

Medical Doctorate (M.D.) Degree Program and Courses Specifications for **Medical Microbiology and Immunology**

A- Basic Information

- 1-University:** Minia university **Faculty:** Medicine
- 2-Programme(s) title:** MD of medical microbiology and immunology
- 3-Department offering the programme:** Medical Microbiology and Immunology department
- 4-Department offering the course:** Medical Microbiology and immunology department
- 5-Academic year/ Level:** MD of medical microbiology and immunology
- 6-Program Type:** single
- 7-Principal Co-ordinator:** Dr. Wedad Mahmoud Abdelreheem
- 8-Director of the programme (head of the department):** Prof. Wafaa Khiry Mohamed
- 9-Internal evaluator:** Prof. Wafaa Khiry Mohamed, Prof of Medical Microbiology and immunology, Faculty of Medicine, Minia University.
- 10- External evaluator:** Prof. Wafaa Zahran, Prof of Medical Microbiology and immunology, Faculty of Medicine, Zagazig University.

11- Date of specification approval: 5 /3/ 2023

12-Code: MB 100

13- Total number of courses: 4 courses

B- Professional Information

1 - Overall aims of course:

- a. Produce students with a systematic understanding of the scientific basis of traditional and novel microbiological concepts.
- b. Produce students equipped with the knowledge, specialist practical skills and critical awareness to enable them to pursue careers in the microbiological field, whether in the hospital, laboratory, industrial or research setting.
- c. Enable them to work effectively, in partnership with other health professionals, support staff and service users.
- d. Equip students with a critical understanding of the current issues and problems at the forefront of medical microbiology that will allow them to make independent, informed judgments in relation to these issues.
- e. Provide students with the opportunity to participate in, and contribute to, current microbiological research programs within the department, and thus provide the wider microbiological community with new members
- f. The acquisition of life-long habits of reading, literature searches, and consultation with colleagues, attendance at scientific meetings, and the presentation of scientific work that is essential for continuing professional development (CPD).

2 - Intended learning outcomes of course (ILOs):

1-Knowledge and understanding:

- 1.a.** Describe theories, basics and updated sciences in Microbiology, Immunology. And molecular biology.
- 1-b** Discuss the recent advances in biostatistics ,research methodology and clinical epidemiology related to the field of *Microbiology and Immunology*.

1-c Identify the ethical aspects of conducting scientific researches in the field of *Microbiology and Immunology*.

1-d Discuss recent advances in etiology, clinical picture and management of microbial diseases.

1.e. Describe recent advances in the management and prevention of microbial diseases.

1.f. Identify recent advances in methods of molecular biology.

1.g. Identify recent advances in methods of infection control

2 .Intellectual skills:

2.a. Conduct research studies, that add to knowledge.

2.b. Explore scientific papers in the area of Microbiology and Immunology.

2.c. Assess risk in professional practices in the field of Microbiology and Immunology.

2.d. Plan to quality improvement in the field of medical education of Microbiology and Immunology.

2.e. Demonstrate analytical thinking approach in clinical situations related to Microbiology and Immunology.

2.f .Manage scientific discussion based on scientific evidences and proofs.

2.g. Criticize researches related to Microbiology and Immunology.

2.h. Interpret data in front of experts.

3-Professional and Practical Skills

3.a. Master the basic and advanced professional practical skills in the area of Microbiology and Immunology

3.b. Write competently and evaluate the medical reports.

3.c. Evaluate and improve methods and tools existing in the area of Microbiology and Immunology.

3.d. Use the recent diagnostic technologies in Microbiology and Immunology practice.

3.e. train junior staff and plan to improve their performance through continuous medical education programs.

3.f. perform competently all lab. procedures considered essential for Microbiology and Immunology related conditions.

4- General and Transferable Skills

4.a. Communicates effectively by different types of communication skills.

- 4.b. Use appropriate computer program packages and the internet to serve the development of professional practice.
- 4.c. Teach others and evaluate and improve their performance.
- 4.d. use different sources of information and knowledge.
- 4.e Work successfully in a team and also as a team leader .
- 4.f. Manage scientific meetings according to the available time.
- 4.g. design logbooks.
- 4.h. compute with others for improvement of health services

3 - Academic Standards: (Annex 2)

Faculty of Medicine, Minia University adopted the general national academic reference standards provided by the national authority for quality assurance and accreditation of education (NAQAAE) for all postgraduate programs. (Faculty Council Decree No.6854, in its session No.177 Dated: 18/5/2009). {Annex 1}.

- Minia faculty of medicine has developed the academic standards (ARS) for Medical Doctorate (MD) program and was approved in faculty Council decree No.7528, in its session No.191, dated: 15-3-2010), last update: 20-2-2023 {Annex I}.
- Then, Medical Parasitology department has developed the intended learning outcomes (ILOs) for doctorate (MD) program in Medical Parasitology and the Date of program specifications first approval was by department council: 13-5-2013, last update: 6-3-2023{Annex 2}.

4- Program references:

- 1- AcademicReference Standards (ARS) from NQAAC
- 2-Department of Medical Microbiology & Immunology, Faculty of Medicine, Assuit University.
- 3- Department of Medical Microbiology & Immunology, Faculty of Medicine, Cairo University.

C- Curriculum Structure and Contents:

1. Programme duration: 3.5 years

2. Nature of the program: Single

3. Programme structure:

Subject	hours /week	
	Lectures	Practical
First Part:		

Biostatistics + Computer		2	1
Research Methodology		2	1
Molecular biology		2	2
Second Part:			
Medical Microbiology and Immunology (Advanced)		4	2

See Annex 1 for detailed specifications for each course/ module and Annex3: Program Matrix

4. Program Admission Requirements:

I. General Requirement

-Candidates should have either:

1. MBChB Degree from any Egyptian Faculty of Medicine or
2. Equivalent Degree from Medical Schools abroad approved by the Ministry of Higher Education.
- 3- Master Degree in Medical Microbiology and Immunology.
- 4- Regulatory rules of postgraduate studies of Minia Faculty of Medicine.

II. Specific Requirements:

- 1- Candidates graduated from Egyptian Universities should have at least “Good Rank” in their final year /cumulative examination, and grade “Good Rank” in Medical Microbiology and Immunology Course too.
- 2- Master Degree in Microbiology and Immunology with at least “Good Rank”.
- 3- Candidate should know how to speak & write English well.
- 4- Candidate should have computer skills.

5- Regulations for Progression and Program Completion

Duration of program is 3-5 years, starting from registration till acceptance of the thesis; divided to:

1-First Part: (≥6 months):

- Program-related basic science and ILOs & Research Methodology, Ethics, Biostatistics and computer & SPSS.
- At least six months after registration should pass before the student can ask for examination in the 1st part.
- Two sets of exams: 1st in April — 2nd in October .

- For the student to pass the first part exam, a score of at least 60% in each curriculum is needed.

- Those who fail in one curriculum need to re-exam it only.

2-Second Part: (≥24 months):

- Program related specialized science of Microbiology and Immunology Courses and ILOs.

At least 24 months after passing the 1st part should pass before the student can ask for examination in the 2nd part.

- Fulfillment of the requirements in each course as described in the template and registered in the log book a prerequisite for candidates to be assessed and undertake part 1 and part 2 examinations; as following:

- Two sets of exams: 1st in April— 2nd in October.

- At least 60% of the written exam is needed to be admitted to the oral and practical exams.

- 4 times of oral and practical exams are allowed before the student has to re-attend the written exam.

3-Thesis (24-48 months):

- Could start after registration and should be completed, defended and accepted after passing the 2nd part final examination, and after passing of at least 24 months after documentation of the subject of the thesis.

- Accepting the thesis and at least 2 published researches (one international and one local) from the thesis is enough to pass this part.

6-Teaching and learning methods

ILO	Method
Knowledge and Understanding	Interactive Lectures Interactive learning Brain Storming Self directed learning
Professional/practical skills	Practical Sessions Interactive Tutorials Extended Direct Observation

Intellectual skills	Self directed learning Case Study Problem solving
General and Transferable Skills	Seminars Workshops Self directed learning

7-Program assessment methods and rules

Method	ILOs measured	Weighting of assessments (%)
Written examinations: Structured essay questions Objective questions MCQ Problem solving	K & I	50
3-Practical Exams OSPE	P& I skills	20
Oral Exams	K ,I &G skills	30
Logbook assessment	All	-
Research assignment	I &G skills	-
Total		100

1. First Part Final Exam:

Three-hour written exam (including short essay and multiple choice questions) + oral exam + practical exam.

2. Second Part Final Exam Part 2:

- Medical Microbiology and Immunology: Two written exams; each is 3-hour duration, on two separate days, paper 1 on first day and paper 2 on second day (including short essay and multiple choice questions, cases); Oral exam; and Practical exam.

