Zagazig University

Faculty of Pharmacy

Pharmacology Department

Program and Course Specifications

Master and Ph.D.

Degrees

2012/2013

Master Degree

Program Specification

Program Specification

A- Basic Information

1- Program title: M. Pharm. Sci Degree in **Pharmacology**

2- Program type: Monodisciplinary.

3- Faculty/ University: Faculty of Pharmacy, Zagazig University

4- Department: Pharmacology

5- Coordinator: Prof. Dr. Hassan El-Fayoumy

6- Date of program specification approval: 2012

B- Professional Information

1- Program aims:

The Pharmacology Masters program aims to provide the postgraduate master students with a special and advanced education in the field of pharmacology sciences enable them to gain the skills and attributes required for the responsible practice of pharmacological experiments.

2-Intended Learning Outcomes (ILOs):

The Program provides excellent opportunities for students to demonstrate knowledge and understanding qualities and develop skills appropriate for **Pharmacology** Masters of sciences degree.

2-1- Knowledge and Understanding :

On successful completion of the Master degree Program, students will be able to:

A.1-Understand all relevant knowledge of pharmacology.

A.2-Understand the interrelationships between pharmacology and the society in the field of human health.

A.3-Update the information in the field of pharmacology and related subjects.

A.4-Act purposefully, legally, respectfully and responsibly in the field of practice.

A.5-Know the principles and fundamentals of quality of professional practice in the field of pharmacology.

A.6-Recognize social and national responsibility and ethics in scientific research.

2-2 - Intellectual Skills:

On successful completion of the Master degree Program, students will be able to:

B.1- Analyze and interpret data obtained from pharmacological study in a specific and suitable form.

B.2-Postulate solutions to pharmacological problems in the lack of information.

B.3- Combine information from different sources and disciplines and apply it in innovative ways to solve professional problems.

B.4-Carry out an extended research project involving a literature review, problem specification, research outputs and analysis and write a thesis.

B.5-Manage all emergencies and risks properly.

B.6-Improve the performance in the field of pharmacology through modifying the process or procedure used.

B.7-Make decisions in complex and unpredictable situations.

2-3 - Professional and Practical Skills:

It is intended that, on successful completion of the Master degree Program, students will be able to:

C.1-Master a wide range of pharmacological experiments either in vivo or in vitro and other required skills for scientific research.

C.2-Report the work in a written report.

C.3-Asses used methods, tools and instruments in pharmacological research.

2-4 - General and Transferable Skills:

On successful completion of the Master degree Program, students will be able to:

D.1- Communicate effectively and present ideas and findings clearly in oral and written forms.

D.2-Demonstrate competence in the use of information technology broad enough to meet personal, academic and professional needs.

D.3-Recognize learning needs and how to fulfill them.

D.4-Get access of pharmacological information from a variety of sources.

D.5-Develop rules and indicators for assessing the performance of others.

D.6-Appreciate team working.

D.7-Manage time effectively.

D.8-Strive for excellence in life-long learning by planning for the future, participating in continuing education or professional development activities.

3- Academic Standards:

- NARS (National Academic Reference Standards)

Matrix: Comparison between Master degree program ILOs and the National Academic Reference Standards

NARS vs. Program ILOs of Masters in Pharmacology		
NARS		Program ILOs
Knowledge and Understanding	2.1.1- Theories and fundamentals related to the field of learning as well as in related areas.	A.1-Understand all relevant knowledge of pharmacology.
	2.1.2- Mutual influence between professional practice and its impact on the environment.	A.2-Understand the interrelationships between pharmacology and the society in the field of human health.
	2.1.3- Scientific developments in the area of specialization.	A.3-Update the information in the field of pharmacology and related subjects.
	2.1.4- Moral and legal principles for professional practice in the area of specialization.	A.4-Act purposefully, legally, respectfully and responsibly in the field of practice.
	2.1.5- Principles and the basics of quality in professional practice in the area of specialization.	A.5-Know the principles and fundamentals of quality of professional practice in the field of pharmacology.
	2.1.6- The fundamentals and ethics of scientific research.	A.6-Recognize social and national responsibility and ethics in scientific research.

