

Program Specification For Master Degree in Chemical pathology

Code: 1717700

University: Alexandria

Faculty: Medical Research Institute

Program Specification

A-

Basic information

1- Program title : Master of Chemical Pathology.

2- Program type: single double multiple

3- Department(s) : Chemical Pathology

4- Coordinator : Dr/ Azhar Mohamed Nomair

5- External evaluator(s): Prof.Dr/ Ekbal Abou Hashem

6- Last date of program specification approval: 5/6/2014

B-

Professional Information

1- Program aims:

1. Produce scientifically and professionally capable **Chemical Pathologists** to meet regional and national needs while developing study skills and attitudes suitable for life-long learning.
2. Equip students with knowledge, skills and critical awareness to make a significant contribution to research of the department.
3. Integrate information of specialty & related subjects to analyze & solve health care problems, write and appraise reports through assignments and case studies.
4. Manage common and less common problems adequately
5. Competent in basic & some advanced procedural/ practical skills
6. Able to conduct scientific research, recognize ethical and legal considerations in lab practice through thesis work.
7. Plan for professional improvement through conferences and workshops.
8. Understand and integrate basic knowledge of hepatic, GIT and immunological disorders
9. Integrate information on basics of endocrinology and reproductive medicine.
10. Equip students with knowledge of essential facts, concepts, principles and theories of different metabolic diseases.
11. Use systematic approaches to design and conduct scientific research.

By the end of this program the student should:

1. Acquire basic knowledge of chemical pathology.
2. Acquire an appropriate knowledge of laboratory quality and management.

3. Recognize basic principles of techniques and application in laboratory medicine.
4. Understand basic principles of molecular and separation techniques.
5. Demonstrate knowledge of renal function, electrolytes and acid base balance.
6. Acquire an appropriate background of different analytes in the clinical chemistry.
7. Describe the integration of different lab tests in management of different diseases.
8. Acquire basic knowledge of hepatic, GIT and immunological disorders.
9. Recognize basics of endocrinology and reproductive medicine.
10. Demonstrate knowledge of essential facts, concepts, principles and theories of normal and abnormal metabolic function.

2- Intended learning outcomes (ILOS)

a- Knowledge and understanding:

- a1- Define basic principles in chemical pathology including; calculations, sampling, reagent preparation, lab safety, sources of variances & statistical tests.
- a2- Define the quality control principles including internal and external QC, method verification and validation, method comparison and diagnostic performance of different tests.
- a3 - List different techniques & instruments including; spectrophotometry, light scattering techniques, electro & immunochemistry, automation, flame photometer and others.
- a4- Define basic principles of different molecular techniques and discuss various separation techniques such as chromatography & electrophoresis.
- a5- Discuss renal function tests in blood & urine & interpret the results and recall different body ions, water, blood gases & acid base balance.
- a6- Discuss main body analytes including proteins, amino acids, enzymes, vitamins & biochemical aspects of hematology, inflammatory markers and others.
- a7- Discuss main body analytes including cardiac and tumor markers, trace elements, therapeutic drug monitoring, markers of rheumatological and bone diseases, biological fluid and nutritional assessment by Lab measures.
- a8- Discuss hepatic and GIT functions & immunological diseases.
- a9- Recall various endocrinological axes and their dysfunction & reproductive medicine.
- a10- Discuss basics of carbohydrates and lipid metabolism and clinico-laboratory practice in dealing with commonly occurring disease states in metabolic medicine, cardiology, and commonly occurring malignancies.

b- Intellectual skills:

