Faculty of Medicine and Health Sciences

Master in Laboratory Medicine

Master of Laboratory Medicine in Medical Microbiology and Immunology Program Specification

Annexes

Annex-1, Academic Standards Curriculum Criteria of Accreditation board.

	Academic Standards:
1	NARS for medical education in Yemen
2	Academic Standards Curriculum Criteria of Accreditation Board
3	Prime Minister law no. 40 for the year 2008 about the postgraduation studies system in Yemeni universities.

Annex (2) Survey of names Similar Programs at International Universities

#	The Academic Program	The University	The Faculty	Website	The Department	The Country	Study Duration
The 1st Program	Master's of Science in Microbiology and Immunology program	University of Michigan	Medical School	https://medicine.umich.edu/dept/microbiology-immunology/education/masters-program/requirements	Microbiology and Immunology Department	USA	2 Year
The 2nd Program	Microbiology and Immunology M.Sc	University of Nottingham	Faculty of Medicine and Health Sciences	https://www.nottingham.ac.uk/pgstudy/course/taught/microbiology-and-immunology-msc#assessment	Medical School, School of Life Sciences	UK	1 Year
The 3rd Program	Master Degree in Medical Laboratory Sciences/Clinical Microbiology, Immunology and Serology	Jordan University of Science and Technology (JUST	Faculty of Applied Medical Sciences	https://www.just.edu.jo/FacultiesandDepartments/FacultyofGraduateStudies/Pages/Study%20Plans.aspx	Department of Medical Laboratory Sciences	Jordan	2 Year
The 4th Program	Master of Science (MSc) in Clinical Laboratory Sciences	Majmaah University	College of Applied Medical Sciences	https://m.mu.edu.sa/en/colleges/college-of-applied-medical-sciences/175146	Medical Laboratory Sciences	Kingdom of Saudi Arabia	3 Year
The 5th Program	Master Degree of Medical Microbiology and	21 September University for Medical & Applied Sciences	Faculty of Laboratory medicine	https://21umas.edu.ye/higher_academy/	Department of Medical Microbiology and Immunology	Yemen	2 Year

	Immunology						
The 6th Program	Master of Laboratory Medicine in Medical Microbiology and Immunology	Johns Hopkins University	Bloomberg School of Public Health	https://publichealth.jhu.edu/academics/scm-dept-of-molecular-microbiology-and-immunology	Department of Molecular Microbiology & Immunology	USA	2 Year
The 7th Program	M.Sc. degree in Microbiology and Immunology	Touro University	New York Medical College	https://www.nymc.edu/gsbms/gsbms-academics/degrees--programs/master-of-science/microbiology--immunology/	The Graduate School of Biomedical Sciences	USA	2 Year
Ibb University	Master of Laboratory Medicine in Medical Microbiology and Immunology	Ibb University	Faculty of Medicine and Health Sciences	www.ibbuniv.edu.ye	Laboratory Medicine	Yemen	2-3 Years

Annex (3) Survey of Intended Learning Outcomes for Similar Programs at International Universities.

Program Intended Outcomes	Current Program		1st Program	2nd Program	3rd Program	4th Program	5th Program	6th Program
	Ibb university		21th September university	Almajma'a University	Jordan University of Science and Technology (JUST	Johns Hopkins University	Touro University	
	Upon successful completion of Master of Laboratory Medicine in Medical Microbiology and Immunology Program, the graduates will be able to:							
A. Knowledge and Understanding	**A1.**	Demonstrate in-depth knowledge of the concepts of medical bacteriology, virology, mycology, parasitology, immunology, molecular biology and biostatistics	Understand the basic Specific knowledge in medical microorganisms and immunology, including molecular biology, immunology and DNA technology coupled with hands on skills and leadership	1. Enriching government educational institutions, hospitals and research centers with specialists and experts in clinical laboratory sciences. 2. Encourage graduate	Upon the completion of the medical laboratory science program, students will be able to demonstrate: A. Leadership in the community in the field of medical laboratory sciences and medical research. B. Leadership skills in the	1.Graduates will be able to address current and future issues in public health related to the biology, ecology, molecular biology, biochemistry, and genetics of infectious	Demonstrate knowledge of the major organizing concepts within the discipline of specialization. • o explain and appraise major	