8-Evaluation of Program:

Evaluator	Tool	Sample
1- Senior students	Questionnaires	1
2- Alumni	Questionnaires	1
3- Stakeholders (Employers)	Interviews	
4-External Evaluator(s) (External Examiner(s))	Report	1

Annex 1

Specifications for courses/ modules

(First Part)

Course specification of : “Use of Computer in Medicine”

University: Minia

Faculty: Medicine

Department offering the course: Public health and preventive medicine department

Programme(s) on which the course is given: First part MD of Medical Microbiology and Immunology

Academic year/ Level: First part of MD

1. Course Information		
Academic Year/level: First part MD	<i>Course Title:</i> Use of Computer in Medicine	Code: CM 100
<ul style="list-style-type: none">• <i>Number of teaching hours:</i><ul style="list-style-type: none">- <i>Lectures: 20 hours</i>- <i>Practical/clinical: 10 hours</i>- <i>Total: 30 hours</i>		
2. Overall Aims of the course	<i>By the end of the course the student must be able to:</i> <ol style="list-style-type: none">1. Recognize knowledge about the software and their applications in Medicine2. Gain skills necessary for using and managing health care information systems	
3. Intended learning outcomes of course (ILOs):		

<i>Upon completion of the course, the student should be able to:</i>			
A. Knowledge and understanding	A.1. Define each part of computer hardware and its function A.2. State various computer applications in medicine - for instruction, information managing, and computer based medical record, etc. A.3. Define telemedicine and its importance A.4. Recognize importance of health information technology in improvement of healthcare A.5. Describe electronic medical records and obstacles facing it A.6. Identify the concept of big data analysis		
B. Intellectual Skills	B.1. Criticize adoption of telemedicine B.2. Discover factors constraining adoption of telemedicine		
C. Professional and Practical Skills	C.1. Design framework for understanding of health information system performance		
D. General and transferable Skills	D.1. Utilize computers in conducting research D.2. Appraise adoption of telemedicine D.3. Discover skills to carry out the process of improving health information system performance		
4. Course Contents			
Topic	No. of hours	Lecture	Tutorial/ Practical
Use of Computer in Medicine			
General concepts Introduction to Microsoft PowerPoint	6	4	2
Health Information Systems (HIS)	6	4	2
Telemedicine	6	4	2
Software Used in the Health Care	6	4	2
Big Data Analysis in Health	6	4	2
Total	30	20	10
5. Teaching and Learning Methods	Since COVID-19 pandemic, blended learning approach was adopted that mixes virtual face-to-face interaction activities with the online learning. 60% of study method is offline and 40% of study is online		

	<p>Online learning materials are available at Minia University site</p> <ul style="list-style-type: none"> ▪ Lectures: Face to face lectures, Pre-recorded video lectures ▪ Practical lessons ▪ Assignment ▪ Online quizzes
<p>6. Teaching and Learning Methods for students with limited Capacity</p>	<ul style="list-style-type: none"> • Outstanding student rewarded certificate of appreciation due to high level of achievement • Limited students divided into small group to make learning more effective
<p>7. Student Assessment</p>	
<p>A. Student Assessment Methods</p>	<p>7.1- Research assignment: to assess general transferable skills, intellectual skills.</p> <p>7.2- Written exams:</p> <ul style="list-style-type: none"> • Short essay: to assess knowledge. • Commentary: to assess intellectual skills. <p>7.3- Practical Exams: to assess practical skills, intellectual skills.</p> <p>7.4- Oral Exams: Oral exams to assess knowledge and understanding, attitude, communication</p> <p>7.5- Structured oral exams: to assess knowledge.</p>
<p>B. Assessment Schedule (Timing of Each Method of Assessment)</p>	<p>Assessment 1: Final written exam week: 24-28</p> <p>Assessment 2: Oral exam week: 24-28</p> <p>Assessment 3: Practical exam week: 24-28</p>
<p>C. Weighting of Each Method of Assessment</p>	<p>Final Written Examination 100%</p> <p>Oral Examination 100%</p> <p>Practical Examination 100%</p> <p>Total 100%</p>
<p>8. List of References</p>	
<p>A. Course Notes/handouts</p>	<p>Department notes, lectures and handouts</p>
<p>B. Essential Books</p>	<p>Essential Medical Statistics, Betty R. Kirkwood and J. A. Sterne (2000), 2nd edition</p>

C. Recommended Textbooks	Data Management and Analytics for Medicine and Healthcare: Begoli, Edmon, Fusheng Wang, and Gang Luo. Springer, 2017.
D. Periodicals, websites	<ul style="list-style-type: none"> - National Institutes of Health: http://www.nih.gov - American Medical Informatics Association: http://www.amia.org/

○ **Course Coordinators:**

➤ **Coordinators:**

1) **Lecturers:** Dr / Shaimma Mahmoud, Dr/ Chrestina Monir
(2Assistant coordinator: Assistant lecture Shaza Fadel

○ **Head of Department:**

Professor Dr. Nashwa Nabil Kamal

Date of program specifications 1st approval by department council: 13 /5/2013.

Date of last update & approval by department council: 6/ 3 / 2023



Matrix of Coverage of Course ILOs By Contents

Contents (List of course topics)	W e e k N o .	Intended Learning Outcomes (ILOs)			
		A. Knowledge & Understandi ng	B. Intellectual Skills	C. Professiona l & Practical skills	D. General & Transferabl e Skills
		A	B	C	D
Use of Computer in Medicine					
General concepts Introduction to Microsoft PowerPoint		A.1, A.2,			D.1
Health Information Systems (HIS)		A.4, A.5		C1	D.3
Telemedicine		A.3	B.1, .2		D.2
Software Used in the Health Care		A.5, A.6			D.1
Big Data Analysis in Health		A.6			

Matrix of Coverage of Course ILOs by Methods of Teaching & Learning

Methods of Teaching & Learning	Intended Learning Outcomes (ILOs)			
	A. Knowledge & Understanding	B. Intellectual Skills	C. Professional & Practical skills	D. General & Transferable Skills
	A	B	C	D
Lecture	A.1 to A.6	B.1,		
Practical			C1	
Assignment	A.4	B.2		D1.D.2,D3

Matrix of Coverage of Course ILOs by Methods of Assessment

Methods of Assessment	Intended Learning Outcomes (ILOs)			
	A. Knowledge & Understanding	B. Intellectual Skills	C. Professional & Practical skills	D. General & Transferable Skills
	A	B	C	D
Written paper based exam	A.1, to A.6	B.1		
Practical computer exam (For SPSS, PowerPoint)			C1	D.1
Oral Exam	A.4, A..6	B.2	C.1	D.2, D.3

Course Coordinators:

➤ **Coordinators:**

2) **Lecturers:** Dr / Shaimma Mahmoud, Dr/ Chrestina Monir

(2Assistant coordinator: Assistant lecture Shaza Fadel

○ **Head of Department:**

Professor Dr. Nashwa Nabil Kamal

Date of program specifications 1st approval by department council: 13 /5/2013.

Date of last update & approval by department council: 6/ 3 / 2023

Annex (1)

Specifications for courses/ modules

(First Part)

Course specification of: “Medical Statistics and Research Methodology”

University: Minia

Faculty: Medicine

Department offering the course: Public health and preventive medicine department

Programme(s) on which the course is given: First part MD of Medical Microbiology and Immunology

Academic year/ Level: First part of MD

1. Course Information		
Academic Year/level: First part MD	Course Title: Medical Statistics and Research Methodology	Code: CM 100
<i>Number of teaching hours:</i> <i>- Lectures: 30 hours</i> <i>- Practical/clinical: 15 hours</i> <i>- Total: 45 hours</i>		
2. Overall Aims of the course	By the end of the course the student must be able to: 1. Gain skills necessary for proper practice in the field of Research Methods including diagnostic, problem solving and decision making skills. 2. Apply ethical principles of scientific research with good awareness about patient’s rights. 3. Use precisely the research methodology in researches 4. Influence the students to adopt an analytical thinking for evidence-based medicine 5. Enable graduate students to use statistical principles to improve their professional work and develop the	

	<p>concept of critical interpretation of data</p> <p>6. To use precisely computer programs SPSS, Epi Info and Excel in data analysis</p>
<p>3. Intended learning outcomes of course (ILOs): <i>Upon completion of the course, the student should be able to:</i></p>	
<p>A. Knowledge and understanding</p>	<p>A.1. Define terms of research methodology.</p> <p>A.2. Describe the spectrum of research methodology.</p> <p>A.3. Explain the strategies and design of research.</p> <p>A.4. Describe the study design, uses, and limitations.</p> <p>A.5. Explain evidence-based Medicine</p> <p>A.6. Define causation and association.</p> <p>A.7. Tell the principles and fundamentals of ethics.</p> <p>A.8. Describe the different sampling strategies</p> <p>A.9. Summarize the advantages and disadvantages of different sampling strategies</p> <p>A.10. Summarize different methods of sample size calculation</p> <p>A.11. Recognize the sources and the recent methods in data collection and analysis.</p> <p>A.12. Identify the types of variables</p> <p>A.13. Identify types of tabular and graphic presentation of data</p> <p>A.14. Describe the normal curves and its uses</p> <p>A.15. Identify the characters of normal distribution curve</p> <p>A.16. Identify measures of central tendency and measures of dispersion</p> <p>A.17. Explain regression analysis, its use and differentiate its types</p> <p>A.18. Define the screening tests pertinent to selected diseases and the at-risk approach in the application of screening tests</p> <p>A.19. Explain the usefulness of screening tests</p>
<p>B. Intellectual Skills</p>	<p>B.1. Apply research methods to different community health problems.</p> <p>B.2. Apply appropriate research strategies for use.</p> <p>B.3. Select appropriate research methods.</p> <p>B.4. Teach and advocate appropriately in the research design.</p>

	<p>B.5. Explore the normal curves</p> <p>B.6. Interpret and summarize data</p> <p>B.7. Select the proper test of significance for a specific data.</p> <p>B.8. Interpret selected tests of significance and the inferences obtained from such tests</p>
C. Professional and Practical Skills	<p>C.1. Plan a research proposal for community diagnosis.</p> <p>C.2. Design questionnaires.</p> <p>C.3. Conduct research.</p> <p>C.4. Judge association and causation.</p> <p>C.5. Criticize for bias and confounding factors</p> <p>C.6. Design data entry file</p> <p>C.7. Validate data entry</p> <p>C.8. Manage data files</p> <p>C.9. Construct tables and graphs</p> <p>C.10. Calculate different samples sizes</p> <p>C.11. Calculate measures of central tendency and measures of dispersion</p> <p>C.12. Calculate sensitivity, specificity, and predictive values</p>
D. General and transferable Skills	<p>D.1. Lead a research team to conduct a specific study.</p> <p>D.2. Take part and work coherently with his associates to in research.</p> <p>D.3. Write scientific papers.</p> <p>D.4. Appraise scientific evidence</p> <p>D.5. Analyze and interpret data</p> <p>D.6. Use standard computer programs for statistical analysis effectively</p>