Intellectual Skills	2.2.1- Analyze and evaluate information in the field of specialization and analogies to solve problems	B.1- Analyze and interpret data obtained from pharmacological study in a specific and suitable form.
	2.2.2- Solve specified problems in the lack or missing of some information.	B.2-Postulate solutions to pharmacological problems in the lack of information.
	2.2.3-Correlate and integrate different pharmaceutical knowledge to solve professional problems.	B.3- Combine information from different sources and disciplines and apply it in innovative ways to solve professional problems.
	2.2.4- Conduct research and write scientific report on research specified topics.	B.4-Carry out an extended research project involving a literature review, problem specification, research outputs and analysis and write a thesis.
	2.2.5- Evaluate and manage risks and potential hazards in professional practices in the area of specialization	B.5-Manage all emergencies and risks properly.
	2.2.6- Plan to improve performance in the field of specialization.	B.6-Improve the performance in the field of pharmacology through modifying the process or procedure used.
	2.2.7- Professional decision-making in the contexts of diverse disciplines.	B.7-Make decisions in complex and unpredictable situations.

Professional and Practical Skills	2.3.1- Master basic and modern professional skills in the area of specialization.	C.1-Master a wide range of pharmacological experiments either in vivo or in vitro and other required skills for scientific research.
	2.3.2- Write and evaluate professional reports.	C.2-Report the work in a written report.
	2.3.3- Assess methods and tools existing in the area of specialization.	C.3-Asses used methods, tools and instruments in pharmacological research.
General and Transferable Skills	2.4.1- Communicate effectively.	D.1- Communicate effectively and present ideas and findings clearly in oral and written forms.
	2.4.2- Effectively use information technology in professional practices	D.2-Demonstrate competence in the use of information technology broad enough to meet personal, academic and professional needs.
	2.4.3- Self-assessment and define his personal learning needs.	D.3-Recognize learning needs and how to fulfill them.
	2.4.4- Use variable sources to get information and knowledge.	D.4-Get access of pharmacological information from a variety of sources.

	2.4.5- Set criteria and parameters to evaluate the performance of others	D.5-Develop rules and indicators for assessing the performance of others.
	2.4.6- Work in a team and lead teams carrying out various professional tasks.	D.6-Appreciate team working.
	2.4.7- Manage time effectively.	D.7-Manage time effectively.
	2.4.8- Continuous and self learning.	D.8-Strive for excellence in life-long learning by planning for the future, participating in continuing education or professional development activities.

4-Curriculum Structure and Contents:

a- Program duration: **3- 5** years

b- Program structure:

- The Masters program can be completed in 3-5 years.
- The Faculty of pharmacy implements the credit hour system.
- The program is structured as:

1- Courses: General (1 year) and Special

No. of credit hours for program courses:

Compulsory: 12

Elective: (2x4) 8

Special: (3x4) 12

2- Thesis: 30 hours

The candidate must complete a research project on an approved topic in the Pharmaceutical Sciences. To fulfill this requirement the student must present (written and orally) a research proposal and write a thesis.

3- General University Requirements: 10 credit hours including:

a- TOEFL (400 units)

b- Computer course

c-Program Curriculum:

Course Code	Course Title	Credit hours	Program ILOs Covered
	General Courses:		
M110	1- Molecular Biology	4	A1, A2, A3, B3,D2, D4.D8
M112	2- Physiology	2	A1, A2, B3, D1
M111	3- Biostatistics	2	A1, A2, A3, B1, B6, D2
M102	4- Instrumental analysis	4	A1, A2, B2, B3, D2, D5, D6
ME4	5- Elective A Biotechnology	4	A1, A2, A3, B3 D2, D4,D6, D8
ME5	6- Elective B Applied Pharmacology	4 4	A1, A2, B3, B7, D3 A1, A2, B2, B3, D4

ME7	Drug induced diseases		
	Special Courses:		
Lsp1	Advanced pharmacology techniques	4	A3, A5, B1, B5 and D5
Lsp2	Drug targeting	4	A1, A2, B3 and D6
Lsp3	Pathophysiology	4	A1, A2, B3 and D7
	Thesis	30	A1, A2, A3, A4, A5, A6, B1, B2, B3, B4, B5, B6, B7, C1, C2, C3, D1, D2, D3, D4, D5, D6, D7 and D8

5-Program admission requirements:

- Candidate should have obtained the certificate of Bachelor degree in pharmaceutical sciences with general grade good and grade good in the specialty from one of the Egyptian universities or an equivalent certificate from a foreign institute recognized by the university.
- Admission is in October each year.

6- Admission Policy:

The faculty complies with the admission regulations and requirements of the Egyptian Supreme Council of Universities (ESCU).

