Institute of Biological Sciences

Programs Offered:

Master of Philosophy in Microbiology

Master of Philosophy in Biotechnology

Doctor of Philosophy in Microbiology

Doctor of Philosophy in Biotechnology

Vision

The institute is the integrative force at national and international level that will catalyze innovation at the interface between Biotechnology, Microbiology, Botany, Medical Lab Technology, Physiotherapy and other applied sciences; and to achieve excellence as a teaching and research institute in various fields to produce highly skilled professionals and researchers catering to challenging national needs.

Mission

To provide pedagogy embracing speculative and heuristic abilities of its graduates to produce skilled human resource in he fields of Microbiology, Biotechnology and Botany. To prepare the scholars for the new paradigms of interdisciplinary research and development; the institute is open to external collaborations. To achieve excellence in education and research, so that the graduates may play a significant role in the social and economic development of the country.

Master of Philosophy in Microbiology

Minimum Duration : 4 Semesters, 2 Years
Maximum Duration : 8 Semesters, 4 Years
Minimum CGPA required to earn degree 2.50

Program Code	112
Number of Courses	9 + Research Thesis
Credit Hours	32

Eligibility

Candidate having 16 years of education in relevant field with 2.00 CGPA on the scale of 4.00 in semester system or at least 50% marks in annual system from any recognized institute/university is eligible to apply.

Applicant needs to pass GAT (General) to be conducted by NTS/ETEA/any Registered Testing Agency or University, with at least 50% cumulative score and to clear departmental interview at the time of Admission.

Program Outcomes:

After completion of M.Phil program in Microbiology, scholars will be able to:

- Envisage local and national problems pertaining to Microbiology and design and undertake independent research to find solutions.
- Handle, preserve and manipulate microorganisms for the benefit of mankind.
- Strengthen the theoretical & practical foundation of our graduates through state of the art course work.
- Write and review research and communicate with peers in the field.
- The Successful Graduates will prove to be good researchers.

Program Objectives:

- To Provide scholars with a solid foundation in the field of Microbiology.
- To explore the role of microorganisms in human and live stock diseases and the production of value added products and services like biomass, enzymes, chemicals, vaccines, monoclonal antibodies, diagnosis, degradation of organic wastes and bio leaching of minerals from raw ores etc.
- To update the scholars on techniques in different disciplines such as molecular microbiology, microbial bio process technology, medical microbiology and environmental microbiology etc.
- To enhance at national and international level the skills and capabilities of the graduates through participation in seminars, symposia and workshops.

SEMESTER ONE

Course Code	Course Title	Cr. Hrs.12
	Core Course I	3-0
	Core Course II	3-0
	Core Course III	3-0
	Elective I	3-0

SEMESTER TWO

Course Code	Course Title	Cr. Hrs.12
	Core Course IV	3-0
	Core Course V	3-0
	Core Course VI	3-0
	Elective II	3-0

SEMESTER THREE

Course Code	Course Title	Cr. Hrs. 2
RES 581	Research Methodology	2-0

SEMESTER FOUR

Course Code	Course Title	Cr. Hrs. 6
RES 690	Research Thesis	0-6

List of Core Courses (Select any Six Courses):

Course Code	Course Title	Cr. Hrs.
MB 501	Advances in Microbiology	3-0
MB 503	Biodegradation and Bioremediation	3-0
MB 507	Advances in Medical Microbiology	3-0
RES 581	Research Methodology	2-0
RES 511	Research Planning Scientific writing	3-0
MB 514	Microbial Biotechnology	3-0
MB 515	Clinical Virology	3-0
MB 517	Microbial Diversity	3-0
BIO 519	Advances in Molecular Biology	3-0

Course Code	Course Title	Cr. Hrs.
MB 521	Research Techniques and Instrumentation	3-0
MB 525	Microbial Enzyme Technology	3-0
MB 610	Antimicrobials and Resistance Issues	3-0
MB 614	Pharmaceutical Microbiology	3-0
MB 618	Microbial Proteins Isolation and Purification	3-0
MB 622	Advances in Immunology	3-0
MB 628	Molecular Mechanisms of Pathogenesis	3-0
MB 630	Pharmaceutical Bioassays	3-0
PH 610	Epidemiology	3-0

ELECTIVES (Select any one in each semester)

Course Code	Course Title	Cr. Hrs.
MA 534	Biostatistics	3-0
MB 527	Clinical Microbiology	3-0
MB 530	Food Microbiology	3-0
MB 538	Fermentation Technology	3-0
MB 605	Microbial Physiology	3-0
MB 612	Industrial Microbiology	3-0
MB 620	Metabolic Engineering	3-0
BIO 637	Molecular Cancer Biology	3-0
MB 640	Vaccinology	3-0
MB 643	Current trends in Microbiology	3-0
MB 644	Molecular Biology of Gene Expression	3-0
MB 645	Epidemiology: in Analytical and experimental approaches	3-0
MB 647	Management of infectious waste	3-0
MB 649	Mycotic infection	3-0

