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**Program SPECIFICATION FOR Doctorate Degree in  
Pharmacology Code: 1704800**

**University:** Alexandria

**Faculty:** Medical Research Institute

**Program Specification**

**A-**

**Basic information**

**1- Program title:** Doctorate of Philosophy in Pharmacology and Experimental Therapeutics

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

**3- Department(s):** Pharmacology

**4- Coordinator:** A. Roaida Refaat

**5- External evaluator(s):** Prof. Safaa El Rewini, Faculty of Medicine, Alexandria University.

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

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**B-**

**Professional Information**

**1- Program aims:**

**The program is designed to:**

1. Provide a deep-rooted knowledge of the essential basic molecular biology, biochemical and physiological sciences related to pharmacology.
2. Manage difficult and professional problems in pharmacology adequately.
3. Provide higher updated knowledge of the progress of pharmacology published in recent textbooks.
4. Provide a sense of curiosity and enthusiasm for evidence based settings related to pharmacology.
5. Demonstrate acquisition of specific professional skills in experimental design and in the analysis of experimental data.

6. Conduct scientific research proficiently that add to the existing specialty knowledge.
7. Promote professional development of communication skills and the ability to use information technology.
8. Provide sufficient knowledge of ethical principles relevant to the field of pharmacology.

## **2- Intended learning outcomes (ILOs)**

### **a-knowledge and understanding:**

1. Recall updated knowledge of the relevant science of molecular biology.
2. Discuss principles of biochemistry related to pharmacology.
3. Discuss principles and updates in the field of physiology.
4. Discuss updated in-depth knowledge of therapeutics in cardiovascular diseases; arrhythmia, shock, autoimmune GIT diseases, autoinflammatory diseases, joint and hematopoietic disorders and respiratory diseases.
5. Explain clinically relevant age, sex and disease related variations that affect response to drugs, pharmacoepidemiology uses, challenges and role in drug safety assessment.
6. Discuss the updates in the field of neuropharmacology and ethical principles relevant to practice in the use of drugs that relieve pain and ameliorate the suffering of patients.
7. Discuss principles of immunopharmacology, molecular therapies of diabetes and hyperlipidemia, osteoporosis, resistance to antimicrobial drugs, role and limitations of alternative and complementary therapies commonly in use.
8. Recall recent chemotherapeutic agents used in solid tumors, leukemia, stem cell and cancer therapy and multidrug resistance in cancer patients.
9. Recall the principles and updates of clinical pharmacokinetics and pharmacodynamics.

10. Discuss the principles of quality assurance in therapy with different drugs & drug abuse.
11. Discuss the relation between the pharmacological practice and effects on surrounding environment.
12. Discuss ethics and principles of scientific research and statistical principles for analysis of data.
13. Design, conduct, and explore publishing of scientific research.

**b- Intellectual skills:**

1. Contrast the facts of relevant basic sciences molecular biology, biochemistry and physiology with reasoning, diagnosis and management of clinical problems in pharmacology.
2. Analyze rational therapeutic strategies for both acute and chronic clinical conditions taking into account the various variables that influence these strategies.
3. Appraise alternative decisions in different situations in the field of pharmacology taking into consideration toxicity and effectiveness of therapy.
4. Distinguish changes in relevant pharmacokinetic parameters in high-risk patients.
5. Distinguish recent chemotherapeutic drugs in different types of cancer.
6. Examine involvement in research studies related to pharmacology and in evaluation of statistical data.
7. Prepare scientific articles to be published in indexed journals.

**c- Professional and practical skills:**

1. Write reports for the medical statistical data.
2. Interpret reports and case studies related to pharmacology.

**d- General and transferable skills:**

- 1- Communicate effectively using all methods.
- 2- Use information technology to improve professional practice.

- 3- Seek continuous learning.
- 4- Present scientific topics clearly
- 5- Develop skills of team work and open discussion
- 6- Manage scientific meeting.