- b1- Demonstrate basic principles in chemical pathology including; calculations, sampling, reagent preparation, lab safety, sources of variances & statistical tests.
- b2- Illustrate quality control principles including internal and external QC, method verification and validation, method comparison and diagnostic performance of different tests.
- b3- Analyze different techniques & instruments including; spectrophotometry, light scattering techniques, electro & immunochemistry, automation, flame photometer and others.
- b4- Compare basic principles of different molecular techniques and illustrate various separation techniques such as chromatography & electrophoresis..
- b5- Appraise renal function tests in blood & urine & interpret the results and demonstrate different body ions, water, blood gases & acid base balance.
- b6- Illustrate the use of laboratory test for main body analytes including proteins, amino acids, enzymes, vitamins & biochemical aspects of hematology, inflammatory markers and others.
- b7-Appraise different analytes including cardiac and tumor markers, trace elements, therapeutic drug monitoring, markers of rheumatological and bone diseases, biological fluid and nutritional assessment by Lab measures
- b8- Interpret abnormal lab results concerning hepatic and GIT functions & immunological diseases
- b9 – Illustrate different laboratory algorithms for endocrinal abnormalities and reproductive disorders.
- b10- Differentiae different laboratory markers in carbohydrates and lipid metabolism.
- b11- Write a thesis protocol using a scientific systematic approach to a research problem

c- Professional and practical skills:

- c1- Prepare different concentrations of reagents, buffers and standards with application of lab safety measures as well as calculations, sampling, reagent preparation, sources of variances & statistical tests and specimen collection & patient identification.
- c2- Employ different quality control charts of internal and external QC, method verification and comparison & their statistics and use of diagnostic performance.
- c3- Apply the use of different lab techniques of different tests such as spectrophotometry, light scattering techniques, immunochemistry, automation & flame photometer.
- c4- Apply different molecular techniques including nucleic acid extraction, PCR & others as well as application of different lab separation techniques such as chromatography & electrophoresis.

c5- Employ the use of renal function tests in blood & urine & interpret the results and evaluate different tests for assessment of body ions, water, blood gases & acid base balance.

c6-Apply different tests for body analytes including proteins, amino acids, enzymes, vitamins, inflammatory markers, & biochemical tests for hematological diseases and others..

c7-Assess different laboratory tests for cardiac and tumor markers, trace elements, heavy metals intoxication, therapeutic drug monitoring and markers of rheumatological & bone diseases.

c8- Analyze laboratory tests for diagnosis of hepatic and GIT functions as well as immunological disorders using different techniques and case studies to aid in the differential diagnosis.

c9- Interpret different laboratory tests to assess various endocrinological cases with their hormonal axis & assess diseases of reproductive medicine by Lab means.

c10- Apply different laboratory tests to diagnose diseases related to carbohydrates and lipid metabolism.

d- General and transferable skills:

d1-Develop skills in reading and research and practice self appraisal, determines his learning needs, learn independently and seek continuous learning through thesis work

d2-Establish team work skills and use of different sources of information to obtain data.

d3-Acquire skills in communication and problem solving and share in determination of standards for evaluation of others through thesis and seminars

d4- Establish skills in presentation of case study

3- Academic standards

3a External references for standards (Benchmarks)

Generic Academic Reference Standards of the National Authority for Quality Assurance and Accreditation of Education (NAQAAE)

Adopted at MRI Council 2/2/2014 and readopted 15/1/2023

Last date of academic reference standards (ARS) approval by institute Council 15/1/2023

3b Comparison of provision to selected external references

Generic Academic Standards	ARS of MSc in Chemical pathology
A1- Basic facts , theories, of the specialty and related subjects/ field	a1- Define basic principles in chemical pathology including; calculations, sampling, reagent preparation, lab safety, sources of variances & statistical tests. a3 - List different techniques & instruments including;