			skills for a successful career.	students to learn lifelong, engage in scientific research, and apply ethics to the human aspects of clinical laboratory practices. 3. Enhance leadership, communication, and effective teamwork.	administration of medical laboratories. C. Ability to communicate professionally with patients and health care providers. D. Ability to apply their medical knowledge in the field of medical laboratory sciences. E. Ability to collect various clinical samples including blood and others. F. Ability to understand and carry out biomedical scientific research. G. Ability to carry out various laboratory analyses on clinical samples. H. Ability to efficiently use and operate various	diseases and their vectors. 2. Graduates will be able to address current and future issues in public health related to immunology, immunization, and pathogenesis of infectious diseases. 3. Graduates will be able to design and conduct experiments to acquire new knowledge of host-pathogen interactions. 4. Graduates will be able to format and organize scientific	theoretical and organizing paradigms. o describe seminal experimental results in the field and explain their contribution to the development of current understanding. o identify major unanswered questions or significant gaps in our understanding of the disciplinary area.	
	A2.	Enhance advance theoretical and practical background of the clinical implications of microbiology and immunology, including the laboratory diagnosis involvement and the prevention measures.	Describe the important mechanisms of microbial pathogenesis, modes of transmission, eliminated, clarify treatment and outcomes of infections with emphasis on cellular and molecular immunology and immunity to infections					
	A3.	Exposed to various research techniques through their own research projects and by related courses. consequently, students will obtain hands-on experience on modern technology information and scientific methods, while enhancing their understanding on the applicability of science.	List the key considerations and principles in the planning and design of a study on the basis of statistical methods.					
			Discuss the					

			different microbial and immunology diseases and the principle different laboratory techniques, including the isolation, characterization of specific microbes, seroimmunology and nucleic acid in clinical specimens		laboratory equipment. I. Ability to operate advanced automated laboratory equipment. J. Ability to work as part of a team among the medical setting. K. Ability to apply appropriate specific safety measures when dealing with clinical samples and patients. L. Ability to apply appropriate general laboratory safety measures and utilize protective equipment. M. Ability to work ethically by respecting patient privacy and maintain confidentiality. N. Ability to identify issues and troubleshoot them should they arise	rationales, experimental data, and conclusions for presentation in written form and orally at venues such as scientific meetings, seminars, and journal clubs. 5. Graduates will be able to evaluate the ethical implications of scientific research and conduct scientific activities in an ethical and responsible manner.		

					among the laboratory setting. O. Ability to apply quality control and quality assurance measures and protocols in the laboratory setting.			
B. **Cognitive/ Intellectual Skills**	**Upon successful completion of Master of Laboratory Medicine in Medical Microbiology and Immunology Program, the graduates will be able to:**							
	B1.	Analyze schematically the cause, pathogenicity, diagnosis and prevention methods of infectious diseases as well as immune response tools and disorders. .	Interpret and explain results simply and effectively to clinicians and patients					
	B2.	Develop and comprehend the linkage between the advance knowledge in microbiology, immunity and its application in research.	Illustrate important mechanisms of microbial pathogenesis, basic concepts of molecular immunology, immunity to infection, risk of					

			infection, outcomes of infections and vaccines for individual infectious or immunological disease.					
	B3.	Use information, pick up the gap or problem, plan experiments, solve problems, interpret results, make decision and develop strategies on microbiology issues	Design guidelines for prevention, control of infection/disease and antibiotic treatment regimens used for managing microbial and immunological diseases.					
	B4.	Enhance specialty while he study deepening of knowledge on specific subjects (thesis study)	Categorize health risk factors associated with working in a research diagnostic laboratory					
C. **Practical and Professional Skills**	**Upon successful completion of Master of Laboratory Medicine in Medical Microbiology and Immunology Program, the graduates will be able to:**							
	C1.	Collect, evaluate, process. transport various clinical samples for advanced microbiological and	Demonstrate important mechanisms of microbial					