### 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) approved by Institute council 15/1/2023

#### 3b. Comparison of provision to selected external references

NAQAAE	ARS
<b>A1-Basic facts , theories, of the specialty and related subjects/ fields</b>	a1. Identify established and updated molecular biology, physiological and biochemical sciences related to pharmacology.
<b>A2-Mutual relation between professional practice and effects on environment</b>	a6. Recognize the effect of medical practice on surrounding environment.
<b>A3-Recent advances in the field of practice</b>	a2. Recognize established, updated and evidence-based theories and developments in the basic science of pharmacology.
<b>A4-Details of ethical &amp; legal practice</b>	a5. Mention ethical principles relevant to practice in the use of drugs.
<b>A5 -Quality standards of the practice</b>	a4. Identify the principles of quality assurance in therapy with different drugs & drug abuse.
<b>A6- Design, conduction &amp; publishing of scientific research</b>	a7. Design, conduct, and explore publishing of scientific research
<b>A7- Ethical considerations in different types of scientific research</b>	a3. Identify ethics and principles of scientific research.
<b>B1 –Analyze, deduce, extrapolate and evaluation of information</b>	b2. Evaluate changes in relevant pharmacokinetic parameters of the up to date drugs used in patients with common and less common diseases.

<b>B2- Solve the majority of problems in the specialty according to the available data ( complete or incomplete data)</b>	b1. Integrate basic and other relevant sciences to solve pharmacology related problems. b3. Interpret different drug related problems in clinical and/or pharmacy settings.
<b>B3- Conduct research studies that add to the existing specialty knowledge</b>	b5. Conduct research studies that add to the existing pharmacology knowledge.
<b>B4- Publish scientific articles/papers (in indexed journals)</b>	b6. Prepare scientific articles/papers to be published in indexed journals.
<b>B5- Plan and implement (or supervise implementation of) enhancement &amp; improvement approaches to practice</b>	-b5. Conduct research studies that add to the existing pharmacology knowledge.
<b>B6- Take decisions in various professional situations (including dilemmas &amp; controversial issues).</b>	b4. Evaluate alternative decisions in different situations in the pharmacology field.
<b>B7- Add to the specialty field through creativity &amp; innovation</b>	b5. Conduct research studies that add to the existing pharmacology knowledge.
<b>B8- Manage discussions on basis of evidence and proofs.</b>	b1. Integrate basic and other relevant sciences to solve pharmacology related problems.
<b>C1- Competent in all basic and all required advanced professional skills (to be determined according to the specialty board/ department).</b>	C1. Write and comment on reports for situations related to the field of pharmacology.
<b>C2- Write and appraise reports</b>	C1. Write and comment on reports for situations related to the field of pharmacology.
<b>C3-Evaluate and improve methods and tools used in specialty</b>	C2. Apply different statistical tests for analysis of pharmacological data
<b>C4- Use technology to advance practice</b>	C2. Apply different statistical tests for analysis of pharmacological data
<b>C5- Plan professional development courses to improve practice and enhance performance of juniors</b>	C1. Write and comment on reports for situations related to the field of pharmacology.
<b>D1- Communicate effectively using all methods</b>	d4. Develop skills of communication and interaction d6. Present scientific topics clearly

<b>D2- Use information technology to improve his/her professional practice</b>	d3. Develop skills of information technology
<b>D3- Teach and evaluate others</b>	d6. Present scientific topics clearly d7. Develop skills of open discussion
<b>D4- Perform self appraisal and seek continuous learning</b>	d2. Develop skills of critical thinking and self appraisal
<b>D5- Use different sources of information to obtain data</b>	d5. Study independently to meet targets with deadlines
<b>D6- Work in teams as well as a member in larger teams</b>	d1. Develop skills of team work
<b>D7- Manage scientific meetings and appropriately utilize time</b>	d2. Develop skills of critical thinking d6. Present scientific topics clearly d7. Develop skills of open discussion

#### 4- Curriculum structure and contents

##### 4.a program duration: (3-5 years)

##### 4.b program structure :

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

Semester	Core courses	Elective courses
	Number of hours	Number of hours
<b>First semester</b>	<b>5</b>	<b>3</b>
<b>Second semester</b>	<b>7</b>	
<b>Third semester</b>	<b>6</b>	
<b>Fourth semester</b>	<b>3+ 2 Thesis</b>	
<b>Fifth semester- end of program</b>	<b>22 Thesis</b>	

4.b.ii-                      Lectures      22      Practical      2      Thesis      24      Total      48

No. of credit hours





Compulsory  Elective  Optional  Total

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 (21)

Code No.	Course Title	No. of credit hours	No. of hours /week	
			Lecture	Practical
1704801	Clinical pharmacology & Therapeutics II	3	3	-
1704802	Therapeutics in high risk patients	3	3	-
1704803	Neuropharmacology	2	2	-
1704804	Advanced topics in pharmacology II	2	2	-
1704805	Recent advances in chemotherapy	3	3	-
1704806	Clinical pharmacokinetics	2	2	-
1701822	Biochemistry	1	1	-
1703821	Physiology	1	1	-
1721820	Medical Statistics	3	2	2
1701823	Molecular Biology	1	1	-
		21	20	2

### 5.2- Elective I (3)

Code No.	Course Title	No. of credit hours	No. of hours /week	
			Lecture	Practical
1721821	Computer	3	2	2
1706820	Bacteriology	3	2	2
1707820	Parasitology	3	2	2
1708820	Immunology III	3	2	2

1713820	Human Genetics	3	2	2
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### 5.3 Optional – (none)

#### 6- Program admission requirements

Graduate students with a Master degree in Pharmacology with a general grade of at least good from an Egyptian university.

