

Department of Microbiology

BS. Medical Microbiology Scheme of Study



Faculty of Allied Health Sciences

Health Services Academy (HSA) Park Road, Islamabad

BS MEDICAL MICROBIOLOGY

1. Overview of the program

The objective of BS Medical Microbiology is to develop skilled graduates by providing quality education in a diverse learning environment, equipped laboratories, and internship and research programs overseen by highly educated and experienced faculty. Furthermore, a graduate degree in microbiology will provide our graduates with abilities in both basic and applied microbiology. To achieve this goal, we provide them with the research-based education they need to keep up with advances in microbiology.

2. Program Objectives

- ❖ To learn the microbiological concepts and applications of the knowledge in the diverse fields of Medical Microbiology, Infectious diseases, Immunology, and Molecular microbiology
- ❖ To explain the theoretical basis of the tools, technologies and methods common to microbiology
- ❖ To demonstrate practical skills in the use of tools, technologies and methods common to microbiology, and apply the scientific method and hypothesis testing in the design and execution of experiments

3. Core values

- ❖ Perform integrated interdisciplinary teaching and research with the highest level of ethics and professionalism, to meet the needs of stakeholders; and be responsive to changing global trends.
- ❖ Promote and defend the freedom of thought, academic enquiry, expression and association.
- ❖ Demonstrate sensitivity to student welfare and staff needs, and to practice environmental stewardship to the highest standards.

4. Jobs and placements

This is the most asked questions among the students while choosing a degree. Well, studying microbiology will certainly open a gateway to numerous job opportunities. Graduates with a degree of microbiology can work as the following:

- Clinical microbiologist
- Research microbiologist
- Immunologist
- Clinical biochemist
- Toxicologist

- Food microbiologist
- Research scientist
- Environmental microbiologist
- Fermentation technologist
- Pharmacologist
- And much more

Moreover, a microbiologist can easily get jobs in below-listed areas:

- Infectious disease diagnostics labs
- Food and nutrition companies
- Research departments
- Chemical industries as quality control
- Pharmaceutical companies as quality control
- Biotechnology firms
- Public health lab

5. Core Activities

- ❖ The institute instructs in the *biomedical sciences* related to Medical Microbiology.
- ❖ The institute trains Undergraduate students in Medical Microbiology in the four years' degree program.
- ❖ In addition, the institute also invests in preparing active future Medical Microbiologist, *researchers and teachers*.
- ❖ It engages its students in activities ranging from *optimization of laboratory protocols and animal handling to poster & oral presentations and critical reviews*.
- ❖ The institute arranges *research days and conferences* throughout the year, in which the new inductees are given an opportunity to develop an orientation regarding the core activities and structure of the department while the current students present their posters and critical reviews and receive feedback from the faculty members of different departments.
- ❖ Furthermore, students assessed for their understanding and application of knowledge through both *formative and summative assessments*.

6. Teaching and Learning Methods

Students will experience a wide variety of teaching and learning methods from expert staff including *tutorials, lectures, seminars, workshops, small group discussions, and problem-based learning, and laboratory sessions*. As such the students will develop a wide range of skills useful in basic and applied environment. These skills will aid in *teamwork, scientific exploration, and problem solving and identifying relevant laboratory protocols*.

7. Assessment Methods

Students will be assessed both *formatively and summative*. Throughout the year formative assessment in the form of class tests, presentations and assignments along with the feedback will be carried out. Summative assessment will include end of the course terminal exam

featuring multiple-choice questions. The practical aspects will be assessed using viva and Objective structured Practical examination (OSPE).

8. Registration in the Health Services Academy

- ❖ Registrar of the university shall maintain a register of BS Medical Microbiology through Admission Test and Open Merit list of HSA.
- ❖ A "notification of registration" for each candidate approved /allowed for admission to BS program shall be issued by the University.
- ❖ Registration may be renewed on payment of the prescribed fee if a scholar is re-admitted within a year after having been struck off the rolls for any valid reason.
- ❖ A person registered for the BS degree program shall be called Medical Microbiologist. Each student so selected shall be required to register and pay the dues within 30 days from the date of issuance of the notification of registration, failing which the admission of the selected candidate shall be deemed as cancelled. The university shall determine the tuition fee and other dues from time to time.

9. Mentors

The students shall select their teaching mentor in the first year and research mentor at the end of last year. The coordinator shall serve as mentor before selection of mentors.

10. Student Assessment Methods

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|---------------------------------|---------------------------------------|
| a. Class quiz | to assess continuous learning process |
| b. Mid and terminal examination | to assess learning out comes |
| c. Presentations | to assess communication skills |
| d. Assignments | to assess writing skills |

11. Weighting of assessments for each course Total marks=100

Midterm exam	20
Terminal examination	50
Oral/practical examination	10
Presentations/Assignment	10
Class quizzes	10
Total	100

12. Frame work of the program as per Under Graduate Policy, 2023

Nature	Courses	Credit Hours
General Education Courses	Functional English	3+0=3
	Information and communication Technologies ICT	2+1=3
	Ideology and Constitution of Pakistan	2+0=2
	Islamic studies/Ethics	2+0=2
	Natural Sciences	2+1=3
	Quantitative reasoning - I	3+0=3
	Social sciences	2+0=2