Course Code	Course Title	Cr. Hrs.
MB 651	Diagnostic Chemistry for Microbial diseases	3-0
MB 653	Environment Microbiology & Public Health	3-0
MB 655	Advances in Soil Microbiology	3-0
MB 657	Veterinary Microbiology	3-0
MB 659	Microbial Human Diseases	3-0
MB 662	Current Trends in Molecular Medicine	3-0
MB 664	Microbial Plant Diseases	3-0
MB 665	E. Coli genetics	3-0
MB 666	Microbial biofilm	3-0
MB 667	Extremophiles	3-0

Master of Philosophy in Biotechnology

Minimum Duration : 4 Semesters, 2 Years
Maximum Duration : 8 Semesters, 4 Years
Minimum CGPA required to earn degree 2.50

Program Code	113
Number of Courses	9 + Research Thesis
Credit Hours	32

Eligibility

Candidate having 16 years of education in relevant field with 2.00 CGPA on the scale of 4.00 in semester system or at least 50% marks in annual system from any recognized institute/university is eligible to apply.

Applicant needs to pass GAT (General) to be conducted by NTS/ETEA/any Registered Testing Agency or University, with at least 50% cumulative score and to clear departmental interview at the time of Admission.

Program Outcomes:

After completion of M.Phil program in Biotechnology, graduates will be able to:

- Envisage local and national problems pertaining to Biotechnology and design and undertake independent research to find solutions.
- Strengthen the theoretical & practical foundation of our graduates through state of the art course work.
- Handle and manipulate biotechnology for the benefit of mankind.

  Write and review research and communicate with peers in the field.
- To promote and facilitate applications of biotechnology at gross-root level to strengthen the national economy.

Program Objectives:

- To provide scholars with a solid foundation in the rapidly expanding field of Biotechnology.
- To provide scholars with knowledge, understanding of current theories, concepts and laboratory practices in biotechnology.
- To offers opportunities to the scholars to carry out research in areas such as; Nano biotechnology, Biodegradation,
- Microbial Enzymes, Biosurfactants, Fermentation Biotechnology, Forensic Biotechnology and Diagnostics etc.
- To spread general awareness regarding utilization of biotechnology in different sectors of society and R&D organization.
- To promote and facilitate applications of biotechnology at gross-root level to strengthen the national economy of the state.

SEMESTER ONE

Course Code	Course Title	Cr. Hrs.12
	Core Course I	3-0
	Core Course II	3-0
	Core Course III	3-0
	Elective I	3-0

SEMESTER TWO

Course Code	Course Title	Cr. Hrs.12
	Core Course IV	3-0
	Core Course V	3-0
	Core Course VI	3-0
	Elective II	3-0

Doctor of Philosophy in Microbiology

Minimum Duration : 6 Semesters, 3 Years
Maximum Duration : 16 Semesters, 8 Years
Minimum CGPA required to earn degree 3.00

Program Code	160
Number of Courses	06 + Dissertation
Credit Hours	54

Eligibility

Candidate having 18 years of education in relevant field with 3.00 CGPA on the scale of 4.0 in semester system or at least 60% marks in annual system from any recognized institute/university is eligible to apply.

Applicant needs to pass GAT (Subject) to be conducted by NTS/ETEA/any registered Testing Agency or University with at least 60% cumulative score and to clear Departmental interview at the time of Admission.

Candidates who have done MS without Research thesis may be considered for admission in the PhD program provided they have one published paper in an HEC recognized journal as a principle author.

Program Outcomes:

- Graduates after successful completion of PhD will be able to critically analyze problems related to environment, health, agriculture and industry and devise innovative solutions through microbiological interventions.
- The graduates will be able to effectively communicate with scientific community seminars, conferences, workshops, publications in national and international forms.
- This program will produce skilled researchers in the field of microbiology for serving the academia, industry and research organizations at national and international level.

Program Objectives:

The curriculum designed for Ph.D in Microbiology is extensive training that will equip the graduates to meet the challenges with the issues for board spectrum of areas of Microbiology such as health, food, poultry, agricultural, environmental and industrial avenues. These skilled graduates will play a vital role in the uplift of national economic growth of the country. The program will also create awareness about the role of microbiology in improving socio-economic uplift of the country and make liaison between microbiologists with society and industry.