4. Course Contents

Topic	No. of hours	Lecture	Tutorial/ Practical
<i>Research methods</i>			
<u>Introduction :</u> - Introduction to research. - Terminology and Rationale - Originality		3	
<u>Study design :</u> -Cross sectional study and the prevalence rate -Cohort study, incidence rate, relative & attributable risk		4	

-Case-control study, Odd's ratio sampling -Experimental study and clinical trials			
- Sources of Errors in Medical Research - Bias and confounding and its Control.		3	
- Validity and reliability		2	
- The questionnaire design		2	
- Writing the Research Paper or Manuscript - Protocol Writing		2	2
- Critic technique for the literature review		2	2
- Association and causation		1	
- Evidence -based approach in medical practice		2	1
- Ethics of medical research		2	
Statistics			
Sampling		1	
Introduction to Sample Size Calculation		1	1
Data presentation		1	1
Tests of significance		2	
Introduction to SPSS		1	1
Proportion test			1
Chi-square test			1
Student T test, Paired T test			1
ANOVA test			1
Correlation (simple and multiple)			1
Regression			1
Screening		1	1
Total		30	15
5. Teaching and Learning Methods	<p>Since COVID-19 pandemic, blended learning approach was adopted that mixes virtual face-to-face interaction activities with the online learning. 60% of study method is offline and 40% of study is online</p> <p>Online learning materials are available at Minia University site</p> <ul style="list-style-type: none"> ▪ Lectures: Face to face lectures, Pre-recorded video lectures ▪ Practical lessons ▪ Assignment ▪ Online quizzes 		
6. Teaching and Learning Methods for students with limited Capacity	<ul style="list-style-type: none"> • Outstanding student rewarded certificate of appreciation due to high level of achievement 		

	<ul style="list-style-type: none"> Limited students divided into small group to make learning more effective
7. Student Assessment	
D. Student Assessment Methods	<p>7.1- Research assignment: to assess general transferable skills, intellectual skills.</p> <p>7.2- Written exams:</p> <ul style="list-style-type: none"> Short essay: to assess knowledge. Commentary: to assess intellectual skills. <p>7.3- Practical Exams: to assess practical skills, intellectual skills.</p> <p>7.4- Oral Exams: Oral exams to assess knowledge and understanding, attitude, communication</p> <p>7.5- Structured oral exams: to assess knowledge.</p>
E. Assessment Schedule (Timing of Each Method of Assessment)	<p>Assessment 1: Final written exam week: 24-28</p> <p>Assessment 2: Oral exam week: 24-28</p> <p>Assessment 3: Practical exam week: 24-28</p>
F. Weighting of Each Method of Assessment	<ul style="list-style-type: none"> - Final Written Examination 100% - Oral Examination 100% - Practical Examination 100% - Total 100%
8- List of References	
A. Course Notes/handouts	<ul style="list-style-type: none"> - Department notes, lectures and handouts
B. Essential Books	<ul style="list-style-type: none"> - The Lancet Handbook of Essential Concepts in Clinical Research
C. Recommended Textbooks	<p><u>Research methods:</u></p> <ul style="list-style-type: none"> - Introducing Research Methodology; A Beginner's Guide to Doing a Research Project - Understanding Clinical Research, Renato Lopes and Robert Harrington; ISBN-10: 0071746781 ISBN-13: 978-0071746786 - Users' guides to the medical literature: a manual for evidence-based clinical practice: Guyatt, G., D.

	<p>Rennie, M. Meade and D. Cook (2002), AMA press Chicago.</p> <ul style="list-style-type: none"> - Research Methods in Community Medicine: Surveys, Epidemiological Research, Programme Evaluation, Clinical Trials, 6th Edition Joseph Abramson, Z. H. Abramson <p><u>Computer:</u></p> <ul style="list-style-type: none"> - Discovering statistics using IBM SPSS statistics, Field, A. (2013). sage. - Medical Statistics: A Guide to SPSS, Data Analysis and Critical Appraisal, Belinda Barton, Jennifer Peat - 2nd Edition Everitt, Brian S. - Medical statistics from A to Z: a guide for clinicians and medical students. Cambridge University Press, 2021. - Bowers, David. Medical statistics from scratch: an introduction for health professionals. John Wiley & Sons, 2019. - Aviva, P. (2015): Medical Statistics at a Glance, Blackwell Company, 2nd, ed., Philadelphia
<p>D. Periodicals, websites</p>	<ul style="list-style-type: none"> - https://phrp.nihtraining.com/users/login.php - http://www.jhsph.edu/ - Journal of Biomedical Education - https://lagunita.stanford.edu/courses/Medicine/MedStats-SP/SelfPaced/about?fbclid=IwAR3nfirLM4wnuEqqUjLjk8TCR7lzPdnpGqwin06L-GjFq32a62w3j6R5s9c

○ **Course Coordinators:**

➤ **Coordinators:**

Lecturers: Dr / Chrestina Monir, Dr Shaimma Mahmoud

Assistant Coordinator: Assis .lecturer Shaza Fadel

Head of Department:

Professor Dr. Nashwa Nabil Kamal

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A handwritten signature in blue ink, appearing to read "Nadha N. Kand", is written over a faint rectangular stamp.

Matrix of Coverage of Course ILOs By Contents

Contents (List of course topics)	W e e k N o .	Intended Learning Outcomes (ILOs)			
		A. Knowledge & Understanding	B. Intellectual Skills	C. Professional & Practical skills	D. General & Transferable Skills
		A	B	C	D
Introduction : - Introduction to research. - Terminology and Rationale - Originality		A.1, A.2,			
- Study design : -Cross sectional study and the prevalence rate -Cohort study, incidence rate, relative & attributable risk -Case-control study, Odd's ratio sampling -Experimental study and clinical trials		A.3, A.4,	B.1, B.2, B.3, B.4,	C.1,	
- Sources of Errors in Medical Research - Bias and confounding and its Control.			B.3,	C.5	
- Validity and reliability					
- The questionnaire design				C.2,	
- Writing the Research Paper or Manuscript - Protocol Writing			B.3,	C.3,	D.1, D.2, D.3
- Critic technique for the literature review					
- Association and causation		A.6,		C.4,	
- Evidence -based approach in medical practice		A.5,			
- Ethics of medical research		A.7			

<i>Statistics</i>					
Sampling		A.8, A.9, A.11			D.4
Introduction to Sample Size Calculation		A.10		C.10	D.4
Data presentation		A.13, A.14	B.6	C.9	D.4
Tests of significance		A.15, A.16	B.5	C.11	D.4
Introduction to SPSS		A.12	B.6	C.6, C.7, C.8	D.5, D.6
Proportion test		A.11	B.7, B.8		D.5, D.6
Chi-square test		A.11	B.7, B.8		D.5, D.6
Student T test, Paired T test		A.11	B.7, B.8		D.5, D.6
ANOVA test		A.11	B.7, B.8		D.5, D.6
Correlation (simple and multiple)		A.11	B.7, B.8		D.5, D.6
Regression		A.17	B.7, B.8		D.5, D.6
Screening		A.18, A.19	B.7, B.8	C.12	D.4

Matrix of Coverage of Course ILOs by Methods of Teaching & Learning

Methods of Teaching & Learning	Intended Learning Outcomes (ILOs)			
	A. Knowledge & Understanding	B. Intellectual Skills	C. Professional & Practical skills	D. General & Transferable Skills
	A	B	C	D
Lecture	A.1, A.2, A.3, A.4, A.5, A.6, A.7, A.8,A9,A10,A11,A12,A13 A.14, A.15, A.16,A17, A.18	B.1, B.2, B.3, B.4, B5,B.6, B.7, B.8		
Practical			C1, C.3, C4, C.5, C.6, C.7, C.8. C.9, C.10, C11,C.12	
Assignment	A.11, A.13, A.18	B.7, B.8	C.2, C.6, C.8, C.9, C.10, C.12	D.1, D.2., D.4, D.5, D.6

Matrix of Coverage of Course ILOs by Methods of Assessment

Methods of Assessment	Intended Learning Outcomes (ILOs)			
	A. Knowledge & Understanding	B. Intellectual Skills	C. Professional & Practical skills	D. General & Transferable Skills
	A	B	C	D
Written paper based exam	A.3, A.4, A.5, A.6, A.7, A.8, A.9, A.14, A.15, A.16, A.18	B.3, B.5,		
Practical exam (Statistical exam)			C.1, C.2, C.5, C.6, C.7, C.8, C.9, C.10, C.11, C.12	
Oral exam	A.10, A.11, A.12, A.13, A.15, A.16, A.17, A.18	B.1, B.2, B.6, B.7, B.8		D.1, D.2, D.5, D.6

○ **Course Coordinators:**

➤ **Coordinators:**

Lecturers: Dr / Chrestina Monir, Dr Shaimma Mahmoud

Assistant Coordinator: Assis .lecturer Shaza Fadel

Head of Department:

Professor Dr. Nashwa Nabil Kamal

Date of program specifications 1st approval by department council: 13 /5/2013.

Date of last update & approval by department council: 6 / 3 / 2023

Annex (1)
Specifications for courses/ modules
(First Part)

Course Specifications of Molecular biology

A- Basic Information

Program on which the course is given: MD degree in Microbiology and Immunology.

Major or minor element of program: Minor.

Department offering the program: Medical Microbiology and Immunology department

Department offering the course: Medical Microbiology and Immunology department

Academic year / Level: first part

Code: MB 100

Number of teaching hours:

- **Lectures:** 30 hours
- **Practical/clinical:** 30 hours
- Total:** 60 hours

Date of specification approval:

Course Coordinator: Assoc. Prof / Wedad Mahmoud

B- Professional Information

1) Aim of the course:

- a) To enable students to understand the structure of nucleic acids.
 - b) To enable the student to describe the biological membrane, the role of free nucleotides in signal transduction control, and macromolecules involved in transmission information from gene expression to the formation of functioning proteins.
 - c) To familiarize the students with basic principles of Molecular biology and protein synthesis.
-

- d) To enable the student to be familiar with molecular Biology Techniques and their clinical implications.