7-Student assessment methods:

Method	ILOS
Written exam	Knowledge and Understanding and Intellectual Skills
Oral exam	Knowledge and Understanding ,Intellectual Skills and General and Transferable Skills
Activity	Intellectual Skills and General and Transferable Skills
Seminars	Knowledge and Understanding ,Intellectual Skills & General and Transferable Skills
Follow up	Professional and practical Skills & General and Transferable Skills
Thesis and oral presentation	Knowledge and Understanding, Intellectual Skills, Professional and practical Skills & General and Transferable Skills

Grade Scale	Grade point average value (GPA)	Numerical scale
A+	5	≥ 95%
A	4.5	90- < 95%
B+	4	85- < 90%
B	3.5	80- < 85%
C+	3	75- < 80%

C	2.5	70- < 75%
D+	2	65- < 70%
D	1.5	60- < 65%

8-Failure in Courses:

Students who fail to get 60% (1 point)

9-Methods of program evaluation

Evaluator	Method	Sample
Internal evaluator: Professor Dr. Hassan El-fayoumy	Program evaluation Courses evaluation	Program report Courses report
External evaluator: Professor Dr.	Program evaluation Courses evaluation	Program report Courses report
Others methods	Matrix with NARS Questionnaires	The Matrix Results of the questionnaires

Program coordinator **Head of Department**

Prof. Dr. Rasha Abd El-Ghany **Prof. Dr. Hassan El-fayoumy**

Physiology

Course specification of ygoloisyhP

A- Course specifications:

- Program on which the course is given: Master of Pharmaceutical Sciences
- Major or Minor element of program: Major
- Department offering the program: Pharmacology Dept.
- Department offering the course: Pharmacology Dept.
- Date of specification approval: 2012/2013

1- Basic information:

Title: **Physiology** Code: M112
Lectures: 2 hrs/week Credit hours: 2 hrs/week
Total: 2hrs/week

2- Overall aim of the course:

- On completion of the course, the students will be able to build up comprehensive knowledge on the overall mammalian physiological functions of the different body organs as well as certain abnormal conditions.

3. Intended learning outcome s (ILOs) of Physiology:

Knowledge and Understanding	
a1	Describe the mechanical, physical, and biochemical functions of humans in good health, their organs, and the cells of which they are composed.
a2	Illustrate the interrelationships between physiology and the society in the field of human health.
Intellectual skills	
b1	Apply the knowledge of physiological prosperities to restore stability.
General and Transferable skills	
d1	Communicate effectively and present ideas and findings clearly in oral and written forms.

4. Course Content of Physiology:

Week number	Lecture contents (2hrs/week)
1	Nerve & Muscle
2	Autonomic Nervous System 1
3	Autonomic Nervous System 2
4	Cardiovascular System 1
5	Cardiovascular System 2
6	Central Nervous System 1
7	Central Nervous System 2
8	Kidney
9	Respiratory System Activity (Review article- Presentation……)
10	GIT
11	Endocrine System 1
12	Endocrine System 2
13	Blood physiology
14	Membrane physiology
15	Revision

5- Teaching and Learning Methods:

- Lectures
- Self learning
- noissucsid nepO

6- Student Assessment methods:

- Written exam to assess: a1, a2 and b1.
- Oral exam to assess: a1, a2, b1 and d1.
- Activity to assess: d1

Assessment schedule:

Assessment (1): Activity	Week 9
Assessment (2): Written exam	Week 16
Assessment (3): oral exam	Week 16

Weighting of Assessment:

Assessment method	Marks	Percentage
• Activity	10	10 %
• Written exam	75	75 %
• oral exam	15	15 %
TOTAL	**100**	**100%**

7- References and books:

A-Scientific papers

B- Essential books:

- Linda S. Costanzo (2007). Board Review Series: Physiology. Lippincott Williams & Wilkins. 4th ed
- Gyton physiology (2006) Arthur C. Guyton , John E. Hall, 11th edition Elsevier Inc.
- Clinical physiology (2005) An Examination Primer Ahis Banerjee , Cambridge University Press.

Facilities required for teaching and learning:

1. **For lectures:** Black (white) boards, computer, data show.