SEMESTER ONE

Course Code	Course Title	Cr. Hrs. 9
	Core Course I	3-0
	Core Course II	3-0
	Elective I	3-0

SEMESTER TWO

Course Code	Course Title	Cr. Hrs. 9
	Core Course III	3-0
	Core Course IV	3-0
	Elective - II	3-0

SEMESTER THREE

Course Code	Course Title	Cr. Hrs. 2
RES 581	Research Methodology	2-0

SEMESTER FOUR

Course Code	Course Title	Cr. Hrs. 6
RES 690	Research Thesis	0-6

List of Core Courses (Select any Six Courses):

Course Code	Course Title	Cr. Hrs.
BIO 525	Cell and Molecular Biology	3-0
BT 501	Recombinant DNA Technology	3-0
BT 505	Plant Biotechnology	3-0
BT 509	Microbial Biotechnology	3-0
BT 517	Techniques in Biotechnology	3-0
BT 521	Gene Expression and Regulation	3-0
BT 525	Current Trends in Biotechnology	3-0
BT 601	Medical Biotechnology	3-0
BT 604	Food Biotechnology	3-0
BT 607	Forensic Biotechnology	3-0
BT 609	Environmental Biotechnology	3-0
BT 616	Principles of Gene Manipulations	3-0
BT 619	Biosafety and Risk Management	3-0
BT 623	Biological Sequence Analysis and Structural Bioinformatics	3-0
RES 511	Research Planning and Scientific Writing	3-0
RES 555	Research Techniques and Instrumentation	3-0

ELECTIVES

Course Code	Course Title	Cr. Hrs.
MA 534	Biostatistics	3-0
MB 527	Clinical Microbiology	3-0
MB 530	Food Microbiology	3-0
MB 538	Fermentation Technology	3-0
MB 605	Microbial Physiology	3-0
MB 612	Industrial Microbiology	3-0
MB 620	Metabolic Engineering	3-0
BIO 637	Molecular Cancer Biology	3-0
MB 640	Vaccinology	3-0
MB 643	Current trends in Microbiology	3-0
MB 644	Molecular Biology of Gene Expression	3-0
MB 645	Epidemiology: in Analytical and Experimental Approaches	3-0
BT 660	Mushroom Culturing as Novel Commercial Crop	3-0
BT 661	Molecular Diagnostics	3-0
BT 662	Biological Nitrogen Fixation	3-0
BT 663	Dairy Technology	3-0
BT 664	Vaccines	3-0
BT 666	Stem Cells and Therapeutic Medicine	3-0
BT 667	Molecular Biology	3-0
BT 669	Biosensors	3-0
BT 671	Hospital waste management	3-0
BT 672	Water and waste water treatment	3-0
BT 673	Biochemistry of Nucleic Acid	3-0
BT 674	Epigenetics	3-0
BT 675	Bioinformatics & protein structure & function	3-0
BT 677	Plasmids, Episomes & Insertion Sequences	3-0
BT 678	Biofuels and Biorefineries	3-0

SEMESTER THREE and Onwards : RES 900 Dissertation 0-9

- Course will be selected from the given list of approved courses in consultation with the Research Advisor.
- The Research Advisor may direct the scholar to register for additional courses related to the area of research.
- Scholar will submit his research proposal through GSC for approval from BOASAR.
- The scholar shall be required to publish a research paper in an HEC recognized journal before the public defense of the PhD dissertation.
- University Rules and Regulations for Post Graduate Degrees will be applicable.
- * HEC quality criteria is applicable.

List of Core Courses (Select any Four Courses):

Course Code	Course Title	Cr. Hrs.	Course Code	Course Title	Cr. Hrs.
MB 700	Fermentation Technology	3-0	MB 711	Probiotics	3-0
MB 703	Virology	3-0	MB 713	Biodegradation & Bioremediation	3-0
MB 705	Soil and Agriculture Microbiology	3-0	MB 715	Microbes and Nervous System	3-0
MB 707	Chromosomal Abnormalities and Genetic Counselling	3-0	MB 715	Plant Virology	3-0
MB 709	Microbiology and Environmental Hazards	3-0	MB 719	Advances in Microscopy and Image Analysis	3-0
			RES900	Dissertation	0-9

ELECTIVES

Course Code	Course Title	Cr. Hrs.	Course Code	Course Title	Cr. Hrs.
MA 800	Biostatics	3-0	MB 822	Management of Infectious Wastes	3-0
MB 802	Microbial Diversity	3-0	MB 824	Mycotic Infection	3-0
MB 804	Clinical Microbiology	3-0	MB 826	Diagnostics Chemistry for Microbial Diseases	3-0
MB 805	Food Microbiology	3-0	MB 828	Environmental Microbiology & Public Health	3-0
MB 806	Fermentation Technology	3-0	MB 830	Advances in Soil Microbiology	3-0
MB 808	Microbial Physiology	3-0	MB 832	Veterinary Microbiology	3-0
MB 810	Industrial Microbiology	3-0	MB 834	Microbial Plant Diseases	3-0
MB 812	Metabolic Engineering	3-0			
MB 814	Molecular Cancer Biology	3-0			
MB 816	Vaccinology	3-0			
MB 818	Current Trend in Microbiology	3-0			
MB 820	Epidemiology: Analytical and Experimental Approaches	3-0			