2) INTENDED LEARNING OUTCOMES (ILOs):

a. Knowledge and Understanding:

By the end of the course, students should be able to:

- A1- Describe the chemistry of nucleotides and nucleic acids.
- A2- Point out the processes of replication, transcription and translation.
- A3- Describe recombinant DNA bio techniques.
- A4- Describe Different Sequencing techniques
- A5- Explain applications of proteomics and genomics
- A6- Memorize the facts and principles of the other relevant basic and clinically supportive sciences as biochemistry related to:
 - The structure and regulation of DNA & genome
 - Transcription, translation and Protein synthesis
 - Mutation & DNA repair -DNA transfer Regulation of gene expression
 - Genetic engineering and its applications
- A7- State update and evidence based Knowledge related to the course:
 - The structure and regulation of DNA & genome
 - Transcription, translation and Protein synthesis
 - Mutation & DNA repair
 - DNA transfer
 - Regulation of gene expression.
 - DNA amplification.
 - Detection of genes (Nucleic acid hybridization and Microarray).
 - Typing of organisms.

b. Intellectual Skills:

By the end of the course, students should be able to:

- B1- Identify electrophoresis bands and comment on them.
 - B2- Interpret the photographs of electrophoresis run of Polymerase chain reaction (PCR) products.
 - B3- Apply the basic and clinically supportive sciences as biochemistry which are appropriate to Molecular Microbiology related conditions / problem / topics
 - B4- Plan for quality improvement in the field of medical education and professional practice in Molecular Microbiology.
 - B5- Design / present case, seminars in common problem related to
-

- Regulation of DNA & genome
- Transcription, translation and Protein synthesis
- Mutation & DNA repair
- -DNA transfer
- Regulation of gene expression.
- DNA amplification.
- Detection of genes (Nucleic acid hybridization and Microarray).
- Typing of organisms.

C. Practical Skills:

C1. Perform the following basic lab skills essential to the course:

- DNA extraction.
- Design a primer and adjusting PCR conditions.
- Blast sequence
- PCR experiment
- Gel electrophoresis
- Probe amplification.

C2. Perform the following advanced lab skills essential to the course:

- Different types of PCR.
- Solid phase nucleic acid hybridization.
- Microarray.
- Nucleic acid hybridization.

C3. Interpret the following noninvasive procedures/ experiment:

- Different types of PCR.
- Solid phase nucleic acid hybridization.
- Microarray.
- Nucleic acid hybridization.
- Sequencing and mapping

C4. Use information technology to support decisions in common situations related to Molecular Microbiology as how to design a primer, adjusting PCR conditions, blast sequence, gel documentation and analysis.

C5. Write and evaluate competently all forms of professional reports related to Molecular Microbiology (lab reports, experiments reports,)

D. General and Transferable Skills:

D1- Present information clearly in written, electronic and verbal forms during preparation of seminars.

D2- Communicate ideas and arguments effectively.

D3-Manage time and resources effectively and set priorities.

D4- Apply knowledge of study designs and statistical methods to the appraisal of clinical studies

D5- Use information technology to manage information, access on-line medical information; and support their own education

D6- Work effectively in different health care delivery settings and systems.

3) COURSE CONTENTS:

Topic	No. Hours	Lecture	Tutorial/Practical
1-Nucleic acid structure.	2	2	
2- Replication, Transcription and Translation.	4	4	
3- Transcription and Translation differences between eukaryotes and prokaryotes.	2	2	2
4- Regulation of gene expression in eukaryotes and in prokaryotes	6	4	2
5- Nucleic acid amplification techniques.	10	4	6
6- DNA sequencing.	8	2	4
7- Proteomics and Genomics.	8	4	4
8- microRNA and siRNA principles.			
8- Regulatory RNA)microRNA and siRNA (.)	8	4	4
9- Molecular Biology Techniques	12	4	8

4. Matrix of Coverage of Course ILOs By Contents

Topic	Covered ILOs			
	Knowledge	Intellectual	Practical skill	General Skills
1-Nucleic acid structure.	A1,5,6,7	B3,5	-	D1,2,3
2- Replication, Transcription and Translation.	A1,2.6,7	B3,4,5	C1,3	D2.3.4
3- Transcription and Translation differences between eukaryotes and prokaryotes.	A1.2.6,7	B2,3,5	C1,3	D3.4

4- Regulation of gene expression in eukaryotes and in prokaryotes	A2,6,7	B1,2,3,4	C 3,4,5	D1.2.3
5- Nucleic acid amplification techniques.	A3,5,7	B1,2,3,5	C1,3,5	D2.4,6
6- DNA sequencing.	A4,6,7	B1,2,3,5	C2,3,5	D1,2,3.4.5,6
7- Proteomics and Genomics.	A5,6,7	B3.4,5	C1, 3,4,5	D3,4,5
8- Regulatory RNA)microRNA and siRNA (.)	A1,2, 6,7	B3,4,5	C1,2,3,4	D2,3.4.5
9- Molecular Biology Techniques	A1,2,3,4,5,6,7	B1,2,3,4,5	C1,2,3,4,5	D1,2,3,4.5,6

5. Course Methods of teaching/learning AND MATRIX:

- 1- Lectures for knowledge and intellectual skill outcomes.
- 2- On line lectures and audios
- 3- Practical sessions to gain practical skills aided with the practical book.
- 4-Self-directed learning (SDL) for the topics studied in lectures or related topics; including libraries, E learning (practical photographs and audios of different topics available online for student learning) .
- 5- Seminars

Methods of Teaching & Learning	Intended Learning Outcomes (ILOs)			
	A. Knowledge & Understanding	B. Intellectual Skills	C. Practical skills	D. General & Transferable Skills
	A	B	C	D
Lecture	A.1, A.2, A.3, A.4, A.5, A.6, A.7	B1,2,3, 4,5		
Practical		B.1,B.2, B.3, B.4, B.5	C1,2,3,4,5	D1,,2, D.4, D.5,6
Self-directed learning	A.1,2,3, A.4, A.5,6,7	B.1, B.2, B.3, B.4, B.5	C,4,5	D.1, D.2.3, D.4, D.5,6
Seminars	A.1,2,3, A.4, A.5,6,7	B.1,2, B.3, B.4, B.5	C4,5	D.1, D.2.,3 D.4, D.5, 6

6) Student Assessment Methods AND MATRIX:

- Written exams: Short essay, MCQ, case study.
- Practical Exams: OSPE.
- Oral Exams

Methods of Assessment	Intended Learning Outcomes (ILOs)			
	A. Knowledge & Understanding	B. Intellectual Skills	C. Professional & Practical skills	D. General & Transferable Skills
	A	B	C	D
Written exam	A1-A7	B1-B5		
Practical exam OSPE		B1-B5	C.1 -C.5	D1.-D6
Oral Exams	A1-A7	B1-B5	-	

6) Student Assessment Methods AND MATRIX:

- Written exams: Short essay, MCQ, case study.
- Practical Exams: OSPE.
- Oral Exams

Methods of Assessment	Intended Learning Outcomes (ILOs)			
	A. Knowledge & Understanding	B. Intellectual Skills	C. Professional & Practical skills	D. General & Transferable Skills
	A	B	C	D
Written exam	A1-A7	B.3,4, B.5,		D1,4,5
Practical exam OSPE	A6,7	B.1-5	C.1 -C.5,	D.3, D.5,6
Oral Exams	A1,2,3,4,5,6	B1,2,4,5	-	D1,5

Weighting of Assessments:

Final Written Examination 50 %

Oral Examination 30 %

Practical Examination 20%

Total 100%

Formative only assessment: simple research assignment, attendance and absenteeism

7) List of References

6.1- Course Notes

Lectures notes prepared by staff members in the department.

6.2- Essential Books (Text Books): Molecular biology (Robert F. Weaver, 2015) ,
Techniques in Molecular Biology (D. Tagu, C. Moussard, 2020).

8) Facilities Required for Teaching and Learning

7.1- Appropriate teaching accommodation, including laboratory equipments and photographs

7.2-Facilities for field work: hospital visits, and library visits

7.3-Computers with net connection

7.4- Data Show and overhead projectors

Course Coordinator:

Assoc. Prof / Wedad Mahmoud

Head of Department:

Prof Dr / Wafaa Khairy Mohamed

Date of last uodate specification approval: 3/2023



Annex 1

Specifications for courses/ modules

(Second Part)

Course Specification for 2nd part of MD degree of Medical Microbiology and Immunology (Advanced)

A. Basic information

- **Course Title:** Medical Microbiology and Immunology
 - **Faculty:** Medicine.
 - **Name of department:** Medical Microbiology and Immunology
 - **Specialty:** Medical Microbiology and Immunology
 - **Department delivering the course:** Medical Microbiology and Immunology
 - **Program on which the course is given:** MD degree in **Medical Microbiology and Immunology**
-

- **Academic Year:** Second part in MD degree in **Medical** Microbiology and Immunology.
- Course Coordinator: Dr. Wedad Mahmoud
- **Course code: MB 100**

B- Professional Information:

1. Course Aims:

The purpose of the course is to build on the candidate' previously obtained knowledge in the field of Microbiology & Immunology and expand it to a new dimension in updated detailed view in depth of different interest (i.e. detailed updated knowledge and principles, practical skills , self learning and practice improvement in system base practice and creation)in different eras/ units such as general, systematic microbiology& immunology in practice as follows

- **Advanced Bacteriology and infection control:**

-General Bacteriology: Structure, morphology, and classification of bacteria, Growth and nutrition of bacteria, Bacterial metabolism, Antibacterial substances and drug resistance in bacteria, Bacterial ecology and virulence, Host parasite relationship, Bacterial cultures and biochemical reactions.

