viz, 1. Immunoglobulin structure functions and Molecular organization, 2. Allergies, hypersensitive response, Immunodeficiency and Vaccines, 4. Various Immunological techniques and Molecular diagnostics.
Molecular Genetics	BTM 311	Develops understanding on genetics at molecular level, e.g. 1. Molecular mechanisms of DNA replication, repair, mutation, and recombination; 2. Centromere and telomere sequences and DNA packaging; 3. Synthesis and processing of RNA and proteins; 4. Regulation of gene expression; 5. Mutations and DNA repair. 6. Promoters and Transcription factors and their role in gene expression; 7. Epigenetic control of gene expression, Small RNAs and RNA interference.
Nanobiotechnology	BTM 312	To explain the core issues of nanobiotechnology, viz. 1. Biological based Nanosystems, molecular motors, biosensors and other devices, 2. Nanomanipulations, material design, synthesis and their applications.
Molecular Marker Technology	BTF 311	Understanding types and application of molecular markers for 1. Assessing genetic diversity, variety protection; 2. Marker-assisted breeding, 3. Human and animal health, Association with genetic-based diseases, 4. Paternity determinations and Forensic studies.
IPR, Biosafety and Bioethics	BTF 312	Introduction to types of Intellectual Property and various issues related to it for e.g. 1. International and Indian Legislations for the protection of various types of Intellectual Property; 2. Patent search and filing process; 3. Material transfer agreements.
Genomics and Proteomics	BTR 311	Introduce students with newly emerging area of genomics viz. 1. Structural genomics, Physical mapping of genomes; Next generation sequencing; Genome analysis and gene annotation; 2. Genome Projects of various model organisms, 3. Functional genomics including various Transcriptomics and Proteomics techniques.
Enzymology & Enzyme Technologies	BTB 311	Familiarizes the students with Concept and applications of enzymes in biotechnology, industry, environment, agriculture, food and medicine. It impart exposure in several areas viz. 1. Classification and nomenclature of


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		enzymes; 2. General characteristics of enzymes, active site, cofactors, prosthetic groups; 3. Isolation, purification, characterization and assays of enzyme, 4. Enzyme kinetics, Regulation of enzyme activity and Enzyme inhibition.
Biostatistics	BAS 321	Enhances the understanding on various applications of statistics in biology, 1. Random variables and probability distribution of random variables; 2. Hardy-Weinberg Law and Introduction to Poisson process and Markov chains; 3. Chi-square test: testing heterogeneity, use in genetic experiment, detection of linkage, linkage ratios and its estimation; 4. Analysis of variance and Estimation and significance of genotypic and phenotypic variation. 5. Analysis of covariance, block designs and Testing of heritability.
Computational Biology	BTI/BTR 321	Provides an introduction to computational biology along with Web based servers and software for 1. Genomevisualization and analysis, 2. Protein interaction databases, Principles of Protein structure prediction, Fold Recognition (threading), Homology modeling and Methods for comparison of 3D structures of proteins. 3. Phylogenetic analysis and application of Genome browsers in genomic research.
Optional/ Elective Course in Plant Biotechnology	Elective I	Imparting skill set in various areas of Plant Biotechnology viz. 1. Plant Tissue Culture and its Applications. 2. Principles and Applications of Plant Genetic Transformation. 3. Epigenetics and Gene Regulation. 4. Applications of Genomics and Proteomics. 5. Molecular Breeding in Field Crops. 6. Molecular Breeding of Horticultural Crops and Forest Trees
Optional/ Elective Course in Animal Biotechnology	Elective II	Gain attributes and skill set in various areas of Animal Biotechnology viz. 1. Animal Genomics. 2. Embryo Transfer Technologies. 3. Principles and Procedures of Animal Cell Culture. 4. Transgenic Animal Production. 5. Molecular Diagnostics. 6. Molecular Virology and Vaccine Production
Optional/ Elective Course in Microbial and Environmental Biotechnology	Elective III	Provides knowledge and skill set in various areas of Microbial and Environmental Biotechnology viz. 1. Microbial Biotechnology, 2. Green Biotechnology. 3. Molecular Ecology and Evolution. 4. Molecular Pharming and Biopharmaceuticals. 5. Food