#### 7- Teaching and learning methods

Lectures, Group discussion (Seminars), Self-directed learning (Assignments), and Brainstorming.

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

For the progression and completion of the program to obtain the degree of Doctor of Philosophy in Pharmacology the student must:

- 1- Complete 24 credit hours with CGPA of at least C+. through courses.
- 2- Complete 24 credit hours through thesis.
- 3- Pass a comprehensive exam.
- 4- 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

<b>Evaluator</b>	<b>Tool</b>	<b>Sample</b>
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	Prof. Safaa El Rewini, Faculty of Medicine, Alexandria University
5- Other		

**Program coordinator:**

Name: A. Prof. Rowaida Refaat

Signature:



**Department Head:**

Name: Prof. Wessam El Hadidi

Signature: Wessam El Hadidi

**Date of Department Council Approval: 27/8/2023**

**Program-course ILO Matrix**

<b>Course Title</b>	<b>A 1</b>	<b>A 2</b>	<b>A 3</b>	<b>A 4</b>	<b>A 5</b>	<b>A 6</b>	<b>A 7</b>	<b>A 8</b>	<b>A 9</b>	<b>A 10</b>	<b>A 11</b>	<b>A 12</b>	<b>A 13</b>	<b>B 1</b>	<b>B 2</b>	<b>B 3</b>	<b>B 4</b>	<b>B 5</b>	<b>B 6</b>	<b>B 7</b>	<b>C 1</b>	<b>C 2</b>	<b>D 1</b>	<b>D 2</b>	<b>D 3</b>	<b>D 4</b>	<b>D 5</b>	<b>D 6</b>
Clinical pharmacology & Therapeutics II				X						X				X	X	X			X				X	X	X	X	X	X
Therapeutics in high risk patients					X					X				X	X	X	X		X				X	X	X	X	X	X
Neuropharmacology						X				X	X			X	X	X			X				X	X	X	X	X	X
Advanced topics in pharmacology II							X			X				X	X	X			X				X	X	X	X	X	X
Recent advances in chemotherapy								X		X								X	X				X	X	X	X	X	X
Clinical pharmacokinetics									X								X		X			X	X	X	X	X	X	X
Biochemistry		X												X														
Physiology			X											X														
Medical Statistics												X							X		X							
Molecular Biology	X													X														
Thesis												X								X								

**Program Aims vs Program ILOs:**

<b>Program Aims / Program ILOs</b>	<b>A</b>	<b>a</b>	<b>a</b>	<b>a</b>	<b>a</b>	<b>b</b>	<b>C</b>	<b>C</b>	<b>d</b>	<b>d</b>	<b>d</b>	<b>d</b>	<b>d</b>	<b>d</b>															
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	
1-Provide a deep-rooted knowledge of the essential basic molecular biology, biochemical and physiological sciences related to pharmacology	x	x	x												x														
2-Manage difficult and professional problems in pharmacology adequately.				x	x	x	x			x	x				x	x	x	x	x				x						
3- Provide higher updated knowledge of the progress of pharmacology published in recent textbooks.				x	x		x	x	x						x				x	x									
4-Provide a sense of curiosity and enthusiasm for evidence-based settings related to pharmacology.					x		x				x				x	x													
5-Demonstrate acquisition of specific professional skills in experimental design and analysis of experimental data.													x									x							
6- Conduct scientific research proficiently that add to the existing specialty knowledge.														x								x				x	x		x
7-Promote professional development of communication skills and the ability to use information technology.																								x	x			x	
8-Provide sufficient knowledge of ethical principles relevant to the field of pharmacology.						x																							

