MS in Microbiology

Program Overview:

When choosing a career in microbiology one should be prepared to embrace the multidisciplinary sciences. Many microbiologists are responsible for different drug discoveries and techniques which benefit lives one way or other.

Because of the immense importance of microorganisms in all aspects of our health and wealth, microbiologists are always in demand especially in fields of pharmaceuticals, food & beverage industry, vaccine development, health care products, agriculture, plant and seed prevention, clinical human & livestock pathologies and diagnosis, research centers & laboratories, environmental companies, renewable energy and bioremediation sector, public health laboratories and teaching & academia.

Main Areas of Research:

- Identify up-to-date foundational knowledge encompassing Human Physiology, Biochemistry, Genetics, Immunology and Microbiology.
- Understand relevant ethical concepts related to scientific publication and research conduct.
- Perform basic laboratory techniques used in microbiological research.
- Perform, and quantitatively/qualitatively evaluate the results of laboratory experiments.
- Search, identify and evaluate scientific information, including primary literature.
- Understand relevant literature adequacy, value, and logic.
- Prepare scientific oral and written reports.
- Develop teamwork and communication skills.
- Appreciate the value of Microbiology.
- Develop a capacity for self-reflection.
- Appreciate and utilize objective and constructive feedback from supervisors and peers.
- Appreciate the importance of the ethical implications of scientific issues in society.

For more information, please refer to the list of faculty members for their research field on the Department website.

Admission Requirement:

16 years of education or equivalent e.g. BS (Microbiology) - 4 years/ M.Sc. in Microbiology/ MBBS from HEC recognized university with at least 60% Marks (Annual System) or CGPA ≥ 2.5 out of 4.00 (Semester System).

GAT general with at least 50% marks or GAT subject with at least 60% marks or HAT for the admission /scholarship in the specific program of study.

For more information on application deadlines, tests, and other admission requirements, please visit the admissions section of the Graduate Studies Office.

Program Requirement:

The minimum and maximum duration of the MS program is 1.5 to 4 years. Students must meet the following requirements for graduation:

- A minimum of 24 credit hours course work with a minimum CGPA of 2.5
- Successful defense of synopsis/ research proposal and its approval from Advanced Studies and Research Board (AS&RB).
- A minimum of 6 credit hours research work/ thesis.
- Thesis defense and viva.

Program Structure:

S#	Course Codes	Course Title	Credit Hours
FIRST SEMESTER			
1		Microbial Biology and Systematics	3 + 0
2		Instrumentation and Bio-analytical Techniques	3 + 0
3		Elective I	3 + 0
4		Elective II	3 + 0
SECOND SEMESTER			
1		Genomics and Proteomics	3 + 0
2		Research Methodology	3 + 0

3		Elective III	3 + 0
4		Elective IV	3 + 0
THIRD SEMESTER			
1	THESIS-601	Thesis	6 + 0
		TOTAL	**6**
		Total Courses	**2**
		Total Credit Hours	**3**

List of electives courses:

LIST OF ELECTIVE COURSES FOR MS-MICROBIOLOGY

Elective courses for the first 2 semesters will be selected and offered by the department from the following list of elective courses each with a weightage of three (3) credit hours is hereby presented:

Advance Microbiology:

1. Advance Bacteriology
2. Advance Mycology
3. Advance Parasitology
4. Advance Virology
5. Microbial Metabolic Regulation
6. Advance Molecular Microbiology
7. Advance Microbial Physiology

Agriculture Microbiology:

1. Advance Plant Pathology
2. Advance Veterinary Microbiology
3. Control of Plant Microbial Diseases
4. Current development in Plant Diseases Diagnosis
5. Pathogens of Aquatic Animals
6. Pathogens of Plant Diseases
7. Plant viral Diseases

Clinical Microbiology

1. Advance Immunology
2. Advance Medical Mycology

3. Clinical Molecular Diagnostics
4. Molecular Mechanism of Anti-microbial drugs
5. Epidemiology: Analytical & expedited Approaches
6. Molecular Pathogenesis
7. Vaccinology

Food and Environmental Microbiology:

1. Microbial Pollution and Waste Management
2. Microbiology of Soil and Bioremediation
3. Public Health Microbiology
4. Current Advances in Food Preservation and Packaging
5. Food Borne Diseases
6. Advance Dairy Microbiology

Industrial and Pharmaceutical Microbiology:

1. Bioreactors & Biosensors
2. Fermentations and their industrial applications
3. Industrial Microbiology
4. Pharmaceutical Microbiology
5. Innovations in Microbial Fermentation Technology
6. Microbial Enzyme Technology
7. Microbial Strain Development for Industry

Microbial Omics:

1. Microbial Genomics and Bioinformatics
2. Microbial Transcriptomics and Bioinformatics
3. Microbial Proteomics and Bioinformatics
4. Microbial Systems Biology
5. Microbial Patho-informatics
6. Microbial Molecular Systematics
7. Computer-Aided Drug Designing
8. Microbial Phylogenomics

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