

Program Specification For Master Degree in Parasitology

Code: 1707700

University: Alexandria

Faculty: Medical Research Institute

Program Specification

A- Basic information

1- Program title : Master of Science in Applied and Molecular Parasitology

2- Program type: single double multiple

3- Department(s) : Parasitology Department

4- Coordinator : Dr : Heba Said

5- External evaluator(s): Dr.Maha Gaafer

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

B- Professional Information

1- Program aims:

-Provide students with information and practical training to be able to pursue a career as competent parasitologist demonstrating adequate awareness and professional skills to recognize, and manage many parasitological diseases

-Equip the students with specialized knowledge and skills to be able to design, carry out and contribute significantly to research in the field of parasitology.

By the end of the program the students should

1-Demonstrate basic knowledge on biology and transmission of major species of helminthes, protozoa and arthropods of medical importance.

2-Describe and use basic techniques in parasitology.

3-Recall the basic knowledge of molecular parasitology and identify its role in the diagnosis of different parasitological diseases

4- Conduct different immunological techniques to identify parasitic infections.

- 5- Understand the basic concepts of Immunology in parasitic disorders and discuss the disordered function of the immune system in these diseases.
- 6- Interpret and analyze the results of epidemiological studies of parasitic diseases and propose measures for control and or elimination of some parasitic infections.
- 7- Investigate various aspects of parasitic diseases by using appropriate models of experimental animals.
- 8- Integrate knowledge base in medical parasitology to interpret different parasitic disorder, solve problems and critically analyze data related to these disorders.
- 9- Develop adequate professional skills to be able examine clinical or environmental samples for parasites and to identify the detected parasites.
- 10- Understand the ethical responsibility in the field of biomedical research and professional practice.
- 11- Apply advanced technological methods to solve parasitic diseases related problems in accordance with local and national priorities and develop continuous learning attitudes.
12. Develop skills in information technology, problem solving, scientific research, and team working.
13. Prepare and present literature review of different parasitological conditions.
14. Show competence in communicating with others to discuss parasitological problems and findings.
15. Use systematic approaches to design and conduct scientific research.

2- Intended learning outcomes (ILOS)

a- knowledge and understanding:

- a1. Review structural features and life cycle of helminthic parasites and explain main features of diseases caused by these parasites and principle measures of control.
- a2. Recall biology and life cycle of protozoan and arthropod parasites and discuss their medical importance, detection and prevention.
- a3. Understand the general considerations for specimen collection and preservation prior to parasitological examinations and discuss different direct diagnostic techniques used for detection of parasitic infections.
- a4. Describe basis of immunological methods used in diagnosis of parasitic infections and discuss their applications, advantages and limitations for selected parasites.
- a5. Explain important information regarding the principles of immune regulation in response to parasitic infections.

- a6. Understand various methods of epidemiologic investigations applicable to parasitic diseases and review the distribution and determinants of parasitic diseases in different localities.
- a7. Discuss morbidity caused by parasitic infections and their pathological and clinical impact on different body systems.
- a8. Review aspects of interaction between parasitic infections and other infections and medical conditions.
- a9. Provide knowledge on types and mechanism of action of anti-parasitic chemotherapy and its use in the treatment of parasitic diseases and transmission control or elimination.
- a10. Understand the role of snails in transmission of human parasites and recall important information on taxonomy, ecology and rearing of medically important snails.
- a11. Recognize the concept of ethics and discuss the principle ethical considerations in different types of biomedical research.
- a12. Understand basic concepts for protein analysis, gene function and, PCR and recall the applications of molecular biology in the field of parasitology.

b- Intellectual skills:

- b1. Distinguish morphological features of helminthic parasites and appraise different factors affecting their life cycle pattern and select suitable methods for detection of helminthic infections in man.
- b2. Differentiate protozoan and arthropod parasites of medical importance, illustrate their life cycle and select suitable methods for diagnosis of protozoal diseases.
- b3. Compare the utility of direct techniques used in diagnosis of parasitic infections evaluate results.
- b4. Select suitable serological techniques in different situations, interpret the results and relate them to other findings.
- b5. Illustrate the diversity in immunological response to different protozoan and helminth parasites and demonstrate the interaction of parasites with the human system and its impact on disease outcome.
- b6. Analyze factors causing perpetuation of parasitic infections at individual and community level and select appropriate methods for evaluation of parasitic diseases spread or elimination.
- b7. Differentiate symptoms and signs of parasitic diseases from those caused by non-parasitic causes, appraise prognosis and analyze the contribution of parasitic infections to the burden of tropical diseases in terms of morbidity and mortality.
- b8. Integrate clinical findings and scientific information and construct schemes to solve problems related to parasitic diseases including those associated with other medical conditions.

- b9. Select suitable anti-parasitic chemotherapy based on mechanism of action, efficacy and drug-drug interactions, calculate dosage and analyze patients response to therapy
- b10. Design protocols for laboratory infection of potential snail vectors with parasites and illustrate the role of snail control in prevention or eradication of parasitic infections.
- b11. Evaluate important ethical guidelines in research involving man or experimental animals
- b12. Illustrate applications of different molecular techniques in parasitology including diagnosis of light infections, antigen preparations, species identification and control of parasitic infections.
- b13. Write a thesis protocol using a scientific systematic approach to a research problem.

c- professional and practical skills:

- c1. Perform microscopic examination of different clinical and environmental samples for detection and identification of parasites and write reports..
- c2. Apply proper procedures for collection ,preservation and transportation of clinical samples submitted for parasitological examination.
- c3. Apply basic techniques used in parasitology labs, including direct smears, temporary and permanent staining, concentration and quantitative techniques on clinical samples (simple sedimentation -formol ether- kato katz- floatation -blood films – filtration)
- c4. Use different equipments in parasitological laboratory including ELISA reader and thermal cyclers, electrophoresis apparatus.
- c5. Apply DNA extraction methods and use PCR (conventional) in diagnosis and investigation of parasitic diseases.
- c 6. Implement basic quality control measures in parasitology labs.
- c7. Develop practical skills in essential immunological techniques (Indirect haemagglutination-ELISA- Immunochromatography)
- c8. Perform proper clinical examination of patients with suspected parasitic diseases and determine disease stage and complications.
- c9. Design epidemiological studies to investigate prevalence and risk factors for parasitic diseases and participate in implementation of control programs to combat parasites.
- c10. Collect and examine snails for trematode infection and use snails in research investigating snail transmitted parasites.

d- General and transferable skills:

- d1- Gain skills in organizing seminars with oral and written presentations and group discussion.
- d2- Practice to use the internet and different periodicals to prepare a scientific topic

- d3- Work as part of a team
- d4-Integrate quality control standards in the laboratory
- d5- Develop skills in communications
- d6- Use the computer in statistical analysis.

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 12/2/2014 and re-adopted at 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 Master of Parasitology
A1-Basic facts , theories, of the specialty and related subjects/ fields	<p>a1- Review main morphological features, life cycle stages and modes of transmission of helminths, protozoa and arthropods of medical importance.</p> <p>a2- Discuss immunological and clinical aspects of parasitic infections and various methods of treatment, control and elimination.</p> <p>a3- Recognize the general considerations for specimen collection and methods of sample preparation and examinations for detection of parasitic infections.</p> <p>a4- Understand various methods of epidemiologic investigations applicable to parasitic diseases, and review the distribution and determinants of parasitic diseases in different localities.</p> <p>a5- Describe basis and applications of different immunological and molecular methods used in the field of parasitology.</p> <p>a6- Understand the adequate principles for dealing with snails in conducting parasitology research and recognize their role in transmission of human parasites.</p> <p>a7- Recognize the concept of ethics in different types of biomedical research.</p>
A2- Mutual relation between professional practice and effects on environment	<p>a4- Understand various methods of epidemiologic investigations applicable to parasitic diseases, and review the distribution and determinants of parasitic diseases in different localities</p>