Doctor of Philosophy in Biotechnology

Minimum Duration : 6 Semesters, 3 Years
Maximum Duration : 16 Semesters, 8 Years
Minimum CGPA required to earn degree 3.00

Program Code	161
Number of Courses	06 + Research Thesis
Credit Hours	54

Eligibility

Candidate having 18 years of education in relevant field with 3.00 CGPA on the scale of 4.00 in semester system or at least 60% marks in annual system from any recognized institute/university is eligible to apply.

Applicant needs to pass GAT (Subject) to be conducted by NTS/ETEA/any registered Testing Agency or University with at least 60% cumulative score and to clear Departmental interview at the time of Admission.

Candidates who have done MS without Research thesis may be considered for admission in the PhD program provided they have one published paper in an HEC recognized journal as a principle author.

Program Outcomes:

- Graduates after successful completion of PhD will be able to critically analyze problems related to environment, health, agriculture and industry and devise innovative solutions through biotechnological interventions.
- The graduates will be able to effectively communicate science orally in seminars & conferences and through publication in reputable national and international journals.
- This program will produce skilled researchers in the field of biotechnology for serving in academia, industry and research organizations.
- They will be capable to teach, supervise and develop novel techniques.

Program Objectives:

- To provide scholars with a solid foundation in the rapidly expanding field of biotechnology.
- To provide scholars with knowledge, understanding of current theories, concepts and laboratory practices in biotechnology.
- To offer opportunity to the prospective scholars to carry out research in areas such as, Nano-biotechnology, Biodegradation, Microbial Enzymes, Biosurfactants, Fermentation Biotechnology, Forensic Biotechnology & diagnostics etc.
- To spread general awareness regarding utilization of biotechnology in different sectors of society and R&D organizations.

SEMESTER ONE

Course Code	Course Title	Cr. Hrs. 9
	Core Course I	3-0
	Core Course II	3-0
	Elective I	3-0

SEMESTER TWO

Course Code	Course Title	Cr. Hrs. 9
	Core Course III	3-0
	Core Course IV	3-0
	Elective - II	3-0

SEMESTER THREE and Onwards : RES 900 Dissertation 0-9

- Course will be selected from the given list of approved courses in consultation with the Research Advisor.
- The Research Advisor may direct the scholar to register for additional courses related to the area of research.
- Scholar will submit his research proposal through GSC for approval from BOASAR.
- The scholar shall be required to publish a research paper in an HEC recognized journal before the public defense of the PhD dissertation.
- University Rules and Regulations for Post Graduate Degrees will be applicable.
- * HEC quality criteria is applicable.

List of Core Courses (Select any Four Courses):

Course Code	Course Title	Cr. Hrs.	Course Code	Course Title	Cr. Hrs.
BT 700	Fermentation Biotechnology	3-0	BT 713	Mycorrhizal Biotechnology	3-0
BT 703	Animal Cell and Tissue Culture	3-0	BT 715	Algal Biotechnology	3-0
BT 705	Methods in Molecular Diagnostics	3-0	BT 717	Animal Biotechnology	3-0
BT 707	Biofuels and biorefineries	2-0	BT 719	Phytoremediation and Bioremediation Technology	3-0
BT 709	Pharmaceutical Biotechnology	3-0			
BT 711	Fungal Biotechnology	3-0			

ELECTIVES

Course Code	Course Title	Cr. Hrs.	Course Code	Course Title	Cr. Hrs.
BT 821	Biosensors	3-0	BT 806	Cell Signaling	3-0
BT 823	Hospital Waste Management	3-0	BT 808	Genomics	3-0
BT 825	Water and Waste Water Treatment	3-0	BT 810	Proteomics	3-0
BT 827	Biochemistry of Nucleic Acid	3-0	BT 812	Tissue Engineering	3-0
BT 829	Epigenetics	3-0	BT 814	Fundamentals of Biotechnology	3-0
BT 831	Bioinformatics and Protein Structure/Function	3-0	BT 816	Gene Therapy	3-0
			BT 819	Dermatogenetics	3-0
BT 833	Microbial Enzyme Technology	3-0			
BT 835	Plasmids, Episomes and Insertion Sequences	3-0			
BT 800	Molecular Immunology	3-0			
BT 802	General Virology	3-0			
BT 804	Bioprocess Technology	3-0			
BT 805	Current Trends in Molecular Medicine	3-0			