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		Biotechnology. 6. Bio-prospecting of Molecules and Genes
Optional/ Elective Course in Bioinformatics	Elective IV	Exposure and developing skills in various areas of Bioinformatics viz. 1. Programming for Bioinformatics. 2. Computational Methods for Data Analysis. 3. Bioinformatics Tools and Biological Databases. 4. Structural Bioinformatics. 5. Pharmaco genomics. 6. Metabolomics and System Biology
Educational Tour (NG)	BTS 411	To practically Impart awareness about Local, neighboring or other University/SAU/Research Station/ KVK/ ICAR/ Institutes/ Industries etc. visit based on their importance and relevance for improvement of student exposure towards different Academic/ Industrial environments.
Student READY – (04 Optional topics) In-house Skill Development Modules	BTS 412	The students will be able to know the scope, significance, and methodology used in specialized field of any one chosen elective, Elective I. Plant Biotechnology, Elective II. Animal Biotechnology, Elective III. Microbial and Environmental Biotechnology, Elective IV. Bioinformatics.
Bioprocess Engineering, Bioseperation and Downstream processing	BTO/AGE 411	Student will become efficient and acquire acumen on various aspects of 1. Bioprocess principles including upstream and downstream processing. 2. Chemical engineering principles applied to biological system, 3. Principle of reactor design along with various types of microbial and enzyme reactors and Instrumentation control and optimization, 4. Mass and Heat transfer; 5. Media formulation and optimization.
Student READY - Project Formulation, Execution and Presentation	BTS 421	1. Carry out a substantial research-based project. 2. Analyze data and synthesize research findings. 3. Report research findings in written and verbal forms.
Student READY - Entrepreneurial Development in Biotechnology	BTS 422	1. Develop idea generation, creative and innovative skills. 2. Aware of different opportunities and successful growth stories. 3. Learn how to start an enterprise and design research plans those are suitable for funding by considering all dimensions of business. 4. Understand entrepreneurial process by way of studying different case studies.


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PG/Ph.D

Plant Molecular Biology & Biotechnology

Duration (PG)	Two academic years (4 semesters)
Duration (Ph.D)	Three academic years (6 semesters)
Minimum Eligibility, Curriculum Structure & other details:	http://www.svpuat.ac.in/


PROGRAMME OUTCOMES (POs)

1. To equip students with fundamental concepts of core domain subjects of Biological systems, environment and biotechnology and learn how different biotechnological approaches are used around the world to manage various relevant issues in diverse areas of Plant biology.
2. To encourage students for undertaking various latest and innovative research theme and ideas, which benefit society. The student will develop simulations to think as a biotechnological strategist and design an appropriate solution to diverse problems in areas of Agriculture, Health, Industry etc.
3. To provide practical experience and exposure of working on diverse biotechnological problems. Students will develop ethical practices and imbibe values for becoming Biotechnology professionals.
4. To equip students with latest analytical tools and bioinformatics software, which help in analysis of the biological and environmental factors relevant to various segments of Plant Biotechnology.
5. Deeper understanding of Biotechnological Functions: Expertise in learning processes and functions that operates in Biological Organisms with focus on Plant Biotech related aspects.
6. Interpersonal Skill Development: Expertise in communication both spoken as well as written form.


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7. Enhance creativity and developing Critical and Analytical Thinking Abilities: Critical thinking in academics, presentations, research and professional alliances relies heavily on one's ability to be creative.
8. Exposure for developing Entrepreneurship Acumen: Helps to prepare students for research/ managerial roles and as entrepreneurs.
9. Develop skills to Identify problems, define objectives collect and analyse information, evaluate alternatives, and leverage technology to enable qualitative and quantitative methods to solve problems. Equips students to demonstrate the capabilities required to apply cross-functional knowledge and technologies in solving real-world biotechnological problems.
10. Appropriate techniques: Enables students to demonstrate use of appropriate techniques to effectively manage academic and research challenges in field of Biotechnology.
11. Practical exposure: Providing an opportunity for the students to gain practical exposure towards various sections of biotechnology, the workplace and make them industry ready.
12. Analytical and Decision Making qualities: Equip students with techniques of analyzing and interpretation of the research data which is used in Decision Making.
13. To inculcate students with the ability to analyze various functional issues affecting the biotechnological organization and acquiring conceptual clarity of various functional areas of Plant biotechnology.
14. The students understand the ethical challenges and choices in a biotechnological unit setting and develop ability to evolve strategies for organizational benefits.
15. To incorporate in students the benefits and ability to gain multidisciplinary knowledge through seminar reports, case study analysis, Research projects and industrial training and Organizational visits.
16. Demonstrate ability to work in Groups and leadership in their career.
17. To organize Workshops, Short Term Courses, Conferences, and seminars for students throughout the course for better understanding of the subject expertise, knowledge and skills required to the organization/ industry.