<p>A3- Main scientific advances in the field of practice</p>	<p>a2 - Discuss immunological and clinical aspects of parasitic infections and various methods of treatment, control and elimination. a5-Describe basis and applications of different immunological and molecular methods used in the field of parasitology.</p>
<p>A4-Fundamentals of ethical & legal practice</p>	<p>a7- Recognize the concept of ethics in different types of biomedical research.</p>
<p>A5 -Quality standards of the practice</p>	<p>a3 -Recognize the general considerations for specimen collection and methods of sample preparation and examinations for detection of parasitic infections. a5-Describe basis and applications of different immunological and molecular methods used in the field of parasitology.</p>
<p>A6- Basics and ethics of scientific research</p>	<p>a6- Understand the adequate principles for dealing with snails in conducting parasitology research and recognize their role in transmission of human parasites a7- Recognize the concept of ethics in different types of parasitological research.</p>
<p>B1 -Interpret, analyze & evaluate the information to solve problems</p>	<p>b1-Distinguish morphological features and life cycle stages of different parasites and categorize parasites according to their modes of transmission and illustrate the diversity in human immune response to parasites. b2-Select suitable parasitological, immunological and molecular methods for detection of parasitic infections, compare the utility of different techniques and evaluate results. b4- Differentiate symptoms and signs of parasitic diseases and select suitable anti-parasitic chemotherapy based on mechanism of action, efficacy and drug-drug interactions, calculate dosage and analyze patients response to therapy. b5- Analyze factors causing perpetuation of parasitic infections at individual and community level, Integrate findings and scientific information and construct schemes to solve problems related to parasitic diseases, interpret common graphs and confidence interval and select the appropriate test to compare between groups.</p>
<p>B2- Solve some problems that do not conform to classic data (incomplete data)</p>	<p>b4- Differentiate symptoms and signs of parasitic diseases and select suitable anti-parasitic chemotherapy based on mechanism of action, efficacy and drug-drug interactions, calculate dosage and analyze patients response to therapy.</p>
<p>B3- Integrate different information to solve professional problems</p>	<p>b2-Select suitable parasitological, immunological and molecular methods for detection of parasitic infections, compare the utility of different techniques and evaluate results. b4- Differentiate symptoms and signs of parasitic diseases and select suitable anti-parasitic chemotherapy based on mechanism of action, efficacy and drug-drug interactions, calculate dosage and analyze patients response to therapy.</p>
<p>B4- Conduct a scientific research &/Or write scientific systematic approach to a research problem (hypothesis)</p>	<p>b8- Write a thesis protocol using a scientific systematic approach to a research problem.</p>
<p>B5- Evaluate risks imposed during professional practice.</p>	<p>b4- Select suitable anti-parasitic chemotherapy based on mechanism of action, efficacy and drug-drug interactions, calculate dosage and analyze patients response to therapy.</p>