	<p>spectrophotometry, light scattering techniques, electro & immunochemistry, automation, flame photometer and others</p> <p>a4- Define basic principles of different molecular techniques and discuss various separation techniques such as chromatography & electrophoresis</p> <p>a6- Discuss main body analytes including proteins, amino acids, enzymes, vitamins & biochemical aspects of hematology, inflammatory markers and others</p> <p>a9- Recall various endocrinological axes and their dysfunction & reproductive medicine.</p> <p>a10- Discuss basics of carbohydrates and lipid metabolism and clinico-laboratory practice in dealing with commonly occurring disease states in metabolic medicine, cardiology, and commonly occurring malignancies.</p>
<p>A2- Mutual relation between professional practice and effects on environment</p>	<p>a5- Discuss renal function tests in blood & urine & interpret the results and recall different body ions, water, blood gases & acid base balance</p> <p>a7- Discuss main body analytes including cardiac and tumor markers, trace elements, therapeutic drug monitoring, markers of rheumatological and bone diseases, biological fluid and nutritional assessment by Lab measures .</p> <p>a8- Discuss hepatic and GIT functions & immunological diseases.</p> <p>.</p>
<p>A3- Main scientific advances in the field of practice</p>	<p>a2- Define the quality control principles including internal and external QC, method verification and validation, method comparison and diagnostic performance of different tests .</p> <p>a3 - List different techniques & instruments including; spectrophotometry, light scattering techniques, electro & immunochemistry, automation, flame photometer and others.</p> <p>a4- Define basic principles of different molecular techniques and discuss various separation techniques such as chromatography & electrophoresis.</p>
<p>A4- Fundamentals of ethical & legal practice</p>	<p>a2- Define the quality control principles including internal and external QC, method verification and validation, method comparison and diagnostic performance of different tests .</p>
<p>A5 -Quality standards of the practice</p>	<p>a2- Define the quality control principles including internal and external QC, method verification and validation,</p>

	method comparison and diagnostic performance of different tests.
A6- Basics and ethics of scientific research	a1- Define basic principles in chemical pathology including; calculations, sampling, reagent preparation, lab safety, sources of variances & statistical tests.
B1- Interpret, analyze & evaluate the information to solve problems	<p>b1- Demonstrate basic principles in chemical pathology including; calculations, sampling, reagent preparation, lab safety, sources of variances & statistical tests.</p> <p>b5- Appraise renal function tests in blood & urine & interpret the results and demonstrate different body ions, water, blood gases & acid base balance .</p> <p>b6- Illustrate the use of laboratory test for main body analytes including proteins, amino acids, enzymes, vitamins & biochemical aspects of hematology, inflammatory markers and others.</p> <p>b7-Appraise different analytes including cardiac and tumor markers, trace elements, therapeutic drug monitoring, markers of rheumatological and bone diseases, biological fluid and nutritional assessment by Lab measures</p>
B2- Solve some problems that do not conform to classic data (incomplete data)	<p>b8- Interpret abnormal lab results concerning hepatic and GIT functions & immunological diseases</p> <p>b9 – Illustrate different laboratory algorithms for endocrinal abnormalities and reproductive disorders.</p> <p>b10- Differentiae different laboratory markers in carbohydras and lipid metabolism.</p>
B3- Integrate different information to solve professional problems	<p>b6- Illustrate the use of laboratory test for main body analytes including proteins, amino acids, enzymes, vitamins & biochemical aspects of hematology, inflammatory markers and others</p> <p>b10- Differentiae different laboratory markers in carbohydras and lipid metabolism.</p>
B4- Conduct a scientific research &/Or write scientific systematic approach to a research problem (hypothesis)	b11-Write a thesis protocol using a scientific systematic approach to a research problem
B5- Evaluate risks imposed during professional practice	<p>b1- Demonstrate basic principles in chemical pathology including; calculations, sampling, reagent preparation, lab safety, sources of variances & statistical tests .</p> <p>b2- Illustrate quality control principles including internal and external QC, method verification and validation, method comparison and diagnostic performance of different tests.</p>