- **Course Coordinators: Dr/ Mona Foaud**
- **Head of Department: Prof Dr/ Hassan El-Fayoumy**
- **Date: 2012-9-3 تم اعتماده فى مجلس القسم بتاريخ**

Matrix I of Physiology course					
Week number	Course Contents	Knowledge and understanding		Intellectual skills	General & Transferable skills
		a1	**a2**	**b1**	**d1**
1	Nerve & Muscle	X	x	X	
2	Autonomic Nervous System 1	X	x	X	
3	Autonomic Nervous System 2	X	x	X	
4	Cardiovascular System 1	X	x	X	
5	Cardiovascular System 2	X	x	X	
6	Central Nervous System 1	X	x	X	
7	Central Nervous System 2	X	x	X	
8	Kidney	X	x	X	
9	Respiratory System- Activity	X	x	X	X
10	GIT	X	x	X	
11	Endocrine System 1	X	x	X	
12	Endocrine System 2	X	x	X	
13	Blood physiology	X	x	X	
14	Membrane physiology	X	x	X	
15	Revision	X	x	X	X

Matrix II of Physiology

NARS		Program ILOs	Course ILOs	Course content	Source	Teaching and learning methods		Method of Assessment		
						Lectures	Self learning	Written exam	Oral exam	Activity
Knowledge and Understanding	2.1.1- Theories and fundamentals related to the field of learning as well as in related areas.	A.1-Understand all relevant knowledge of pharmacology.	a1	All the topics	Scientific papers, text books and Internet	X	X	X	X	
	2.1.2- Mutual influence between professional practice and its impact o the environment.	A.2-Understand the interrelationships between pharmacology and the society in the field of human health.	a2	All the topics	Scientific papers, text books and Internet	X	X	X	X	

Intellectual Skills	2.2.3-Correlate and integrate different pharmaceutical knowledge to solve professional problems.	B.3- Combine information from different sources and disciplines and apply it in innovative ways to solve professional problems.	b1	All the topics	Scientific papers, text books and Internet	X	X	X	X	
General & Transferable skills	2.4.1- Communicate effectively.	D.1- Communicate effectively and present ideas and findings clearly in oral and written forms.	d1	Activity	Scientific papers, text books and Internet	X	X		X	X

Biostatistics

Course specification of Biostatistics

A- Course specifications:

- Program on which the course is given: Master of Pharmaceutical Sciences
- Major or Minor element of program: Major
- Department offering the program: Pharmacology Dept.
- Department offering the course: Pharmacology Dept.

- Date of specification approval: 2012/2013

1- Basic information:

Title: **Biostatistics** Code: M111
Lectures: 2 hrs/week Credit hours: 2 hrs/week
Total: 2hrs/week

2- Overall aim of the course:

On completion of the course, the students will be able to design a good research experiment, statistically analyze the results of research experiments and interpret the results of statistical analysis of experimental data.

3. Intended learning outcome s (ILOs) of Biostatistics:

Knowledge and Understanding	
a1	Understand the fundamentals and principles of Biostatistics.
a2	Identify the interrelationships between biostatistics and the society.
a3	Update the information in the field of biostatistics.
Intellectual skills	
b1	Analyze statistically and interpret data obtained from pharmacological experiments in different forms.
b2	Improve experimental design of pharmacological experiments.
General and Transferable skills	
d1	Demonstrate competence in the use of information technology broad enough to meet personal, academic and professional needs.

4. Course Content of Biostatistics:

Week number	Lecture contents (2hrs/week)
1	General Principle of biostatistics 1
2	General Principle of biostatistics 2
3	Presentation of data
4	Descriptive statistics
5	Measures of central tendency
6	Measures of variability
7	Normal frequency distribution curve
8	Probability
9	Comparing of two means Activity
10	Comparing of more than two means
11	Chi square test
12	Regression and correlation analysis
13	Complex analysis
14	Criteria of good experimental design
15	Revision

5- Teaching and Learning Methods:

- Lectures
- Self learning
- noissucsid nepO

6- Student Assessment methods:

- Written exam to assess: a1, a2, a3, b1 and b2.
- Oral exam to assess: a1, a2, a3, b1, b2 and d1.
- Activity to assess: d1

Assessment schedule:

Assessment (1): Activity	Week 9
Assessment (2): Written exam	Week 16
Assessment (3): oral exam	Week 16

Weighting of Assessment:

Assessment method	Marks	Percentage
• Activity	10	10 %
• Written exam	75	75 %
• oral exam	15	15 %
TOTAL	**100**	**100%**

7- References and books:

A-Scientific papers

B- Essential books:

- Danial W (1995). Biostatistics: A foundation for analysis in health science. (6th ed.) New York: John Wipij & sensing

C- Electronic resources

- Dom Spina (2003) Statistics Workshop distance learning material. British Pharmacological Society University of Manchester

Facilities required for teaching and learning:

1. **For lectures:** Black (white) boards, computer, data show.