	<p>b7-Design protocols for laboratory infection of experimental animals and snail vectors with parasites and illustrate the role of snail control in prevention or eradication of parasitic infections.</p>
<p>B6- Plan for professional improvement</p>	<p>b2-Select suitable parasitological, immunological and molecular methods for detection of parasitic infections, compare the utility of different techniques and evaluate results.</p> <p>b3- Illustrate applications of different molecular techniques in parasitology.</p>
<p>B7- Take professional decisions in wide range of professional situations</p>	<p>b4- Differentiate symptoms and signs of parasitic diseases and select suitable anti-parasitic chemotherapy based on mechanism of action, efficacy and drug-drug interactions, calculate dosage and analyze patients response to therapy.</p> <p>b5- Analyze factors causing perpetuation of parasitic infections at individual and community level, Integrate findings and scientific information and construct schemes to solve problems related to parasitic diseases, interpret common graphs and confidence interval and select the appropriate test to compare between groups.</p>
<p>C1- Competent in all basic and some of the advanced professional skills (to be determined according to the specialty board/ department)</p>	<p>c1- Apply proper procedures for collection of stool, blood, urine, CSF as well as environmental samples and use different techniques in parasitology labs, including direct smears, staining, concentration and quantitative methods for detection and identification of parasites.</p> <p>c2- Develop essential practical skills o be able to apply different types of molecular techniques and immunological methods for diagnosis and investigation of parasitic diseases.</p> <p>c3- Implement basic quality control measures in parasitology labs .</p> <p>c4- Perform proper clinical examination of patients with suspected parasitic diseases and determine disease stage and complications.</p> <p>c5- Design and conduct studies to investigate prevalence and risk factors for parasitic diseases, to determine trematode infection of snails , and to use experimental animals and snails in research involving parasites and use the suitable statistical measure or test through statistical software to present and interpret data.</p>
<p>C2- Write and appraise reports</p>	<p>c1 Apply proper procedures for collection of stool, blood, urine, CSF as well as environmental samples and use different techniques in parasitology labs, including direct smears, staining, concentration and quantitative methods for detection and identification of parasites.</p> <p>c2- Develop essential practical skills o be able to apply different types of molecular techniques and immunological methods for diagnosis and investigation of parasitic diseases.</p> <p>c4- Perform proper clinical examination of patients with suspected parasitic diseases and determine disease stage and complications.</p> <p>c5- Design and conduct studies to investigate prevalence and risk factors for parasitic diseases, to determine trematode infection of snails , and to use experimental animals and snails in research involving parasites and use the suitable statistical measure or test through statistical software to present and interpret data.</p>
<p>C3- Evaluate methods and tools used in specialty</p>	<p>c1- Apply proper procedures for collection of stool, blood, urine, CSF as well as environmental samples and use different techniques in parasitology labs, including direct smears, staining, concentration and quantitative methods for detection and identification of parasites.</p> <p>c2- Develop essential practical skills o be able to apply different types of molecular techniques and immunological methods for diagnosis and</p>

	investigation of parasitic diseases. c5- Design and conduct studies to investigate prevalence and risk factors for parasitic diseases, to determine trematode infection of snails , and to use experimental animals and snails in research involving parasites and use the suitable statistical measure or test through statistical software to present and interpret data.
D1- Communicate effectively using all methods	d5- Develop skills in communications.
D2- Use information technology to improve his/her professional practice	d2- Practice to use the internet and different periodicals to prepare a scientific topic. d6- Use the computer in statistical analysis.
D3- Practice self appraisal and determines his learning needs	d1- Gain skills in organizing seminars with oral and written presentations and group discussion.
D4- Share in determination of standards for evaluation of others (e.g.: subordinates/ trainees etc.)	d1- Gain skills in organizing seminars with oral and written presentations and group discussion. d4- Integrate quality control standards in the laboratory .
D5- Use different sources of information to obtain data	d2- Practice to use the internet and different periodicals to prepare a scientific topic.
D6- Work in teams	d3- Work as part of a team.
D7- Manage time effectively	d1- Gain skills in organizing seminars with oral and written presentations and group discussion.
D8- Work as team leader in situations comparable to his work level	d3- Work as part of a team.
D9- Learn independently and seek continuous learning	d2- Practice to use the internet and different periodicals to prepare a scientific topic.

4- Curriculum structure and contents

4.a program duration: 2 academic years.