		immunological analyses.	pathogenesis, basic concepts of molecular immunology, immunity to infection, risk of infection and outcomes of infections					
	C2.	Efficiently use advanced laboratory equipment and carry out advanced molecular, microbiology and immunology analysis.	Perform diagnostic laboratory tests in medical bacteriology, virology, mycology and immunology to offer basic advice on relevant investigations, interpretation of results and infection control procedures in association with quality assurance and control procedure.					
			Applied laboratory data relevant to the cases of medical					

			microbiology, immunology and identified the pathogen by the isolation and its specific growth characteristics if any, distinguishing biochemical tests, its morphological and/or staining characteristics, immunological or nucleic acid-based tests..					
D. General and Transferable Skills	**Upon successful completion of Master of Laboratory Medicine in Medical Microbiology and Immunology Program, the graduates will be able to:**							
	D1.	Learned to use information and communication technologies at an advanced level with computer software to develop knowledge and communication skills	Communicate effectively through oral presentations, computer processing and presentations, and written reports.					
	D2.	Transfer knowledge in medical microbiology and immunology to the	Respect the role of staff and co-staff members					

		medical students and to the community members, and apply life-long learning	regardless of degree or occupation.					
	D3.		Write scientific article according to the basics of scientific research					

Annex-4, Survey of Credit Hours of Similar Programs

	6th Program		5th Program		4th Program		3rd Program		2nd Program		1st Program		Mean		Current Program	
Program name	Master's of Science in Microbiology and Immunology program		Microbiology and Immunology M.Sc		Master Master Degree in Medical Laboratory Sciences/Clinical Microbiology, Immunology and Serology		Master of Science (MSc) in Clinical Laboratory Sciences		Master Degree of Medical Microbiology and Immunology		Master of Laboratory Medicine in Medical Microbiology and Immunology				Master of Laboratory Medicine in Medical Microbiology and Immunology	
University	University of Michigan		University of Nottingham		Jordan University of Science and Technology (JUST		Majmaah University		21 September University for Medical & Applied Sciences		Johns Hopkins University				Ibb University	
Country	USA		UK		Jordan		Kingdom of Saudi Arabia		Yemen		USA				Yemen	
Total credit hours	**Credit Hour**	**Courses**	**Credit Hour**	**Courses**	**Credit Hour**	**Courses**	**Credit Hour**	**Courses**	**Credit Hour**	**Courses**	**Credit Hour**	**Courses**	**Credit Hour**	**Courses**	**Credit Hour**	**Courses**
	28	12	120	8	25	11	50	11	30	13	64	23			30	12
Credit hours distribution	**C.H**	**Courses**	**C.H**	**Courses**	**C.H**	**Courses**	**C.H**	**Courses**	**C.H**	**Courses**	**C.H**	**Courses**	**C.H**	**Courses**	**C.H**	**Courses**
Speciality requirements – **Obligatory**	28	12	120	8	16	8			27	12	64	23			30	12
Elective					9	3	50	11	3	1						
thesis	1-8	1	60	1	9	1	9	1	6	1					6	1
Mean																

Annex-5, Survey of Course Names of Similar Program

	Current Program	1st Program	2nd Program	3rd Program	4th Program	5th Program	6th Program
University	Ibb university	University of Michigan	University of Nottingham	Jordan University of Science and Technology (JUST	Majmaah University	21 September University for Medical & Applied Sciences	Johns Hopkins University
Faculty	Faculty of Medicine and Health Sciences	Medical School	Faculty of Medicine and Health Sciences	Faculty of Applied Medical Sciences	College of Applied Medical Sciences	Faculty of Laboratory medicine	Bloomberg School of Public Health
Program	Master of Laboratory Medicine in Medical Microbiology and Immunology	Master's of Science in Microbiology and Immunology program	Microbiology and Immunology M.Sc.	Master Degree in Medical Laboratory Sciences/Clinical Microbiology, Immunology and Serology	Master of Science (MSc) in Clinical Laboratory Sciences	Master Degree of Medical Microbiology and Immunology	Master of Laboratory Medicine in Medical Microbiology and Immunology
Country	Yemen	USA	UK	Jordan	Kingdom of Saudi Arabia	Yemen	USA
No. of Courses	12	12	8	11	12	13	23
Total Cr. Hrs.	30	28	120	25	59	30	64
Total Years	2-3	2	1	2	3	2	2