-Systemic Bacteriology: antigenic structure, virulence factors, pathogenesis, mode of transmission and diagnosis of diseases caused by different bacteria.

-Applied Microbiology: System based infections (Urinary tract infections, CNS infections, GIT infections, Bacteriaemia, Respiratory infections, ENT infections).

- **Advanced Virology:**

-General Virology: General characters of viruses, Methods of virus purification, Virus classification, Virus replication, Virus interference and recombination, -Pathogenesis and host defense in virus infections, Laboratory diagnosis of viral infections, and Antiviral drugs.

-Systemic Virology: Viruses causing diarrhea, Childhood exanthems, Poxviruses, Enteroviruses, Papovaviruses, Respiratory viruses, Hepatitis viruses, Herpesviruses, Arthropod born and other zoonotic viruses, Rabies, Retroviruses, and Persistent viral infections of the CNS.

- **Advanced Mycology:**
-

-General Mycology: Classification of fungi, fungal spores, reproduction of fungi, Pathogenesis of fungal infections, laboratory diagnosis of fungal diseases and Chemotherapy of fungal infections.

-Systemic Mycology: Superficial mycosis, cutaneous mycosis, Subcutaneous mycosis, Systemic mycosis, and Opportunistic mycosis.

- **Basic and Clinical Immunology:**

Innate immunity, Acquired immunity(Humoral and cellular), Hypersensitivity, Tolerance and Autoimmunity, Transplantation immunology, Tumor immunology, Immunodeficiency, Basic Lab techniques in immunodiagnostics: Advanced Skills in Immunology-based tests as ELISA, ELISPOT, Immunofluorescence, Tissue culture, western blot, Confocal imaging,

2. Course intending learning outcomes (ILOs):

ILOs	
<u>A-Knowledge and understanding</u>	<p>A1. Describe common clinical conditions and diseases related to pathogenic bacteria as regards to character of pathogenic strain, virulence, mode of transmission, the diagnosis, treatment, prevention and control of the most important infectious clinical conditions, Antimicrobial chemotherapy.</p> <p>A2. Explain the following factual basics and principles essential to Bacteriology:</p> <ul style="list-style-type: none"> .Bacterial morphology and structure. . Bacterial physiology and metabolism. .The principle virulence factor(s) of pathogenic strains. ·The mode(s) of transmission ·The key tests for laboratory diagnosis of the microbial diseases ·The main lines of treatment and prophylactic measures <p>A3. State update and evidence based Knowledge related to bacterial physiology and metabolism, the laboratory diagnosis of the microbial diseases, the new lines of treatment and prophylactic measures</p> <p>A4. Memorize the facts and principles of the other relevant basic and clinically supportive sciences related to bacteriology including:</p> <ul style="list-style-type: none"> - Epidemiology of infectious diseases.

A5. Explain the basic ethical and medicolegal principles relevant to the laboratory diagnosis of infectious diseases.

A6. Define the basics of quality assurance to ensure good professional skills in culture and sensitivity of pathological samples and detection of Antimicrobial resistance.

A7. Demonstrate the ethical and scientific principles of medical research

A8. State the impact of common problems related to the field of bacteriology on the society and how good practice can improve these problems.

A9. Explain the details of different diagnostic tools of diseases related to hospital acquired infections :

Microscopic examination of samples from patients.

Culture of samples on different suitable media.

Confirmatory biochemical reactions.

Antibiotic sensitivity test for the causative organisms.

A10. State update and evidence based Knowledge related to the infection control as:

The Local, national, international guidelines and standards in relation to occupational exposure to infection, device/procedure related infections.

Infection control guidelines for support services and environmental care issues

A11. Describe common clinical conditions and diseases related to virology and the different types of viral infections.

A12. Define the following factual basics and principles essential to:

- the general characteristics and structures of viruses.

- The medically important RNA and DNA Viruses.

- The natural habitat, source of infection, mode of transmission and role of carriers.

-The pathogenesis and clinical presentation of the associated disease

-Methods of laboratory diagnosis

-Lines of management and possible prophylactic measures.

A13. State update and evidence based Knowledge related to the methods of laboratory diagnosis, lines of management and possible prophylactic measures.

A14. Memorize the facts and principles of the other relevant basic and clinically supportive sciences related to virology including: Epidemiology of viral diseases.

A15. Explain the basic ethical and medicolegal principles relevant to the diagnosis of viral infections.

A16. Describe the basics of quality assurance to ensure good professional skills for diagnosis of viral infections.

A17. Explain the ethical and scientific principles of medical research

A18. State the impact of common problems related to the field of specialty on the society and how good practice can improve these problems as diagnosis of viral infections.

A19. Describe common clinical conditions and diseases related to Mycology as superficial and invasive mycosis.

A20. Define the following factual basics and principles essential to Mycology :

- . Classification of fungi.
- .Pathogenesis of fungal infections.
- Laboratory diagnosis of fungal pathogens
- .Systemic mycosis, subcutaneous mycosis,
- .Superficial mycosis
- .opportunistic mycosis.

A21. State update and evidence based Knowledge related to the diagnosis, treatment, prevention and control of fungal diseases.

A22. Memorize the facts and principles of the other relevant basic and clinically supportive sciences related to mycology as role of the immune system in protection against fungal infections and serologic tests and molecular techniques for diagnosis of fungal infections.

A23. Memorize the basic ethical and medicolegal principles relevant to the fungal diseases.

A24. State the basics of quality assurance to ensure good professional skills for diagnosis of fungal infections

A25. Identify the ethical and scientific principles of medical research

A26. Memorize the factual basics, Types and principles of the immune system and essential immunology

A27. Memorize the facts and principles of the basic and clinical immunology

A28. State update and evidence based Knowledge related to the immunological processes underlying:

- Development of autoimmune diseases
- Immune deficiency diseases
- Protection against development of tumor
- Hypersensitivity or allergic reactions
- Rejection of transplanted tissues of organs

A29. State the impact of common problems related to Mycology on the society and how good practice can improve these problems as management of fungal infections.

A30. Describe common clinical conditions and diseases related to:

- MHC and transplantation immunology.
- Hypersensitivity reactions.
- Tumor immunology
- Tolerance and autoimmunity
- Immunodeficiency disorders

A31. Mention the basic ethical and medicolegal principles relevant to the treatment of immunological disorders as:

- autoimmune diseases
- Immune deficiency diseases
- Tumors
- Hypersensitivity or allergic reactions
- Rejection of transplanted tissues of organs

A32. Mention the basics of quality assurance to ensure good professional skills in:

- Detection of tumor antigens.
- Diagnosis of autoimmune diseases and immune deficiency diseases.
- Transplantation
- Detection of hypersensitivity allergens.

	<p>A33. Mention the ethical and scientific principles of medical research</p> <p>A34. State the impact of common problems related to the field of immunology on the society and how good practice can improve these problems as:</p> <ul style="list-style-type: none"> -Hypersensitivity reactions -Graft rejection -Tumors -autoimmune disorders - Immunodeficiency syndromes
<p><u>B. Intellectual outcomes</u></p>	<p>B1. Correlates the facts of relevant basic and clinically supportive sciences with conditions and diseases of relevance to diagnosis of infectious diseases as:</p> <ul style="list-style-type: none"> - Host parasite relationship - Epidemiology of infectious diseases. - Clinical diagnosis of infectious diseases - Genetic basis for antimicrobial resistance. <p>B2. Demonstrate an investigatory and analytic thinking (problem solving) approaches to laboratory diagnosis of infectious bacterial diseases and proper line of treatment and prevention.</p> <p>B3. Design and present audits, cases, seminars in common problems related to identification and pathogenesis of bacteria, laboratory diagnosis, treatment, prevention and control of infectious diseases and detection of antimicrobial resistance.</p> <p>B4. Formulate management plans and alternative decisions in different situations in the field of laboratory diagnosis, treatment, prevention and control of infectious diseases and detection of antimicrobial resistance.</p> <p>B5. Correlates the facts of relevant basic and clinically supportive sciences with conditions and diseases of relevance to viruses as role of the immune system in protection against viral infections and other related conditions.</p> <p>B6. Demonstrate an investigatory and analytic thinking (problem solving) approaches to conditions relevance to diagnosis of viral infections.</p>

B7.Design and present audits, cases, seminars in common problems related to virology: viral infections, latent viruses, persistent viral infections and oncogenic viruses , and scheme for laboratory diagnosis and differentiation between living attenuated and inactivated virus vaccines

B8.Formulate management plans and alternative decisions in different situations in the field of the management of viral infections.

B9.Correlates the facts of relevant basic and clinically supportive sciences with conditions and diseases of relevance to mycology as role of the immune system in protection against fungal infections, serologic tests and molecular techniques for diagnosis of fungal infections, clinical suspicion of fungal infections..

B10.Demonstrate an investigatory and analytic thinking (problem solving) approaches to conditions relevance to identification and diagnosis of fungal infections.

B11.Design and present audits, cases, seminars in common problems related to mycoses and differentiation between them.

B12.Formulate management plans and alternative decisions in different situations in mycosis and differentiation between them.

B13.Correlates the facts of relevant basic and clinically supportive sciences with conditions and diseases of relevance to:

- Protection against development of tumor
- Hypersensitivity or allergic reactions
- Rejection of transplanted tissues of organs
- Development of autoimmune diseases
- Immune deficiency diseases

B14.Demonstrate an investigatory and analytic thinking (problem solving) approaches to conditions relevance to:

- Protection against development of tumor
- Hypersensitivity or allergic reactions
- Graft rejection
- Development of autoimmune diseases
- Immune deficiency diseases

B15.Design and present audits, cases, seminars in common problems related to immune disorders.