B6- Plan for professional improvement	<p>b2- Illustrate quality control principles including internal and external QC, method verification and validation, method comparison and diagnostic performance of different tests.</p> <p>b3- Analyze different techniques & instruments including; spectrophotometry, light scattering techniques, electro & immunochemistry, automation, flame photometer and others.</p> <p>b4- Compare basic principles of different molecular techniques and illustrate various separation techniques such as chromatography & electrophoresis.</p>
B7- Take professional decisions in wide range of professional situations	<p>b5- Appraise renal function tests in blood & urine & interpret the results and demonstrate different body ions, water, blood gases & acid base balance</p> <p>b8- Interpret abnormal lab results concerning hepatic and GIT functions & immunological diseases</p>
C1- Competent in all basic and some of the advanced professional skills (to be determined according to the specialty board/ department)	<p>c1- Prepare different concentrations of reagents, buffers and standards with application of lab safety measures as well as calculations, sampling, reagent preparation, lab safety, sources of variances & statistical tests and specimen collection& patient identification</p> <p>c5- Employ the use of renal function tests in blood & urine & interpret the results and evaluate different tests for assessment of body ions, water, blood gases & acid base balance.</p> <p>c6-Apply different tests for body analytes including proteins, amino acids, enzymes, vitamins, inflammatory markers, & biochemical tests for hematological diseases and others..</p> <p>c7-Assess different laboratory tests for cardiac and tumor markers, trace elements, heavy metals intoxication, therapeutic drug monitoring and markers of rheumatological & bone diseases</p> <p>c8- Analyze laboratory tests for diagnosis of hepatic and GIT functions as well as immunological disorders using different techniques and case studies to aid in the differential diagnosis..</p> <p>c10- Apply different laboratory tests to diagnose diseases related to carbohydrates and lipid metabolism.</p>
C2- Write and appraise reports	<p>c2- Employ different quality control charts of internal and external QC, method verification and comparison & their statistics and use of diagnostic</p> <p>c9- Interpret different laboratory tests to assess various endocrinological cases with their hormonal axis & assess</p>

	disease s of reproductive medicine by Lab means..
C3- Evaluate methods and tools used in specialty	c3- Apply the use of different lab techniques such as spectrophotometry, light scattering techniques, immunochemistry, automation & flame photometer . c4- Apply different molecular techniques including nucleic acid extraction, PCR & others as well as application of different lab separation techniques such as chromatography & electrophoresis.
D1- Communicate effectively using all methods	d3- Acquire skills in communication and problem solving and share in determination of standards for evaluation of others through thesis and seminars
D2- Use information technology to improve his/her professional practice	d2- Establish team work skills and use of different sources of information to obtain data.
D3- Practice self appraisal and determines his learning needs	d1- Develop skills in reading and research and practice self appraisal, determines his learning needs, learn independently and seek continuous learning through thesis work
D4- Share in determination of standards for evaluation of others (e.g.: subordinates/ trainees etc.)	d3- Acquire skills in communication and problem solving and share in determination of standards for evaluation of others through thesis and seminars
D5-Use different sources of information to obtain data	d2- Establish team work skills and use of different sources of information to obtain data.
D6-Work in teams	d2- Establish team work skills and use of different sources of information to obtain data.
D7- Manage time effectively	d4- Establish skills in presentation of case study
D8- Work as team leader in situations comparable to his work level	d2- Establish team work skills and use of different sources of information to obtain data.
D9- Learn independently and seek continuous learning	d1- Develop skills in reading and research and practice self appraisal, determines his learning needs, learn independently and seek continuous learning through thesis work

4- Curriculum structure and contents

4.a program duration : (2.5- 5 years)

4.b program structure :**4.b.i- No. of hours per week in each year/semester:**

Semester	Number of hours
First semester	1717701: 2 1717703 :3 1717707:2 total: 7 ELECTIVE: 4-6
Second semester	1717702:2 1717704 :2 1717708:2 total: 6
Third semester	1717706:3 1717710 :3 total 6 ELECTIVE: 2-6
Fourth semester	1717705 :3 1717709 : 2 total:5

4.b.ii- No. of credit hours Lectures Practical Thesis Total

Compulsory Elective Optional

Msc 30 hours + 8 hours thesis

24 h core courses (14 theoretical + 10 practical)

+ 6 h elective courses (3 theoretical + 3 practical)

+ 8 h thesis

4.b.v- No. of credit hours of specialized courses No. %

4.b.vi- No. of credit hours of other courses No. %

4.b.viii- Program levels (in credit-hours system)

Student is required to pass at least 12 credit hours with CGPA not less than C+ before submitting a thesis proposal.