	No	**Course Name**	**Course Name**	**Course Name**	**Course Name**	**Course Name**	**Course Name**	**Course Name**
First Year First semester	1	Advanced medical bacteriology	Introduction to Infectious Disease	Introduction to Medical Microbiology	Molecular and Cellular Pathogenesis	Cellular & Molecular Biology	Advanced Molecular Microbiology	Fundamental Virology
	2	Cellular and molecular immunology	Introductory Biostats	Immunity and the Immune System	Advanced Biochemistry	Professional Practice in Medical Laboratory.	Advanced Biostatistics and Epidemiology	Molecular Biology Literature
	3	Advanced medical virology	Student Seminars	Viral Pathogenesis and Infection	Advanced Molecular Biology	Biostatistics	Advanced Medical Bacteriology	Anatomy of Scientific Error,Anatomy of Scientific Error - Meta-Science in Research Practice
	4	Advanced Molecular Biology	Research Responsibility and Ethics	Bacterial Pathogenesis and Infections	Advanced Medical Microbiology		Advanced Immunology	Seminars in Research in Molecular Microbiology and Immunology
	5	Advanced medical mycology		Innate immune recognition	Advanced Clinical Laboratory Management		Advanced Medical Virology	Research Forum in Molecular Microbiology and Immunology
	6	Infection control		Core Research Methods:	Seminar		Advanced Medical	Academic & Research Ethics

		(Antimicrobials , resistance and vaccination)		Transferable Research Skills			Mycology	at BSPH (non-credit)
	7			Core Research Methods: Molecular Techniques				Concepts of Molecular Biology
	8			Therapeutic immunology				
First Year Second semester	1	Advanced diagnostic microbiology	Introduction to Translational Research	Research project (Thesis)	Advanced Clinical Laboratory Training	Microbiology I	Research Methods, Research Proposal and Scientific Writing	Principles of Immunology I
	2	Clinical immunology	Graduate Research		Research Methods and Research Proposal	Research Methodology	Advanced Diagnostic Microbiology and Molecular Biology.	Biology of Parasitism
	3	Diagnostic molecular biology	Student Seminars		Advanced Clinical Microbiology and Immunology I /Bacteriology		Advanced Cellular and Molecular Immunology	Current Literature in Microbial Immunity
	4	Biostatistics			Advanced Clinical Microbiology and Immunology II/Immunology		Advanced Medical Parasitology	Seminars in Research in Molecular Microbiology and Immunology

	5	Research methodology			Advanced Clinical Microbiology and Immunology III / Virology and Parasitology		Elective course MS Program (Choose one): Special Topics in Immunology and Serology Special Topics in Clinical Microbiology Special Topics in Molecular Diagnostic Microbiology	Research Forum in Molecular Microbiology and Immunology
	6	Special topics (seminars) in clinical microbiology and immunology						Epidemiology of Infectious Disease
Second Year First semester	1	Thesis	Cancer Biology		Thesis	Microbiology II	Thesis	Pathogenesis of Bacterial Infections
	2		Viral Pathogenesis			Diagnostic Microbiology		Vector Biology and Vector-Borne Diseases
	3		Graduate Research			Medical Genetics		Pandemics of the 20Th Century
	4		Student Seminars					Seminars in Research in

								Molecular Microbiology and Immunology
	5							Research Forum in Molecular Microbiology and Immunology
Second Year Second semester	1		Thesis			Immunology		Vector Biology and Disease Ecology Literature
	2					Viral Pathogenesis and infection OR Infectious and non-infectious diseases		Seminars in Research in Molecular Microbiology and Immunology
	3							Research Forum in Molecular Microbiology and Immunology
Third Year First semester	1					Antimicrobial agents and infection control		Thesis
	2					Project		

						proposal		
Third Year Second semester	1					Thesis		
المجموع		12	12	9	**11**	13	14	21