	<p>B16.Formulate management plans and alternative decisions in different situations in the field of immune disorders.</p>
<p><u>C. Practical skills</u></p>	<p>C1.Perform the following basic lab skills essential to bacteriology:</p> <ul style="list-style-type: none"> ● Identification of basic laboratory equipments. ● Preparation of bacteriological media used for isolation of pathogenic organisms. ● Performance of biochemical reaction needed to confirm diagnosis. ● Preparation of stains viz. Gram’s, Ziehl –Neelson and other special stains and performing staining. ● Washing and sterilization of glassware including plugging and packing. ● Operation of autoclave, hot air oven, distillation plant, filters like Seitz and membrane and sterility tests ● Care and maintenance of common laboratory equipment like water bath, centrifuge, refrigerators, incubators etc. ● Preparation and pouring of liquid and solid media. ● Preparation of reagents – oxidase, kovac, etc. ● Examination of Microbiological specimens such as blood, urine, throat swab, rectal swab, stool, pus. ● Selection and use of the morphology, culture, biochemical reaction, serological and molecular methods for identification of the causative microorganisms (Gram positive and Gram negative cocci and bacilli). <p>C2.use instruments and devices as water bath, centrifuge, refrigerators, incubators, autoclaves etc. used in morphological identification of microorganisms, serological diagnosis, molecular techniques and antimicrobial susceptibility testing.</p> <p>C3. Interpret the following non invasive procedures as: Staining, Culture, biochemical reactions, serological tests, molecular techniques, antimicrobial susceptibility testing and detection of antimicrobial resistance.</p> <p>C4.Perform the following non invasive procedures as: Processing of different clinical samples, Staining, Culture, biochemical reactions, serological tests, molecular techniques, antimicrobial susceptibility testing and detection of antimicrobial resistance.</p> <p>C5.Write and evaluate of the following reports:</p>

- Serologic tests
- Antimicrobial susceptibility testing

C6. Use information technology to support decisions in common situations related to identification of the pathogenic strains causing the infection and the new lines of diagnosis and treatment.

C7. Develop and carry out plans for performing experiments related to identification of the pathogenic strains causing the infection and the new lines of diagnosis and treatment.

C8. Counsel and educate students, technicians and junior staff, in the lab about conditions related to diagnosis of infectious diseases; including handling of samples, devices, safety and maintenance of laboratory equipments.

C9. Share in providing health care services aimed solving health problems and better understanding of the normal structure and function.

C10. Perform the following basic lab skills essential to the course:

- Selection & use different methods of virus purification.

- Recognition the suitable method of virus isolation and other laboratory procedures for diagnosis of viral infections.

C11. use instruments and devices in evaluation of virus purification, isolation and detection of viral antigens and antibodies.

C12. Interpret the following non invasive procedures:

- Different methods of virus purification.

- Methods of viral isolation.

- Serologic diagnosis of viral infections.

- Molecular techniques for detection of viruses.

C13. Perform the following non invasive procedures/ experiments:

- Different methods of virus purification.

- Methods of viral isolation.

- Serologic diagnosis of viral infections.

- Molecular techniques for detection of viruses.

C14. Write and evaluate reports for diagnosis of viral infections.

C15. Perform the following basic experiments in related basic sciences to be utilized in the research work:

Serologic tests, IF, ELISA, tissue culture.

C16. Develop and carry out plans for performing experiments related to management of viral infections.

C17. Counsel and educate students, technicians and junior staff, in the lab about conditions related to virology; including handling of samples, devices, safety and maintenance of laboratory equipments.

C18. Share in providing health care services aimed solving health problems and better understanding of the normal structure and function.

C19. perform the following basic lab skills essential to the used methods of laboratory diagnosis of fungal infections (microscopical examination culture, others like germ tube test, sugar assimilation, antifungal susceptibility tests).

C20. use instruments and devices in in microscopic and macroscopic identification of fungal pathogens.

C21. Interpret the following non invasive procedures/ experiments as: Staining, Culture, sugar assimilation test, germ tube test, antifungal susceptibility tests..

C22. Perform the following non invasive procedures/ experiments as: Staining, Culture, sugar assimilation, germ tube test, antifungal susceptibility tests.

C23. Write and evaluate reports of antifungal susceptibility tests.

C24. Perform the following basic experiments in related basic sciences to be utilized in the research work:

Culture and Serologic tests.

C25. Use information technology to support decisions in common situations related to update methods for diagnosis of fungal Infections.

C26. Develop and carry out plans for performing experiments related to methods for diagnosis of fungal Infections.

C27. Counsel and educate students, technicians and junior staff, in the lab about conditions related to diagnosis of fungal Infections; including handling of samples, devices, safety and maintenance of laboratory equipments.

C28.Share in providing health care services aimed solving health problems and better understanding of the normal structure and function.

C29.perform the following basic lab skills essential to the course:

- ELISA
- Western blot
- Tube agglutination.
- Immunofluorescence

C30.use instruments and devices as:

- ELISA reader for reading the ELISA plate
- Fluorescent microscope for detection of immunoflourescent antibodies.

C31.Interpret the following non invasive procedures:

- ELISA
- Western blot
- Tube agglutination.
- Immunofluorescence

C32.Perform the following non invasive procedures:

- ELISA
- Western blot
- Tube agglutination.
- Immunofluorescence

C33.Write and evaluate of the following reports:

- ELISA report
- Western blot report
- Tube agglutination report
- Immunofluorescence report

C34.Perform the following basic experiments in related basic sciences to be utilized in the research work:

- Western blot
- Immunofluorescence

C35.Use information technology to support decisions in common situations related to Immunology.

C36.Develop and carry out plans for performing experiments related to immunology .

C37.Counsel and educate students, technicians and junior staff, in the lab about conditions related to immunology; including

	<p>handling of samples, devices, safety and maintenance of laboratory equipments.</p> <p>C38.Share in providing health care services aimed solving health problems and better understanding of the normal structure and function.</p>
<p><u>D. General Skills</u></p>	<p>D1.Perform practice-based improvement activities using a systematic methodology (audit, logbook) Sample processing, microscopic examination, culture, serotyping and molecular diagnosis.</p> <p>D2.Appraises evidence from scientific studies.</p> <p>D3.participate in one audit or survey related to the laboratory diagnosis of infectious diseases.</p> <p>D4.Perform data management including data entry and analysis.</p> <p>D5.Facilitate learning of junior students and other health care professionals.</p> <p>D6.Perform practice-based improvement activities using a systematic methodology(audit, logbook): Sample processing, tissue culture, serology and molecular diagnosis.</p> <p>D7.participate in one audit or survey related to virology.</p> <p>D8.Facilitate learning of junior students and other health care professionals about diagnosis of viral infections.</p> <p>D9.Use information technology to support decisions in common situations related to management and the possible prophylactic measures related to viral infections.</p> <p>D10.Perform practice-based improvement activities using a systematic methodology(audit, logbook): Sample processing, culture, serology and molecular diagnosis.</p> <p>D11.participate in one audit or survey related to mycosis</p> <p>D12.Facilitate learning of junior students and other health care professionals about diagnosis of fungal infections</p> <p>D13.Perform practice-based improvement activities using a systematic methodology(audit, logbook) in ELISA, Western blot, tube agglutination, Immunofluorescence.</p> <p>D14.participate in one audit or survey related to immunology.</p>

.Interpersonal and Communication Skills	<p>D15.Maintain ethically sound relationship with senior staff, colleagues, clinicians and technicians.</p> <p>D16.Elicit information using effective nonverbal, explanatory, questioning, and writing skills.</p> <p>D17.Work effectively with others as a member of a health care team of Infection control unit or other professional group.</p> <p>D18.Present a case in seminars.</p> <p>D19.Write a report in Infection Control Lab.</p> <p>D20.Write a report in diagnosis of viral infections.</p> <p>D21.Write a report in diagnosis of fungal infections in lab.</p> <p>D22.Present a case of immunological disorders.</p> <p>D23.Write a report of ELISA, Westernblot or immunoflourescence.</p>
.Professionalism	<p>D24.Demonstrate respect, compassion, and integrity; a responsiveness to the needs of patients and society</p> <p>D25.Demonstrate a commitment to ethical principles including provision or withholding of clinical care, confidentiality of patient information, informed consent, business practices</p> <p>D26.Demonstrate sensitivity and responsiveness to patients’ culture, age, gender, and disabilities</p>

3. Course contents (topic s/modules/rotation Course Matrix)

Topic	Covered ILOs			
	Knowledge	Intellectual	Practical skill	General Skills
Advanced bacteriology				
Structure, morphology of bacteria, Nomenclature and classification of microbes	A1-A2	B1-B4	C1-C10	D1-D5 D15-19, D24-D26

Growth, nutrition and metabolism of bacteria	A1-A3	B1-B4	C1-C10	D1-D5
Antibacterial substances and drug resistance in bacteria	A1-A3	B1-B4	C1-C10	D1-D5
Bacterial ecology, virulence and Host parasite relationship	A1-A8	B1-B4	C1-C10	D1-D5
Bacterial cultures and biochemical reactions	A1-A8	B1-B4	C1-C10	D1-D5 D15-19, D24-D26
diagnosis of the different microorganisms	A1-A8	B1-B4	C1-C10	D1-D5
antigenic structure and virulence factor	A1-A8	B1-B4	C1-C10	D1-D5 D15-19, D24-D26
pathogenesis and mode of transmission of the diseases	A1-A8	B1-B4	C1-C10	D1-D5
important infectious clinical conditions	A1-A8	B1-B4	C1-C10	D1-D5
System based infections	A1-A8	B1-B4	C1-C10	D1-D5 D15-19, D24-D26
Infection control	A1-A9-A10	B1-B4	C1-C10	D1-D5 D19, D24-D26
Advanced Virology				
General characters, classification of viruses and Methods of virus purification	A11, A12	B5-B8	C11-C19	D6-D9, D20
Virus replication, interference and recombination	A12, A14	B5-B8	C11-C19	D6-D9
pathogenesis and host defense in virus infections	A11-A18	B5-B8	C11-C19	D6-D9, D20
laboratory diagnosis of viral infections	A11-A18	B5-B8	C11-C19	D6-D9, D20
antiviral drugs	A11-A13	B5-B8	C11-C19	D6-D9, D24-D26