4.b program structure :

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

Semester	Core Courses	Elective Courses
	No. of hours	No. of hours
First semester	8	2
Second semester	6	2
Third semester	6	
Fourth semester	4	2

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

Compulsory Elective Optional

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

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

4.b.v- 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 credit hours)

Code No.	Course Title	No. of credit hours	No. of hours /week	
			Lecture	Practical
1707701	Parasitology I	4	3	2
1707702	Parasitology II	4	3	2
1707703	Diagnostic parasitology I	4	2	4
1707704	Diagnostic parasitology II	2	1	2
1707705	Immunology of Parasitology	2	2	-
1707706	Epidemiology of parasitic diseases	4	2	4
1707713	Molecular parasitology	2	1	2
1721720	Medical statistics	2	1	2
Total		24	15	18

5.2- Elective I (6 credit hours)

Code No.	Course Title	No. of credit hours	No. of hours /week	
			Lecture	Practical
1707707	Clinical parasitology I	2	1	2
1707708	Clinical parasitology II	1	1	-
1707709	Treatment of parasitic infections	1	1	-

1709740	Basics in Laboratory animal science	2	1	2
1707711	Experimental parasitology II	2	1	2
1707712	Biomedical research ethics	2	2	-
1701720	Biochemistry	2	1	2
1705720	Hematology	2	1	2
1708720	Immunology	2	1	2
1710720	Pathology	2	1	2
1706720	Bacteriology	2	1	2

5.4- Optional – (none)

6- Program admission requirements

Graduate students with a. M.B. Ch. B. of Medicine, B. Sc. of Veterinary, Pharmacy, Science, or Agriculture.

Teaching hours for the program

- In order to be granted the master degree in various fields, the student must fulfill and pass the specified number of credit hours for each degree.
- The student can select a number of courses from within other optional courses at the Medical Research Institute or from other faculties within the University of Alexandria or other universities

7- Teaching and Learning Methods

Lecture, Practical, Brainstorming, Discussion Groups, Problem Solving, Case Study, Field Training, Training Workshops, Self-Directed Learning

8-Regulations for progression and program completion

For the progression and completion of the program to obtain the degree of **Master of Science in Applied and Molecular Parasitology**, the student must:

- 1- Complete **30** credit hours with CGPA of at least C+ through courses.

- 2- Complete **8** credit hours with CGPA of at least C+ through thesis.
- 3- Submit a thesis validity report by an examination committee approved by the department council and their members include at least two external examiners.

9- 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

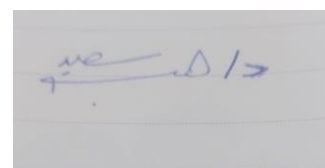
Evaluation of the Program

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) or External Examiner (s)	Reports	Dr.Maha Gaafer
5- Other		

Program coordinator :

Name: **Dr. Heba Said**

Signature :



Department Head:

Name: **Prof. Dr. Hend El-Taweel**

Signature:

Date of Department Council Approval:

28/8/2023



Generic Graduate Attributes of NAQAAE	Graduate Attributes	Program aims
	By the end of this program, the Graduate should be able to	
Apply the basics and methodologies of scientific research and using its various tools proficiently.	1-Apply proper procedures for collection of stool, blood, urine, as well as environmental samples and use different techniques in parasitology labs, including direct smears, staining, concentration and quantitative methods for detection and identification of parasites 2-Distinguish morphological features and life cycle stages of different parasites and categorize parasites according to their modes of transmission.	1-Demonstrate basic knowledge on biology and transmission of major species of helminths, protozoa and arthropods of medical importance. 2-Describe and use basic techniques in parasitology.
Use the analytical methods in the field of specialty	3-Perform proper clinical examination of patients with suspected parasitic diseases and determine disease stage and complications and select suitable anti-parasitic chemotherapy (medical student)	9- Develop adequate professional skills to be able examine clinical or environmental samples for parasites and to identify the detected parasites
Apply specialized knowledge in the field of specialty and integrate it with relevant knowledge in his professional practice.	4-Interpret and analyze the results of epidemiological studies of parasitic diseases and propose measures for detection ,control and elimination	6- Interpret and analyze the results of epidemiological studies of parasitic diseases and propose measures for control and or elimination of some parasitic infections
Demonstrate awareness of current problems and modern visions in the field of specialty	5-Design and conduct studies to investigate prevalence and risk factors for parasitic diseases according to community needs	8- Integrate knowledge base in medical parasitology to interpret different parasitic disorder, solve problems and critically analyze data related to these disorders.
Identify professional problems in the field of specialty and propose solutions to them.	6-Analyze factors causing perpetuation of parasitic infections at individual and community level.	7-Investigate various aspects of parasitic diseases by using appropriate models of experimental animals. 8- Integrate knowledge base in medical parasitology to interpret different parasitic disorder, solve problems and critically analyze data related to these disorders
Master an appropriate of professional skills in the field of including use of technology.	7-Practice to use the internet and different periodicals to prepare a scientific topic and use the computer in statistical analysis	11- Apply advanced technological methods to solve parasitic diseases related problems in accordance with local and national priorities and develop continuous learning attitudes. 12. Develop skills in information technology, problem solving, scientific research, and team working.
Communicate efficiently and lead work teams.	8-organize seminars with oral and written presentations and group discussion. 9-Work as part of a team e.g: lab work team.	14. Show competence in communicating with others to discuss parasitological problems and findings.
Take Decision in different professional contexts.	9-Select suitable parasitological, immunological and molecular methods for detection of parasitic infections.	3-Recall the basic knowledge of molecular parasitology and identify its role in the diagnosis of different parasitological diseases 4- Conduct different immunological techniques to identify parasitic infections
Employ the available resources to achieve the highest benefit and maintain them.	10-apply different types of molecular techniques and immunological methods for diagnosis and investigation of parasitic diseases according to available resources .	5-Understand the basic concepts of Immunology in parasitic disorders and discuss the disordered function of the immune system in these diseases.
Show awareness of his/her role in community development and environmental preservation in light of global and regional changes.	• 4-Interpret and analyze the results of epidemiological studies of parasitic diseases and propose measures for detection ,control and elimination	6- Interpret and analyze the results of epidemiological studies of parasitic diseases and propose measures for control and or elimination of some parasitic infections
Act in a manner that reflects a commitment to integrity, credibility, professionalism, and accountability.	11-Evaluate important ethical guidelines in research involving man or experimental animals 12-Implement basic quality control measures in parasitology labs	10- Understand the ethical responsibility in the field of biomedical research and professional practice.
Realize the need for self-development and engaging in continuous learning.	13-Prepare and present critical literature review of relevant scientific publications updating graduate knowledge 14-Understand the value of scientific research and importance of continuous self-learning	13. Prepare and present literature review of different parasitological conditions. 15. Use systematic approaches to design and conduct scientific research..

***Program Aims vs ILOs matrix**

ILO	a 1	a 2	a 3	a 4	a 5	a 6	a 7	a 9	a 10	a 11	a 12	b 1	b 2	b 3	b 4	b 5	b 6	b 7	b 8	b 9	b 10	b 11	b 12	b 13	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	d 5	d 6				
1	x	x	x									x																																
2				x										x											x	x	x			x										x				
3								x								x											x		x												x			
4				x	x										x							x						x			x										x			
5							x																																					
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8				x				x	x				x				x		x		x																							
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***Teaching methods vs Course matrix**

	1707701	1707702	1707703	1707704	1707705	1707706	1707707	1707708	1707709	1707711	1707712	1707713
Lecture	X	X	X	X	X	X	X	X	X	X	X	X
Practical/Clinical	X	X	X	X	X		X	X		X		X
Brainstorming	X	X	X	X	X	X	X	X	X	X	X	X
Discussion Groups	X		X	X	X	X	X	X	X	X	X	X
Problem Solving							X	X				
Case Study							X	X				
Field Training						X						
Training Workshops	X	X	X									X
Self-Directed Learning	X	X	X	X	X	X	X	X	X	X	X	X
e-learning												
Project												