5- Program Courses**5.1- Compulsory (24 CH)**

Code No.	Course Title Compulsory	No of hours per week		
		Lectures	Practical	Total
1717701	Basic principles in chemical pathology	1	2	2
1717702	Laboratory quality and Management	1	2	2
1717703	Analytical Techniques and applications in laboratory medicine	2	2	3
1717704	Molecular and separation Techniques	1	2	2

1717705	Renal functions, electrolytes and acid base balance	2	2	3
1717706	Assessment of different analytes in the clinical chemistry (part 1)	2	2	3
1717707	Assessment of different analytes in the clinical chemistry (part 2)	1	2	2
1717708	Hepatic, Gastrointestinal and Immunological disorders	1	2	2
1717709	Endocrinology and reproductive medicine: laboratory assessment and applications	1	2	2
1717710	Laboratory and clinical integration in metabolic medicine	2	2	3
Total		14	20	24

b- Elective I**5.2- Elective I (6 hours)**

Code No.	Course Title Elective I	No. of hours /week		
		Lectures	Practical	Total
1201720	Biochemistry	1	2	2
1221720	Biomedical informatics & Human Statistics	1	2	2
1203720	Human Physiology	1	2	2
1205720	Haematology	1	2	2
1206720	Microbiology	1	2	2
1207720	Parasitology	1	2	2
1213720	Human Genetics	1	2	2
1201721	Molecular Biomedicine	1	2	2
1215723	Internal Medicine for Chemical Pathology	1	2	2
1206721	Infection control	1	2	2

5.3- Elective II (none)**5.4- Optional – (none)****6- Program admission requirements**

Graduate students with a M.B.Ch.B. of Medicine

7-Teaching and learning methods (from matrix)

1. Lecture
2. Practical / Clinical
3. Brainstorming
4. Discussion Groups
5. Problem Solving
6. Case Study
7. Self-Directed Learning

Regulations for progression and program completion

For the progression and completion of the program to obtain the degree of Master of Chemical Pathology

- the student must complete ...30...credit hours with CGPA of at least C+ through courses .
- the student must complete ...8 through thesis
- Submit a thesis validity report by an examination committee approved by the department council and their members include at least two external examiners.

8- Evaluation of Students enrolled in the program.

Tool evaluation	Intended learning outcomes being assessed
Written	ILOs a &b
Practical	ILOs c
Oral	ILOs a ,b &d
Semester Work	ILOs b & d

Evaluation of the program

Evaluator	Tool	Sample
1- Senior students	Questionnaire	At least 50 %
2- Alumni	Questionnaire	Representative sample
3- Stakeholders (Employers)	Meeting	Representative sample
4- External Evaluator(S) External Examiner (s)	Report	Dr. Ekbal Abou Hashem Evaluation
5- Other		

Program coordinator :

Name: **Azhar Mohamed Nomair** Signature 

Department Head

Name **Dr Gihan Khalil.** signature 

Date of approval of department council 29 / 8/2023

***Program Aims vs ILOs matrix**

ILOS aims	a 1	a 2	a 3	a 4	a 5	a 6	a 7	a 8	a 9	a 10	b 1	b 2	b 3	b 4	b 5	b 6	b 7	b 8	b 9	B 0	B 1	c 1	c 2	c 3	c 4	c 5	c 6	c 7	c 8	c 9	c 10	d 1	d 2	d 3	d 4	
1	x										x											X										x	x	X	x	
2		x										x											X										x	x	X	x
3			x										x											x									x	x	X	x
4				x										x											X								x	x	X	x
5					x										X												x					x	x	X	x	
6						x										X												x				x	x	X	x	
7							x										x												x			x	x	X	x	
8								X										x											x			x	x	X	x	
9									x											x										x		x	x	X	x	
10										x											x										x	x	x	X	x	
11																						x														

*** Courses vs Program ILOs matrix**

Course title	a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	b1	b2	b3	b4	b5	b6	b7	b8	b9	b10	B11	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	d1	d2	d3	d4
1717 701	X										x											x										x	x	X	x
1717 702		x										x											X									x	x	X	x
1717 703			x										x											X								x	x	X	x
1717 704				x										x											x							x	x	X	x
1717 705					x										X											x						x	x	X	x
1717 706						x										x											x					x	x	X	x
1717 707							x											X											x			x	x	X	x
1717 708								x											x											x		x	x	X	x
1717 709									x											x										x		x	x	x	x
1717 710										x												x									x	x	x	x	x
Thesis																																			