Pathogenesis and mode of transmission of viral diseases	A11-A18	B5-B8	C11-C19	D6-D9
Diagnosis, treatment, prevention and control of viral diseases	A11-A18	B5-B8	C11-C19	D6-D9, D20, D24-D26
Advanced Mycology				
Classification, fungal spores, reproduction of fungi	A19-A20	B9-B12	C20-C29	D13-D14
Pathogenesis of fungal infections	A20-A25	B9-B12	C20-C29	D13-D14
laboratory diagnosis of fungal pathogens	A19-A25	B9-B12	C20-C29	D13-D14, D26
Chemotherapy of fungal Infections	A21-A22-A25	B9-B12	C20-C29	D13-D14, D24
diagnosis, treatment, prevention and control of fungal diseases	A19-A25	B9-B12	C20-C29	D13-D14, D21
Basic and Clinical Immunology				
Innate immunity	A26-A27	B13-B16	C30-C38	D10-D12
Acquired immunity(Humoral and cellular)	A26-A27	B13-B16	C30-C38	D10-D12
Hypersensitivity	A28-A34	B13-B16	C30-C38	D10-D12, D22, D23
Tolerance and Autoimmunity.	A28-A34	B13-B16	C30-C38	D10-D12 D22, D23
Transplantation immunology	A28-A34	B13-B16	C30-C38	D10-D12, D24-D26
Tumor immunology.	A28-A34	B13-B16	C30-C38	D10-D12 D22, D23
Immunodeficiency	A28-A34	B13-B16	C30-C38	D10-D12 D22, D23

4. Course Methods of teaching/learning:

Methods	Knowledge	Intellectual	Practical skill	General Skills
Didactic (lectures, seminars)	X	X	X	X
Self-directed learning	X	X	X	X

Practical		X	X	
Present a case	X	X	X	X
Observation and supervision		X	X	X
Conferences, Work shop	X	X	X	X
Assignments	X	X	X	X

5- Student assessment methods

Method of assessment	The assessed ILOs
1-Research assignment	-general transferable skills, intellectual skills
2-Written Exams:	-knowledge
-Short essay	-knowledge, intellectual skills
-MCQs	- intellectual skills
-Problem solving	-general transferable skills, intellectual skills
3-Practical Exams -OSPE	- Practical skills, intellectual skills
	- Practical skills, intellectual skills
4-Oral Exams. -Structured Oral Exams	-knowledge

6-List of references

Course notes

Lecture handouts

Essential books (text books)

Lippincott's immunology (2017) ,systemic bacteriology
 Jawetz Medical Microbiology (2020).
 Roitt Essential Immunology (2014).
 Abbas Clinical Immunology (2015).
 Alberts Molecular Biology (2010)

Recommended books

A coloured Atlas of Microbiology

Periodicals, Web sites, ... etc

<http://www.ncbi.nlm.gov/>
Freemedicaljournals.com

9- Facilities required for teaching and learning

Data show
Direct Projector
Board
Computers

Program co-ordinator:

Dr. Wedad Mahmoud Abdelraheem

Head of Department:

Prof. Wafaa Khairy Mohamed

Date of last uodate specification approval: 3/2023



Annex (2)

مصنوفه توافق المعايير القومية القياسيه العامه لبرامج الدكتوراه مع المعايير الأكاديميه المعتمده من كليه الطب/ جامعة المنيا لدرجه الدكتوراه فى الميكروبيولوجى والمناعة

Comparison between National Academic Quality Assurance and Accreditation general Academic Reference Standards and Faculty Academic Reference Standard

A-Comparison between National Academic Quality Assurance and Accreditation general Academic Reference Standards and Faculty Academic Reference Standard

1- Graduate attributes:

برامج الدكتوراه NAQAAE	Faculty Doctorate (MD) Program
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<p>1. مواصفات الخريج:</p> <p>خريج برنامج الدكتوراه في أي تخصص يجب أن يكون قادرا على</p>	<p>1. Graduate attributes:</p> <p>Graduate of doctorate (MD) program in any specialty should be able to:</p>
<p>1.1. إتقان أساسيات ومنهجيات البحث العلمي.</p>	<p>1.1. Mastery of basic research skills and types of study design.</p>
<p>2.1. العمل المستمر علي الإضافة للمعارف في مجال التخصص.</p>	<p>1.2. Contribute to development, application, and translation of new medical knowledge in his scholarly field through research.</p>
<p>3.1. تطبيق المنهج التحليلي والناقد للمعارف في مجال التخصص والمجالات ذات العلاقة.</p>	<p>1.3. use analytical and critical skills in observing, collecting and interpreting data.</p>
<p>4.1. دمج المعارف المتخصصة مع المعارف ذات العلاقة مستنبطا ومطورا للعلاقات البينية بينها.</p>	<p>1.4. Integrate biomedical sciences with clinical information to explore scientific basis of medical practice for improvement of management of diseases.</p>
<p>5.1. إظهار وعيا عميقا بالمشاكل الجارية والنظريات الحديثة في مجال التخصص.</p>	<p>1.5. Demonstrate an awareness of current health problems and recent theories in his scholarly field</p>
<p>6.1. تحديد المشكلات المهنية و إيجاد حلولاً مبتكرة لحلها.</p>	<p>1.6. Identify and create solutions for occupational problems and medical malpractice conditions.</p>
<p>7.1. إتقان نطاقا واسعا من المهارات المهنية في مجال التخصص</p>	<p>1.7. perform a wide range of professional skills in his scholarly field.</p>
<p>8.1. التوجه نحو تطوير طرق و أدوات و أساليب جديدة للمزاولة المهنية .</p>	<p>1.8. Develop and improve new methods and approaches in the professional medical practice of the specific field.</p>
<p>9.1. استخدام الوسائل التكنولوجية المناسبة بما يخدم ممارسته المهنية</p>	<p>1.9. Use information technology to improve his professional medical practice including online medical information manage information and researches.</p>

10.1. التواصل بفاعلية وقيادة فريق عمل في سياقات مهنية مختلفة .	1.10. communicate effectively as a member or leader of health care group or other professional group and gain leadership skills.
11.1. اتخاذ القرار في ظل المعلومات المتاحة .	1.11. Make informed decisions based on available data (e.g. patient information, up to date scientific evidence and clinical judgement).
12.1.توظيف الموارد المتاحة بكفاءة وتنميتها والعمل على إيجاد موارد جديدة .	1.12. Effective management, development & improvement of available resources and have the competency to get new resources.
13.1.الوعي بدوره في تنمية المجتمع و الحفاظ على البيئة .	1.13. Be aware of his community needs related to his field and have the ability to improve & maintain health care and carryout system-based improvement.
14.1.التصرف ب ما يعكس الالتزام بالنزاهة والمصادقية وقواعد المهنة .	1.14. Demonstrate ethical behavior, moral reasoning, honesty, integrity, dependability, and commitment to service and health equity.
1.15.الالتزام بالتنمية الذاتية المستمرة ونقل علمه و خبراته للآخرين .	1.15. Critically reflect on one's own performance to set learning and improving goals and sharing his knowledge.

2. Academic standards:

Faculty ARS	NAQAAE General ARS for Postgraduate Programs
1. Knowledge and understanding Upon completion of the MD Program in , the graduate should have sufficient knowledge and understanding of:	1- المعرفة و الفهم بانتهاء دراسة برنامج الدكتوراة فى الميكروبيولوجى والمناعة يجب أن يكون الخريج على فهم ودراية بكل من:
1.A -Established basic, biomedical, clinical,epidemiological and behavioral sciences related conditions, problems and topics.	أ - النظريات و الأساسيات المتعلقة بمجال التعلم وكذا في المجالات ذات العلاقة
1.B- The relation between good clinical care of common health problems in Pediatrics and the welfare of society.	ب- التأثير المتبادل بين الممارسة المهنية وانعكاسها علي البيئة
1. C- Up to date and recent developments in common problems related to Microbiology and Immunology.	ت - التطورات العلمية في مجال التخصص

1. D- Ethical and medicolegal principles relevant to practice in the Microbiology and Immunology.	ث - المبادئ الأخلاقية و القانونية للممارسة المهنية في مجال التخصص
1. E-Quality assurance principles related to the good medical practice in Microbiology and Immunology.	ج - مبادئ و أساسيات الجودة في الممارسة المهنية في مجال التخصص
1. F- Ethical and scientific basics of medical research.	ح - أساسيات وأخلاقيات البحث العلمي
2. Intellectual skills Upon completion of the MD program, the graduate must be able to do the following :	٢- المهارات الذهنية بانتهاء دراسة برنامج الدكتوراة يجب أن يكون الخريج قادرا على:
2.A-Correlation of different relevant sciences in the problem solving and management of common diseases of Microbiology and Immunology.	٢- أ - تحليل و تقييم المعلومات في مجال التخصص و القياس عليها لحل المشاكل
2.B- Problem solving skills based on data analysis and evaluation (even in the absence of some) for common clinical situations related to Microbiology and Immunology.	٢- ب - حل المشاكل المتخصصة مع عدم توافر بعض المعطيات
2.C- Integrate different information to solve professional problems	٢- ت - الربط بين المعارف المختلفة لحل المشاكل المهنية
2.D-Demonstrating systematic approach in studying clinical problems relevant to the Microbiology and Immunology	٢- ث - إجراء دراسة بحثية و / أو كتابة دراسة علمية منهجية حول مشكلة بحثية
2.E-Evaluate risks imposed during the professional practice in Microbiology and Immunology	٢- ج - تقييم المخاطر في الممارسات المهنية
2.F-Plan for professional improvement in Microbiology and Immunology	٢- ح - التخطيط لتطوير الأداء
2.G- Take professional decisions in wide range of professional situations.	٢- خ - اتخاذ القرارات المهنية في سياقات مهنية متنوعة
3-Professional & Practical skills Upon completion of the master program, the graduate must be able to do the following :	٣- المهارات المهنية بانتهاء دراسة برنامج ا يجب أن يكون الخريج قادرا على:
3.A- Demonstrate competency in all basic and some of the advanced professional skills in Microbiology and Immunology	٣- أ - إتقان المهارات المهنية الأساسية و الحديثة
3.B- Write and evaluate/appraise professional reports	٣- ب - كتابة و تقييم التقارير المهنية
3.C- Evaluate methods and existing tools used in Microbiology and Immunology	٣- ت - تقييم الطرق و الأدوات القائمة في مجال
4-General and transferable skills Upon completion of the MD program, the graduate must be able to do the following:	٤- المهارات العامة و المنتقلة بانتهاء دراسة برنامج الدكتوراة يجب أن يكون الخريج قادرا على
4-A- Demonstrate efficient communication skills using all sorts	٤- أ - التواصل الفعال بأنواعه المختلفة

