

## Program SPECIFICATION FOR Master degree in Clinical Physiology

Code: 1703700

**University:** Alexandria      **Faculty:** Medical Research Institute

### Program Specification

#### A- Basic information

1- **Program title:** Master Degree in Clinical Physiology

2- **Program type:**      single            double            multiple     

3- **Department:** Human Physiology department

4- **Coordinator:** Prof. Mervat El-Seweify

5- **External evaluator:** Dr. Alaa El. Dein Hassan Mahmoud, Professor of physiology, faculty of medicine, Alexandria University

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

#### B- Professional Information

##### 1- Program aims:

Produce scientifically and professionally capable Clinical Physiologists to meet regional and national needs while developing study skills and attitudes suitable for life-long learning. Equip students with knowledge, skills and critical awareness to make a significant contribution to research of the department.

##### By the end of this program the student should be able to:

- 1- Recall an appropriate functional background of cells tissues, organs & systems, and demonstrate knowledge of normal physiological function of musculoskeletal, heart and respiratory systems.
- 2- List basic physiological functions of renal, endocrine, GIT, metabolic, blood and nervous system.
- 3- Explore knowledge of the pathophysiology of different diseases.
- 4- Examine and perform basic and some advanced procedural / practical skills competently.
- 5- Explore experience in exercise physiology and its applications.
- 6- List knowledge of quality standards in physiology lab and acquire basic knowledge of biochemistry.
- 7- Recall basics behind the choice of appropriate statistical tests and Use information technology to increase physiological knowledge.
- 8- Use systematic approaches to design and conduct scientific research.

## 2- Intended learning outcomes (ILOs)

### a- Knowledge and understanding:

- a1 - Recall physiological functions of different body systems at molecular, cellular and system levels.
- a2 - Explain the pathophysiology of common diseases affecting different systems of the body.
- a3 - Explain types of exercise and physiology of training and discuss the effect of professional practice on the environment.
- a4 - Define Methods of functional assessment of different body systems.
- a5 - Review medical ethics in research and recall quality standards in physiology lab.
- a6 – Review biochemical principles in metabolism of carbohydrates, lipids, proteins and nucleic acid.

### b- Intellectual skills:

- b1- Distinguish basic cardiopulmonary and endocrine, renal, nervous, metabolic and GIT physiological principles.
- b2- Analyze the pathophysiology of common diseases affecting different body systems and interpret some physiological techniques.
- b3- Analyze and solve problems through utilization of wide range of observational and scientific approach.
- b4- Analyze, compare, and illustrate medical data using statistical analysis and computer science.
- b5- Distinguish between different types of exercise.
- b6- Write a thesis protocol using a scientific systematic approach to a research problem.

### c- Professional and practical skills:

- c1. Perform the technique of sputum induction.
- c2. Apply different techniques of animal handling and experimental hypertension.
- c3. Measure osmotic fragility, membrane extraction, Na- K ATPase and demonstrate lipid peroxidation and antioxidant assay.
  - c4. Perform and interpret kidney and liver function tests, cardiac perfusion, and renal ischemia reperfusion techniques.
  - c5. Develop skills in hormonal assay, buffer preparation, spectrophotometry, and protein electrophoresis.

c6. Setup and calibrate equipment required in clinical physiology lab and perform effectively physiological methods of functional assessment related to diseases (abnormal pulmonary function tests and inhalation challenge, abnormal ECG, ventilatory drive activity and pulse oximetry).

c7. Observe and apply different experimental research techniques.

c8. Perform tests of acid base balance and tests for detection of pathological constituents in urine and perform the measurements of lipid profile and interpret their clinical implication.

c9. Evaluate muscle and nerve function.

c10. Demonstrate general guidelines needed to produce an exercise prescription for special populations (diabetic, Obese, orthopedic, pulmonary and cardiac patients) and illustrate different Types of Exercise.

#### **d- General and transferable skills:**

d1-Communicate effectively through written and oral presentation.

d2- Use information technology to increase physiological knowledge and use modern computing resources for data handling, information retrieval, document preparation, presentation, and communication.

d3-Develop an independent approach to learning.

d4-Establish working relationship with colleagues and work effectively as a part of a team and develop a culture of disseminating and sharing information with peers.

d5- Share in detection of standards for evaluating others (e.g., subordinates, trainees).

d6-Organize time to plan and implement efficient and effective modes of working.

d7-Develop skills in reading, writing and research.

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### 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.