**Program ARS vs ILOs**

Program ILOs ARS	a 1	a 2	a 3	a 4	a 5	a 6	a 7	a 8	a 9	a 10	a 11	a 12	a 13	b 1	b 2	b 3	b 4	b 5	b 6	b 7	C 1	C 2	d 1	d 2	d 3	d 4	d 5	d 6	
a1	x	X	X																										
a2				X	x	x	x	x	x																				
a3												x																	
a4										x																			
a5						x																							
a6											x																		
a7												x									x								
b1														X															
b2															x		x	x											
b3																x													
b4																x													
b5																			x										
b6												x								x									
C1																						x							
C2																					x								
d1																												X	
d2																									X				
d3																							x						
d4																							X						
d5																									X				
d6																										x		X	
d7																											X		

## Teaching and Learning Methods Vs Courses Matrix

Degree: Doctorate

Code: 1704800

	Course code					
	1704801	1704802	1704803	1704804	1704805	1704806
Lecture	√	√	√	√	√	√
Practical/Clinical						
Brainstorming	√	√	√	√	√	√
Discussion Groups (Seminars)	√	√	√	√	√	
Problem Solving						
Case Study						√
Training Workshops						
Self-Directed Learning (Assignments)	√	√	√	√	√	√
e-learning						
Project						

**Program Aims vs Graduate Attributes Matrix**

Generic Graduate Attributes of NAQAAE	Graduate Attributes of Pharmacology	Program Aims
	By the end of this program, graduate should be able to:	
Master the basics and methodologies of scientific research.	-Exhibit mastery of scientific research methodology and professional skills.	5-Demonstrate acquisition of specific professional skills in experimental design and in the analysis of experimental data.
Work continuously to add to his/her knowledge in the field of specialty.	-Increase scientific understanding in pharmacology by investigation and analysis.	3- Provide higher updated knowledge of the progress of pharmacology published in recent textbooks.
Apply the analytical and critical approach to knowledge in the field of specialty and related fields.	-Develop a comprehensive knowledge of pharmacology and related topics to handle challenging professional issues.	4- Provide a sense of curiosity and enthusiasm for evidence-based settings related to pharmacology.
Integrate knowledge in the field of specialty with related knowledge, deduce and develop relationships between them.	Develop a comprehensive knowledge of pharmacology and related topics to handle challenging professional issues.	1-Provide a deep-rooted knowledge of the essential basic molecular biology, biochemical and physiological sciences related to pharmacology
Demonstrate a deep awareness of current problems and modern theories in the field of specialty.	Develop a comprehensive knowledge of pharmacology and related topics to handle challenging professional issues.	2- Manage difficult and professional problems in pharmacology adequately.
Identify professional problems and find innovative solutions to solve them.	Develop ability to make decisions in various practice-related situations.	2- Manage difficult and professional problems in pharmacology adequately.
Master a wide range of professional skills in the field of specialty.	-Exhibit mastery of scientific research methodology and professional skills.	5-Demonstrate acquisition of specific professional skills in experimental design and in the

		analysis of experimental data.
Develop new methods, tools and methods for professional practice.	Develop all the skills, including knowledge of current technology, necessary for safe, ethical, and scientific care administration in the field of pharmacology	5-Demonstrate acquisition of specific professional skills in experimental design and in the analysis of experimental data.
Use appropriate technological means to serve his professional practice.	-Utilize pertinent scientific knowledge to continuously update and improve practical skills.  -Use information technology to increase his/her pharmacological knowledge.	6- Conduct scientific research proficiently that add to the existing specialty knowledge.
Communicate efficiently and lead work teams in various professional scenarios.	Communicate effectively through written and oral presentation.  Develop relationships with colleagues and perform well in a team environment.	7-Promote professional development of communication skills and the ability to use information technology.
Take Decision in light of available data.	Develop ability to make decisions in various practice-related situations.	4- Provide a sense of curiosity and enthusiasm for evidence-based settings related to pharmacology.
Employ and develop available resources efficiently and work to find new resources.	Use information technology to increase his/her pharmacological knowledge.	7-Promote professional development of communication skills and the ability to use information technology.
Show awareness of his/her role in community development and environmental preservation	Show awareness of public health and health policy issues and share in system-based improvement of Pharmacology.	8-Provide sufficient knowledge of ethical principles relevant to the field of pharmacology.
Act in a manner that reflects a commitment to integrity, credibility, and professionalism.	-Communicate effectively through written and oral presentation  - Develop ability to make decisions in various practice-related situations.	8-Provide sufficient knowledge of ethical principles relevant to the field of pharmacology.

Commit to continuous self-development and transfer his/her knowledge and experiences to others.	-Communicate effectively through written and oral presentation	7-Promote professional development of communication skills and the ability to use information technology.
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