	Quantitative reasoning II	3+0=3
	Arts and Humanities	2+0=2
	Expository writing	3+0=3
	Civics and community engagement	2+0=2
	Entrepreneurship	2+0=2
		30 credit hours
Major (Disciplinary) Courses		
	Introduction to medical microbiology	2+1=3
	Pathology	2+1=3
	Microflora of human	3+0=3
	Probiotics & Antimicrobials	2+1=3
	One health	3+0=3
	Medical virology	2+1=3
	Clinical bacteriology	2+1=3
	Public health microbiology	2+1=3
	Medical mycology	2+1=3
	Introduction to Vaccinology	3+0=3
	Medical parasitology	2+1=3
	Microbial Pathogenesis	3+0=3
	Laboratory Management	3+0=3
	Infection Control	3+0=3
	Advanced microbial diagnostics	2+1=3
	Molecular mechanisms of antimicrobial therapeutic agent	2+1=3
	Pharmaceutical Microbiology	2+1=3
	Food and water microbiology	2+1=3
	Medical entomology	2+1=3
	Epidemiology of infectious diseases	3+0=3
	Microbial biotechnology	2+1=3
	Tropical infectious diseases	2+1=3
	Quality Control in Biologics	3+0=3
	Food borne diseases and prevention	2+1=3
		72 credit hours
Interdisciplinary/Allied Courses	Fundamentals of microbiology	3+0=3
	Microbial taxonomy	3+0=3
	Principles of Biochemistry	2+1=3
	General immunology	2+1=3
	Microbial anatomy and physiology	3+0=3
	Molecular cell biology	3+0=3
	Zoonosis	2+1=3
	Microbial genetics	2+1=3
	Bioinformatics	2+1=3
	Biosafety and biosecurity	3+0=3
		30 credit hours
Field Experience/Internship		0+3=3
Capstone Project		0+3=3

Scheme of Studies for BS Medical Microbiology (4 Years)

- Eligibility F.Sc. premedical /A-level/12 years (equivalent) of schooling with science subjects (Biology, Chemistry and Physics) with at least 50% marks in aggregate.
- Total numbers of Credit hours 138 (HEC recommended: 120- 140)
- Duration 4 years
- Semester duration 16-18 weeks
- Semesters 8
- Course Load per Semester 15-18 Credit hours

Semester	Name of Subject	Credits	Pre-requisite
First	FUNCTIONAL ENGLISH	3+0=3	
	INFORMATION AND COMMUNICATION TECHNOLOGIES ICT	2+1=3	
	IDEOLOGY AND CONSTITUTION OF PAKISTAN	2+0=2	
	PRINCIPLES OF BIOCHEMISTRY	2+1=3	
	FUNDAMENTALS OF MICROBIOLOGY	3+0=3	
	MICROBIAL TAXONOMY	3+0=3	
	TOTAL CREDIT HOURS	17	
Second			
	ISLAMIC STUDIES/ETHICS	2+0=2	
	NATURAL SCIENCES	2+1=3	
	QUANTITATIVE REASONING - I	3+0=3	
	SOCIAL SCIENCES	2+0=2	
	MICROBIAL ANATOMY AND PHYSIOLOGY	3+0=3	
	MOLECULAR CELL BIOLOGY	3+0=3	
	TOTAL CREDIT HOURS	16	
Third			
	QUANTITATIVE REASONING II	3+0=3	QUANTITATIVE REASONING - I
	ARTS AND HUMANITIES	2+0=2	
	ZOONOSIS	2+1=3	
	MICROBIAL GENETICS	2+1=3	
	GENERAL IMMUNOLOGY	2+1=3	
	BIOSAFETY AND BIOSECURITY	3+0=3	
	TOTAL CREDIT HOURS	17	
Fourth			
	EXPOSITORY WRITING	3+0=3	
	CIVICS AND COMMUNITY ENGAGEMENT	2+0=2	
	ENTREPRENEURSHIP	2+0=2	
	BIOINFORMATICS	2+1=3	
	Introduction to medical microbiology	2+1=3	
	Pathology	2+1=3	
	Total Credit Hours	16	

Fifth			
	Microflora of human	3+0=3	
	Probiotics & Antimicrobials	2+1=3	
	One health	3+0=3	
	Medical virology	2+1=3	
	Clinical bacteriology	2+1=3	
	Public health microbiology	2+1=3	
	Total Credit Hours	18	

Sixth			
	Medical mycology	2+1=3	
	Introduction to Vaccinology	3+0=3	
	Medical parasitology	2+1=3	
	Microbial Pathogenesis	3+0=3	
	Laboratory Management	3+0=3	
	Infection Control	3+0=3	
	Total Credit Hours	18	
Seventh			
	Advanced microbial diagnostics	2+1=3	
	Molecular mechanisms of antimicrobial therapeutic agent	2+1=3	
	Pharmaceutical Microbiology	2+1=3	
	Food and water microbiology	2+1=3	
	Medical entomology	2+1=3	
	Epidemiology of infectious diseases	3+0=3	
	Total Credit Hours	18	
Eight			
	Microbial biotechnology	2+1=3	
	Tropical infectious diseases	2+1=3	
	Quality Control in Biologics	3+0=3	
	Food borne diseases and prevention	2+1=3	
	RESEARCH PROJECT	0+3=3	
	Total Credit Hours	12	

Internships	0+3=3	In summer after 4 th semester
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Total Course Credit Hours = 138