##### *Graduate Attributes of Master Program in Clinical Physiology*

Generic Graduate Attributes of NAQAAE	Graduate Attributes of Master of Science in Clinical Physiology	Program Aims
	By the end of this program, Graduate of Master of Science in Clinical Physiology, <i>should be able to</i>	
Apply the basics and methodologies of scientific research and using its various tools proficiently.	<ul style="list-style-type: none"> <li>Conduct scientific research in physiology.</li> <li>Evaluate and critical judge scientific papers.</li> </ul>	<ul style="list-style-type: none"> <li>Use systematic approaches to design and conduct scientific research.</li> </ul>
Use the analytical methods in the field of specialty.	<ul style="list-style-type: none"> <li>Integrate different physiological functions to analyze and solve problems in Clinical Physiology.</li> </ul>	<ul style="list-style-type: none"> <li>Recall basics behind the choice of appropriate statistical tests and Use information technology to increase physiological knowledge</li> </ul>
Apply specialized knowledge in the field of specialty and integrate it with relevant knowledge in his professional practice.	<ul style="list-style-type: none"> <li>Demonstrate knowledge of essential facts, principles and theories of normal and abnormal physiological function, integration of physiological functions, in general and in a specific area of research in particular.</li> </ul>	<ul style="list-style-type: none"> <li>Recall an appropriate functional background of cells tissues, organs &amp; systems, and demonstrate knowledge of normal physiological function of musculoskeletal, heart and respiratory systems.</li> </ul>

		<ul style="list-style-type: none"> <li>List basic physiological functions of renal, endocrine, GIT, metabolic, blood and nervous system.</li> <li>Explore knowledge of the pathophysiology of different diseases</li> </ul>
Demonstrate awareness of current problems and modern visions in the field of specialty	<ul style="list-style-type: none"> <li>Identify recent advances in the pathophysiology of common diseases/conditions.</li> </ul>	<ul style="list-style-type: none"> <li>Explore knowledge of the pathophysiology of different diseases.</li> </ul>
Identify professional problems in the field of specialty and propose solutions to them.	<ul style="list-style-type: none"> <li>Manage common and less common clinical physiology problems properly</li> </ul>	<ul style="list-style-type: none"> <li>Explore knowledge of the pathophysiology of different diseases.</li> </ul>
Master an appropriate of professional skills in the field of including use of technology.	<ul style="list-style-type: none"> <li>Carry out physiological investigations and relevant techniques to the research topic.</li> </ul>	<ul style="list-style-type: none"> <li>Examine and perform basic and some advanced procedural / practical skills competently.</li> <li>Explore experience in exercise physiology and its applications.</li> <li>List knowledge of quality standards in physiology lab and acquire basic knowledge of biochemistry.</li> </ul>
Communicate efficiently and lead work teams.	<ul style="list-style-type: none"> <li>Communicate effectively through written and oral presentation.</li> <li>Establish working relationship with colleagues and work effectively as a part of a team.</li> </ul>	<ul style="list-style-type: none"> <li>Use systematic approaches to design and conduct scientific research.</li> </ul>

<p>Take Decision in different professional contexts.</p>	<ul style="list-style-type: none"> <li>• Demonstrate decision-making skills in clinical physiology laboratory.</li> </ul>	<ul style="list-style-type: none"> <li>• Explore experience in exercise physiology and its applications.</li> <li>• List knowledge of quality standards in physiology lab and acquire basic knowledge of biochemistry.</li> </ul>
<p>Employ the available resources to achieve the highest benefit and maintain them.</p>	<ul style="list-style-type: none"> <li>• Use current research and clinical evidence to improve patient's health outcomes.</li> </ul>	<ul style="list-style-type: none"> <li>• Explore knowledge of the pathophysiology of different diseases.</li> <li>• List knowledge of quality standards in physiology lab and acquire basic knowledge of biochemistry.</li> </ul>
<p>Show awareness of his/her role in community development and environmental preservation in light of global and regional changes.</p>	<ul style="list-style-type: none"> <li>• Understand the role of Clinical Physiologist in health and community development</li> </ul>	<ul style="list-style-type: none"> <li>• Explore knowledge of the pathophysiology of different diseases.</li> </ul>
<p>Act in a manner that reflects a commitment to integrity, credibility, professionalism, and accountability.</p>	<ul style="list-style-type: none"> <li>• Establish collaborative work skills through understanding of roles, responsibilities, and competence in practice.</li> </ul>	<ul style="list-style-type: none"> <li>• Use systematic approaches to design and conduct scientific research.</li> </ul>
<p>Realize the need for self-development and engaging in continuous learning.</p>	<ul style="list-style-type: none"> <li>• Use information technology and develop independent learning skills in the field of Clinical Physiology.</li> </ul>	<ul style="list-style-type: none"> <li>• Recall basics behind the choice of appropriate statistical tests and Use information technology to increase physiological</li> </ul>