4-B- Use information technology to improve professional practice	٤- ب - استخدام تكنولوجيا المعلومات بما يخدم الممارسة المهنية
4-C- Demonstrate skills of self-evaluation and identification of personal learning needs	٤- ت - التقييم الذاتي وتحديد احتياجاته التعليمية الشخصية
4-D- Use different sources of information to get data	٤- ث - استخدام المصادر المختلفة للحصول على المعلومات و المعارف
4.E- Demonstrate capability to put roles and indicators for performance evaluation and appraisal	٤- ج - وضع قواعد ومؤشرات تقييم أداء الآخرين
4-F- Work in a team as well as being able to work as a team leader in variable professional situations	٤- ح - العمل في فريق ، وقيادة فرق في سياقات مهنية مختلفة
4-G- Demonstrate skills of effective time management	خ- ادارته الوقت بكفاءة-4
4-H- Demonstrate Skills of self and continuous learning	د- التعليم الذاتي والمستمر-4

B-Comparison between Faculty ARS and Program ILOs

Faculty ARS	Program ILOs
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1-Knowledge and understanding:

Upon completion of the MD program of Microbiology and Immunology the graduate should have sufficient knowledge and understanding of:

1-A- Established, updated and evidence-based theories, basics and developments of *Microbiology and Immunology* and relevant sciences.

1-B Basic, methods and ethics of medical research.

1-C- Ethical principles of medical practice related to *Microbiology and Immunology* field.

1-D- Principles and measurements of quality in the field of *Microbiology and Immunology*.

1-E-Principles and efforts for maintaining and improvements of *Microbiology and Immunology* field.

1-Knowledge and understanding:

By the end of the study of doctoral programme in Microbiology and Immunology the graduate is expected to be able to:

1.a. Describe theories, basics and updated sciences in Microbiology, Immunology. And molecular biology.

1-b Discuss the recent advances in biostatistics ,research methodology and clinical epidemiology related to the field of *Microbiology and Immunology*.

1-cIdentify the ethical aspects of conducting scientific researches in the field of *Microbiology and Immunology*.

1-d Discuss recent advances in etiology ,clinical picture and management of microbial diseases .

1.e. Describe recent advances in the management and prevention of microbial diseases .

1.f. Identify recent advances in methods of molecular biology.

1.g. Identify recent advances in methods of infection control

1.h. Discuss the principles of quality improvement in education and professional practice in the field of *Microbiology and Immunology*.

1.i. Define the effect of professional practice on the environment and the methods of environmental development and maintenance.

<p>2-Intellectual skills:</p> <p><i>Upon completion of the MD program of Microbiology and Immunology, the graduate must be able to do the following :</i></p> <p>2-A-Application of basic and other relevant science to solve Microbiology and Immunology related problems. 2-B-Problem solving based on available data. 2-C- Involvement in research studies related to Microbiology and Immunology 2-D Writing scientific papers. 2-E-Risk evaluation in the related clinical practice. 2-F-Planning for performance improvement in Microbiology and Immunology 2-G-Creation and innovation in the field of Microbiology and Immunology 2-H-Evidence – based discussion. 2-I-Decision making in different situations related to Microbiology and Immunology</p>	<p>2 .Intellectual skills:</p> <p><i>Upon completion of the MD program of Microbiology and Immunology, the graduate must be able to do the following.</i></p> <p>2.a. Conduct research studies, that add to knowledge. 2.b. write scientific papers in the area of Microbiology and Immunology. 2.c. assess risk in professional practices in the field of Microbiology and Immunology. 2.d. Plan to quality improvement in the field of medical education of Microbiology and Immunology. 2.e. demonstrate analytical thinking approach in clinical situations related to Microbiology and Immunology. 2.f. .manage Scientific discussion based on scientific evidences and proofs. 2.g. criticize researches related to Microbiology and Immunology. 2.h. present data in front of experts.</p>
<p>.3. Professional & Practical skills:</p> <p><i>Upon completion of the MD program, the graduate must be able to do the following :</i></p> <p>3. A.1- Provide extensive level of professional practical and/ or clinical services that can help solving health problems and better understanding of the normal structure and function extensive level means in depth understanding from basic science to evidence – based clinical application and possession of skills to manage independently all problems in the practice of Microbiology and Immunology 3. A.2- Master practical / clinical skills relevant to Microbiology and Immunology 3. B- Write and evaluate reports for situations related to the field of Microbiology and Immunology 3.C-Master practice-based learning and improvement skills that involves investigation and evaluation and improvements of practice in Microbiology and Immunology.</p>	<p>3- Professional and Practical Skills</p> <p><i>By the end of the study of MD program in Microbiology and Immunology the graduate is expected to be able to:</i></p> <p>3.a. Master the basic and advanced professional practical skills in the area of Microbiology and Immunology 3.b. Write competently and evaluate the medical reports. 3.c. Evaluate and improve methods and tools existing in the area of Microbiology and Immunology. 3.d. Use the recent diagnostic technologies in Microbiology and Immunology practice. 3.e. train junior staff and plan to improve their performance through continuous medical education programs. 3.f. perform competently all lab. procedures considered essential for</p>

<p>3. D- Use competently all information sources and technology to improve practice in Microbiology and Immunology</p> <p>3. E- Participate in improvement of the education system.</p>	<p>Microbiology and Immunology related conditions.</p>
<p>4. General and transferable skills:</p> <p><i>Upon completion of the MD program, the graduate must be able to do the following:</i></p> <p>4. A- Master effective communication skills that result in effective information exchange and teaming with health professionals</p> <p>4. B- Use competently all information sources and technology to improve professional practice in Microbiology and Immunology</p> <p>4. C.1- Master skills of teaching and Evaluating others.</p> <p>4. C.2- Participate in improvement of the education system.</p> <p>4.D-1- Master professionalism behavior, as manifested through a commitment to carrying out professional responsibilities, adherence to ethical principles.</p> <p>4.D-2- Demonstrate skills of self</p> <p>4.E- Use different sources to get data and information and demonstrate the ability to effectively use system resources to provide relevant services and care that is of optimal value.</p> <p>4. F- Possess the skills of working among a team as well as demonstrate the ability to work as a team leader.</p> <p>4.G- Demonstrate management skills of scientific meetings and time management</p>	<p>4- General and Transferable Skills</p> <p><i>By the end of the study of MD program in Microbiology and Immunology, the Graduate is expected to be able to:</i></p> <p>4.a. Communicates effectively by different types of communication skills.</p> <p>4.b. Use appropriate computer program packages and the internet to serve the development of professional practice.</p> <p>4.c. Teach others and evaluate and improve their performance.</p> <p>4.d. use different sources of information and knowledge.</p> <p>4.e Work successfully in a team and also as a team leader .</p> <p>4.f. Manage scientific meetings according to the available time.</p> <p>4.g. design logbooks.</p> <p>4.h. compute with others for improvement of health services</p>

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Annex (3)

Program matrix

A. Courses with Program ILOs

Course	Knowledge							Intellectual							Practical skills						General															
	A	B	C	D	E	F	G	A	B	C	D	E	F	G	H	A	B	C	D	E	F	A	B	C	D	E	F	G	H							
Course 1: Computer in Medicine		✓						✓						✓														✓								
Course2: Research methodolo gy		✓	✓					✓																					✓							
Course 3: Advanced Molecula r Microbiol ogy	✓				✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Course 4: Advanced Microbiolo gy	✓		✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Date of last uodate specification approval: 3/2023

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B. Course Methods of teaching/learning:

Methods	Knowledge	Intellectual	Practical skill	General Skills
Didactic (lectures, seminars, tutorial)	✓	✓	✓	✓
Self-directed learning	✓	✓	✓	✓
Practical		✓	✓	
Present a case	✓	✓	✓	✓
Observation and supervision		✓	✓	✓
Conferences, Workshop	✓	✓	✓	✓
assignments	✓	✓	✓	✓

Date of last update specification approval: 3/2023



C. Program assessment methods matrix

Method	Knowledge	Intellectual	Practical Skills	General Skills
	K	I	P	G
Research assignments, Thesis, Publishing	✓	✓	✓	✓
Log book	✓	✓	✓	✓
oral examination	✓	✓	✓	✓
Written examination	✓	✓	✓	✓
Practical exam	✓	✓	✓	

Program co-ordinator:

Dr. Wedad Mahmoud Abdelraheem

Head of Department:

Prof. Wafaa Khairy Mohamed

Date of specification approval: 3/2023

Case 2