Teaching and Learning Methods Vs Course Matrix
 Degree: Master Chemical Pathology Code: 1717700

	17177 01	17177 02	17177 03	17177 04	17177 05	17177 06	17177 07	17177 08	17177 09	17177 10
Lecture	x	x	x	x	X	X	X	x	x	x
Practical / Clinical	x	x	x	x	X	X	X	x	x	x
Brainstormi ng		x		x				x	x	x
Discussion Groups	x	x	x	x	X	X	X	x	x	x
Problem Solving	x	x	x	x	X	X	x	x	x	x
Case Study	x	x	x	x	X	X	x	x	x	x
Training Workshops										
Self- Directed Learning	x	x	x	x	X	X	x	x	x	x
e-learning										
Project										

Program ARS vs ILOs matrix

ILO ARS	a 1	a 2	a 3	a 4	a 5	a 6	a 7	a 8	a 9	a 10	b 1	b 2	b 3	b 4	b 5	b 6	b 7	b 8	b 9	b 10	b 11	c 1	c 2	c 3	c 4	c 5	c 6	c 7	c 8	c 9	c 10	d 1	d 2	d 3	d 4	
A1	X																																			
A2		X																																		
A3			X																																	
A4				X																																
A5					X																															
A6						X																														
A7							X																													
A8								X																												
A9									X																											
A10										X																										
B1											X																									
B2												X																								
B3													X																							
B4														X																						
B5															X																					
B6																X																				
B7																	X																			
B8																		X																		
B9																			X																	
B10																				X																
B11																					X															
C1																						X														
C2																							X													
C3																								X												
C4																									X											
C5																										X										
C6																											X									
C7																												X								
C8																													X							
C9																														X						
C10																															X					
D1																																X				
D2																																	X			
D3																																		X		
D4																																				X

Program aims versus graduate attributes matrix

<i>Generic graduates attributes</i>	<i>Graduate attributes</i>	<i>Program aims</i>
Apply the basics and methodologies of scientific research and using its various tools proficiently.	Acquire basic knowledge of chemical pathology.	Produce scientifically and professionally capable Chemical Pathologists to meet regional and national needs while developing study skills and attitudes suitable for life-long learning. Use systematic approaches to design and conduct scientific research.
Use the analytical methods in the field of specialty	Acquire an appropriate knowledge of laboratory quality and management.	Equip students with knowledge, skills and critical awareness to make a significant contribution to research of the department.
Apply specialized knowledge in the field of specialty and integrate it with relevant knowledge in his professional practice.	Recognize basic principles of techniques and application in laboratory medicine.	Integrate information of specialty & related subjects to analyze & solve health care problems, write and appraise reports through assignments and case studies.
Demonstrate awareness of current problems and modern visions in the field of specialty	Understand basic principles of molecular and separation techniques.	Manage common and less common problems adequately
Identify professional problems in the field of specialty and propose solutions to them.	Demonstrate knowledge of renal function, electrolytes and acid base balance.	Competent in basic & some advanced procedural/ practical skills
Master an appropriate of professional skills in the field of including use of technology.	Acquire an appropriate background of different analytes in the clinical chemistry.	Able to conduct scientific research, recognize ethical and legal considerations in lab practice through thesis work.
Communicate efficiently and lead work teams.	Describe the integration of different lab tests in management of different diseases.	Plan for professional improvement through conferences and workshops.
Take Decision in different professional contexts.	Acquire basic knowledge of hepatic, GIT and immunological disorders.	Understand and integrate basic knowledge of hepatic, GIT and immunological disorders
Employ the available resources to achieve the highest benefit and maintain them.	Recognize basics of endocrinology and reproductive medicine.	Integrate information on basics of endocrinology and reproductive medicine.
Show awareness of his/her role in community development and environmental preservation in light of global and regional changes.	Demonstrate knowledge of essential facts, concepts, principles and theories of normal and abnormal metabolic function.	Equip students with knowledge of essential facts, concepts, principles and theories of different metabolic diseases.