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COURSE OUTCOMES (COs)

Subject	Subject Code	Course Outcomes
Principles of Biotechnology**	BTF 501	Familiarizes the students with the fundamental principles of Biotechnology, various developments in Biotechnology and its potential applications.
Fundamentals of Molecular Biology**	BTM 502	Imparts the students with the basic cellular processes at molecular level.
Molecular Cell Biology**	BTC 503	Develops understanding of the students on the cell biology at molecular level.
Plant Tissue Culture & Genetic Transformation	BTF 504	Familiarizes the students with hands on training on various techniques of plant tissue culture, genetic engineering and transformation.
Techniques In Molecular Biology I**	BTA 505	Provides hands on training on basic molecular biology techniques.
Microbial/ Industrial Biotechnology	BTO 506	Acquaints the students about the various microbial processes/systems/activities, which have been used for the development of industrially important products/processes.
Molecular Breeding	BTF 507	Familiarizes the students about the use of molecular biology tools in plant breeding.
Genomics & Proteomics	BTR 508	Introduces the students with recent tools used for genome analysis and their applications.
Techniques In Molecular Biology II	BTA 509	Provides hands on training on various molecular techniques used in molecular breeding and genomics.
Biosafety, IPR and Bioethics*	BTO 510	Development of awareness about various aspects of biosafety regulations, IPR and bioethics concerns arising from the commercialization of biotech products.
Animal Biotechnology*	BTI 511	Provides an overview and current developments in different areas of animal biotechnology.
Immunology and Molecular Diagnostics*	BTI 512	Awareness about the application of various immunological and molecular diagnostic tools.
Nano-Biotechnology*	BTB 513	Develops understanding of the molecular techniques involved in structure and functions of nano-biomolecules in cells such



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		as DNA, RNA and proteins.
Principles of Genetics*	BTM 551	Development of understanding about the basic concepts of genetics, students to develop their analytical, quantitative and problem solving skills from classical to molecular genetics.
Basic Biochemistry*	BTB 552	Provides elementary knowledge/overview of structure, functions and metabolism of biomolecules.
Biostatistics and Computers*, **	BAS 553	Exposure of students to various statistical methods to analyze their experimental data.
Principles of Microbiology*	BTP 554	Acquaints the students with history, classification and role of microbiology in agriculture, food and environment.
Introduction to Bioinformatics	BTI 555	Imparts an introductory knowledge about the subject of bioinformatics to the students studying any discipline of science.
Environmental Biotechnology	BTC 556	Apprise the students about the role of biotechnology in environment management for sustainable eco-system and human welfare.
Master's Seminar	BTS 591	1. Demonstrate use of appropriate methodologies and test the strength of their topic statement. 2. Shall be able to show insight on topic, appropriate signposting, and clarity of purpose. 3. Demonstrate problem-solving skills and apply theoretical knowledge.
Master's Research	BTS 599	Research topics providespractical skills and facilitate for appropriate research directions to the PG students.
Advances in Plant Molecular Biology	BTM 601	Understanding and discussions on the specialized topics and recent advances in the field of plant molecular biology.
Advances in Genetic Engineering	BTM 602	Imparts knowledge on specialized topics and advances in field of genetic engineering and their application in plant improvement.
Advances in Microbial Biotechnology	BTP 603	Apprise the students on specialized topics about industrially important microorganisms.
Advances in Crop Biotechnology	BTF 604	Knowledge on specialized topics on the application of molecular tools in breeding of



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		specific crops.
Advances in Functional Genomics and Proteomics	BTR 605	It provides recent advances and applications of functional genomics and proteomics in agriculture, medicine and industry.
Commercial Plant Tissue Culture	BTO 606	Enables to accomplish the commercial applications of plant tissue culture in agriculture, medicine and industry.
Advances in Animal Biotechnology	BTI 607	Provides cutting edge knowledge on advances in different areas of animal biotechnology.
Doctoral Seminar I	BTS 691	1. To develop understanding on selected topic. 2. Information collection and its organization into a presentation. 3. To develop Effective presentation and communication abilities.
Doctoral Seminar II	BTS 692	1. Demonstrate use of appropriate methodologies and test the strength of their selected topics. 2. Shall be able to show insight on topic, appropriate signposting, and clarity of purpose. 3. Demonstrate problem-solving skills and apply theoretical knowledge.
Doctoral Research	BTS 699	1. Carry out a substantial research-based project. 2. Analyze data and synthesize research findings. 3. Report research findings in written and verbal forms. 4. Use research findings to advance scientific theory and practice.

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