		<p>knowledge.</p> <ul style="list-style-type: none"> <li>• Use systematic approaches to design and conduct scientific research</li> </ul>
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**ILOs of ARS**

<b>NAQAEE</b>	<b>ARS for master in clinical physiology</b>
<p><b>A1-Basic facts, theories, of the specialty and related subjects/ fields</b></p>	<p>A1. Describe physiological functions of different body systems at molecular, cellular and system level in health and disease.                      A2. Explain the pathophysiology of common diseases affecting different systems of the body in common.                      A3. Describe methods of functional assessment of different body system.                      B2. Predict the behavior of different systems of the body in health and disease.                      B6. Distinguish biochemical basis of the physiological processes</p>
<p><b>A2-Mutual relation between professional practice and effects on environment</b></p>	<p>A4. Explain the effect of professional practice on the environment</p>
<p><b>A3-Main scientific advances in the field of practice</b></p>	<p>A5. Discuss main scientific advances in clinical physiology</p>
<p><b>A4-Fundamentals of ethical &amp; legal practice</b></p>	<p>A7. Identify basic principles and ethics of scientific research</p>
<p><b>A5 -Quality standards of the practice</b></p>	<p>A6. Identify quality standards in physiology lab</p>
<p><b>A6- Basics and ethics of scientific research</b></p>	<p>A7. Identify basic principles and ethics of scientific research.</p>
<p><b>B1 -Interpret, analyze &amp; evaluate the information to solve problems</b></p>	<p>B1. Critically analyze physiological problems and plan strategies for their solution through utilization of observational and scientific approaches.                      B3. Analyze how the physiological functions of different body organs and systems are integrated to provide homeostasis.</p>
<p><b>B2- Solve some problems that do not conform to classic data (incomplete data)</b></p>	<p>B4. Analyze the pathophysiology of common diseases affecting humans.                      B5. Assess and interpret measurement of physiological functions in health and disease.</p>

<b>B3- Integrate different information to solve professional problems</b>	B7. Analyze unusual physiological problems and plan strategies for their solution.
<b>B4- Conduct a scientific research &amp;/Or write scientific systematic approach to a research problem (hypothesis)</b>	B10- Illustrate medical data using appropriate statistical tests. B11. Conduct scientific research through thesis.
<b>B5- Evaluate risks imposed during professional practice.</b>	A4. Explain the effect of professional practice on the environment
<b>B6- Plan for professional improvement</b>	B8. Plan for periodic self-enhancement of his/her skills through assignments
<b>B7- Take professional decisions in wide range of professional situations</b>	B9. Appraise the benefits of belonging to and participating in a professional society, select appropriate societies.  B10. Illustrate medical data using appropriate statistical tests.
<b>C1- Competent in all basic and some of the advanced professional skills (to be determined according to the specialty board/ department)</b>	C1. Develop skills of observation and instrumentation used in the measurement of physiological parameters in laboratory/clinical setting (eg: ECG pre vocational challenge, pulmonary function tests, hormonal assays, lipid profile and kidney function tests, and interpretation of obtained data C3. Perform basic techniques in physiology laboratory. C4. Perform techniques related to a specific area of research in physiology competently.
<b>C2- Write and appraise reports.</b>	C2. Analyze, interpret, and write reports on different laboratory assessment used in the diagnosis of common disorders of the different body systems (e.g., ECG, spirometry, methacholine inhalation challenge, hormonal assays, lipid profile, and kidney function tests).
<b>C3-Evaluate methods and tools used in specialty</b>	C5. Evaluate methods used in measuring different physiological functions.
<b>D1- Communicate effectively using all methods</b>	D1. Communicate effectively through written and oral presentation.
<b>D2- Use information technology to improve his/her professional practice</b>	D2. Use information technology in handling physiological data, information retrieval, document preparation, presentation, and communication
<b>D3-Practice self-appraisal and determines his learning needs</b>	D3. Develop an independent approach to learning as a preparation for continuous professional development



<b>D4- Share in determination of standards for evaluation of others (e.g.: subordinates/ trainees etc.)</b>	D4. Share in determination of standards for evaluating others (e.g., subordinates, trainees).
<b>D5- Use different sources of information to obtain data</b>	D7. Use different sources of information to obtain data and develop skills in reading, writing and research.
<b>D6- Work in teams - Manage time effectively</b>	D5. Establish working relationship with colleagues, work effectively as a part of a team and develop a culture of disseminating and sharing information with peers. D6. Organize and manage time to plan and implement efficient and effective modes of working
<b>D7-Work as team leader in situations comparable to his work level</b>	D8. Work as team leader in situations comparable to his work level
<b>D8-Learn independently and seek continuous learning</b>	D3. Develop an independent approach to learning as a preparation for continuous professional development