- **Course Coordinators: Dr/ Shaimaa El-Shazly**
- **Head of Department: Prof Dr/ Hassan El-Fayoumy**
- **Date: 2012-9-3 تم اعتماده فى مجلس القسم بتاريخ**

Matrix I of Biostatistics course							
Week number	Course Contents	Knowledge & understanding			Intellectual skills		General & Transferable skills
		a1	**a2**	**a3**	**b1**	**b2**	**d1**
1	General principle of biostatistics 1	x	x				
2	General principle of biostatistics 2		x	x			
3	Presentation of data	x		x	X		
4	Descriptive statistics	x		x	X		
5	Measures of central tendency	x		x			
6	Measures of variability	x		x			
7	Normal frequency distribution curve	x		x	X		
8	Probability	x		x	X		
9	Comparing of two means- Activity	x		x	X		X
10	Comparing of more than two means	x		x	X		
11	Chi square test	x		x	X		
12	Regression and correlation analysis	x		x	X		
13	Complex analysis				X		
14	Criteria of good experimental design					x	
15	Revision	x	x	x	X	x	X

Matrix II of Biostatistics

NARS		Program ILOs	Course ILOs	Course content	Source	Teaching and learning methods		Method of Assessment		
						Lectures	Self learning	Written exam	Oral exam	Activity
Knowledge and Understanding	2.1.1- Theories and fundamentals related to the field of learning as well as in related areas.	A.1-Understand all relevant knowledge of pharmacology.	a1	General principle of biostatistics 1- Presentation of data - Descriptive statistics - Measures of central tendency - Measures of variability - Normal frequency distribution curve - Probability - Comparing of two means - Comparing of more than two means - Chi square test - Regression and correlation analysis	Scientific papers, text books and Internet	X	X	x	x	
	2.1.2- Mutual influence between professional practice and its impact o the environment.	A.2-Understand the interrelationships between pharmacology and the society in the field of human health.	a2	General principle of biostatistics 1 - General principle of biostatistics 2	Scientific papers, text books and Internet	X	x	x	x	

	2.1.3- Scientific developments in the area of specialization.	A.3-Update the information in the field of pharmacology and related subjects.	a3	General principle of biostatistics 2- Presentation of data - Descriptive statistics - Measures of central tendency - Measures of variability - Normal frequency distribution curve - Probability - Comparing of two means - Comparing of more than two means - Chi square test - Regression and correlation analysis	Scientific papers, text books and Internet	X	x	x	x	
Intellectual Skills	2.2.1- Analyze and evaluate information in the field of specialization and analogies to solve problems	B.1- Analyze and interpret data obtained from pharmacological study in a specific and suitable form.	b1	Presentation of data - Descriptive statistics - Normal frequency distribution curve - Probability - Comparing of two means - Comparing of more than two means - Chi square test - Regression and correlation analysis - Complex analysis	Scientific papers, text books and Internet	X	x	x	x	
	2.2.6- Plan to improve performance in the field of specialization.	B.6-Improve the performance in the field of pharmacology through modifying the process or procedure used.	b2	Criteria of good experimental design	Scientific papers, text books and Internet	X	x	X	x	

General & Transferable skills	2.4.2- Effectively use information technology in professional practices	D.2- Demonstrate competence in the use of information technology broad enough to meet personal, academic and professional needs.	d1	Activities- Revision	Scientific papers, text books and Internet	X	x		x	x

Drug Induced Disease

Course specification of Drug Induced Disease

A- Course specifications:

- Program on which the course is given: Master of Pharmaceutical Sciences
- Major or Minor element of program: Major
- Department offering the program: Pharmacology Dept.
- Department offering the course: Pharmacology Dept.
- Date of specification approval: 2012/2013

1- Basic information:

Title: **Drug Induced Disease** Code: ME7
Lectures: 4 hrs/week Credit hours: 4 hrs/week
Total: 4hrs/week

2- Overall aim of the course:

On completion of the course, the students will be able to define the mechanisms and symptoms of drug induced hepatotoxicity and diagnose possible drug induced hepatotoxicity and how to prevent it.

3. Intended learning outcome s (ILOs) of Drug Induced Disease:

Knowledge and Understanding	
a1	Illustrate principles of drug induced hepatotoxicity.
a2	Demonstrate the relation between different drug classes and the liver functions.
Intellectual skills	
b1	Suggest possible ways to protect against drug induced hepatotoxicity.
b2	Specify different methods for diagnosis and management of liver injury.
General and Transferable skills	
d1	Get access of pharmacological information from a variety of sources.