#### 4- Curriculum structure and contents

4.a program duration: 3-5 years (academic years including thesis)

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	6	
Second semester	6	
Third semester	6	
Fourth semester	4	2
Fifth semester	4	2

4.b.ii- No. of credit hours	Lectures	20	Practical	10	thesis	8	Total	38
	Compulsory	26	Elective	4	Optional	0		

4.b. iii - No. of credit hours of specialized courses	No.	20	%	66.66
4.b. iv- No. of credit hours of other courses	No.		%	13.33

#### 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 (26 CH)

Code No.	Course Title	No. of credit hours	No. of hours /week	
			Lecture	Practical
1703701	Elementary Physiology I	4	3	2
1703702	Elementary Physiology II	4	3	2
1703703	Clinical Physiology I	4	3	2
1703704	Clinical Physiology II	4	3	2
1703705	Exercise physiology	4	3	2
1701720	Biochemistry	2	1	2
1721720	Medical Statistics	2	1	2
1721721	Computer	2	1	2
	<b>total</b>	<b>26</b>	<b>18</b>	<b>16</b>

#### 5.2- Elective I (2 CH)

Code No.	Course Title	No. of credit hours	No. of hours /week	
			Lecture	Practical
1700750	Nutrition	2	1	2
1701721	Molecular Biology	2	1	2
1705720	Hematology	2	1	2
1708720	Immunology	2	1	2
1713720	Genetics	2	1	2
1715755	Internal Medicine	2	1	2

#### 5.3- Elective II (2 CH)

Code No.	Course Title	No. of credit hours	No. of hours /week	
			Lecture	Practical
1715751	Chest Diseases	2	1	2
1715752	Renal Diseases	2	1	2
1715753	Endocrinal Diseases	2	1	2

1715754	Cardiac Diseases	2	1	2
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#### 5.4- Optional – (none)

**6- Program admission requirements:** Graduate students with a M.B.Ch.B. of Medicine

#### 7- Teaching and Learning Methods

- Lecture
- Practical/Clinical
- Brainstorming
- Problem Solving
- Case Study
- Self-Directed Learning

#### 8- Regulations for progression and program completion

For the progression and completion of the program to obtain the degree of master in clinical physiology, the student must.

- 1- Complete 30 credit hours with CGPA of at least C+ through courses.
- 2- Complete 8 credit hours with 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.

#### 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

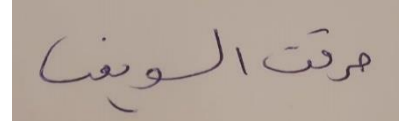
Evaluator	Tool	Sample
1- Senior students	questionnaire	At least 50 %

2- Alumni	questionnaire	Representative sample
3- Stakeholders (Employers)	meeting	Representative sample
4- External Evaluator(S) or External Examiner (s)	Report	Pro.Dr./ Alaa El-Dein Hassan Mahmoud
5- Other		

**Program coordinator:**

Name: Prof. Mervat El Seweify

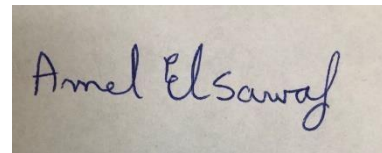
Signature:



**Department Head:**

Name: Prof. Amel El-sawaf

Signature:



**Date of Department Council Approval: 29/8/2023**

***Attached Matrices:***

***\*Program Aims vs ILOs matrix***

***\* Courses vs Program ILOs matrix***

***\*ARS vs ILOs matrix***

***\*Teaching methods vs Course matrix***

**Program Aims vs ILOs matrix**

Aims	ILOS	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	D1	D2	D3	D4	D5	D6	D7
1		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	X	X	X	X		X	X	X	X	X	X	X
5				X								X											X	X	X	X	X	X	X	
6					X	X																		X	X	X	X		X	
7											X		X											X	X	X	X		X	X
8													X											X	X	X	X	X	X	X

### Courses vs Program ILOs matrix

ILOS Courses	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	D1	D2	D3	D4	D5	D6	D7	
Elementary Physiology I	×			×			×						×	×	×		×		×				X	X		X		X	X	
Elementary Physiology II	×			×			×									×	×		×					X	X				X	
Clinical Physiology I		×		×	×			×										×	×				X	X		X	X			
Clinical Physiology II		×		×	×			×	×											×	×			X	X	X		X		
Exercise physiology			×								×											×	X	X	X	X			X	
Biochemistry						×																								
Medical Statistics										×																				
Computer										×																				
Thesis												×												X	X	X	X	X	X	X