4. Course Content of Drug Induced Disease:

Week number	Lecture contents (4hrs/week)
1	Introduction to drug induced disease
2	Liver physiology and pathophysiology
3	Metabolism and mechanisms of liver injury
4	Diagnosis and management of liver injury
5	Animal models of hepatotoxicity
6	Hepatotoxicity of specific drugs (Acetaminophen)
7	Hepatotoxicity of specific drugs (NSAIDs)
8	Hepatotoxicity of specific drugs (Anticonvulsants)
9	Hepatotoxicity of specific drugs (Drugs of abuse) Activity
10	Hepatotoxicity of specific drugs (Antiviral drugs)
11	Hepatotoxicity of specific drugs (Natural medicine)

12	Hepatotoxicity of specific drugs (Cancer Chemotherapy)
13	Presentations
14	Open discussion
15	Revision

5- Teaching and Learning Methods:

- Lectures
- Self learning
- noissucsid nepO

6- Student Assessment methods:

- Written exam to assess: a1, a2, b1 and b2.
- Oral exam to assess: a1, a2, b1, b2 and d1.
- Activity to assess: d1

Assessment schedule:

Assessment (1): Activity	Week 9
Assessment (2): Written exam	Week 16
Assessment (3): oral exam	Week 16

Weighting of Assessment:

Assessment method	Marks	Percentage
• Activity	10	10 %
• Written exam	75	75 %
• oral exam	15	15 %
TOTAL	**100**	**100%**

7- References and books:

A-Scientific papers

B- Essential books:

- Basic and clinical Pharmacology; 10th Edition, Kantzung B.G McGraw Hill Medical Publishing Division 2007.

Facilities required for teaching and learning:

1. **For lectures:** Black (white) boards, computer, data show.

- **Course Coordinators: Dr/ Waleed Barakat**
- **Head of Department: Prof Dr/ Hassan El-Fayoumy**
- **Date: 2012-9-3 تم اعتماده فى مجلس القسم بتاريخ**

Matrix I of Drug Induced Disease course						
Week number	Course Contents	Knowledge and understanding		Intellectual skills		General & Transferable skills
		a1	a2	b1	b2	d1
1	Introduction to drug induced disease	x				
2	Liver physiology and pathophysiology	x				
3	Metabolism and mechanisms of liver injury	x			X	
4	Diagnosis and management of liver injury	x			X	
5	Animal models of hepatotoxicity	x				
6	Hepatotoxicity of specific drugs (Acetaminophen)		x	x		
7	Hepatotoxicity of specific drugs (NSAIDs)		x	x		
8	Hepatotoxicity of specific drugs (Anticonvulsants)		x	x		
9	Hepatotoxicity of specific drugs (Drugs of abuse)- Activity		x	x		X
10	Hepatotoxicity of specific drugs (Antiviral drugs)		x	x		
11	Hepatotoxicity of specific drugs (Natural medicine)		x	x		
12	Hepatotoxicity of specific drugs (Cancer Chemotherapy)		x	x		
13	Presentations	x	x	x	X	
14	Open discussion	x	x	x	X	X
15	Revision	x	x	x	X	X

Matrix II of Drug Induced Disease

NARS		Program ILOs	Course ILOs	Course content	Source	Teaching and learning methods		Method of Assessment		
						Lectures	Self learning	Written exam	Oral exam	Activity
Knowledge and Understanding	2.1.1- Theories and fundamentals related to the field of learning as well as in related areas.	A.1- Understand all relevant knowledge of pharmacology.	a1	Introduction to drug induced disease Liver physiology and pathophysiology Metabolism and mechanisms of liver injury Diagnosis and management of liver injury Animal models of hepatotoxicity	Scientific papers, text books and Internet	x	X	x	x	
	2.1.2- Mutual influence between professional practice and its impact o the environment.	A.2- Understand the interrelationships between pharmacology and the society in the field of human health.	a2	Hepatotoxicity of specific drugs (Acetaminophen) Hepatotoxicity of specific drugs (NSAIDs) Hepatotoxicity of specific drugs (Anticonvulsants) Hepatotoxicity of specific drugs (Drugs of	Scientific papers, text books and Internet	x	x	x	x	

				abuse) Hepatotoxicity of specific drugs (Antiviral drugs) Hepatotoxicity of specific drugs (Natural medicine) Hepatotoxicity of specific drugs (Cancer Chemotherapy)						
Intellectual Skills	2.2.2- Solve specified problems in the lack or missing of some information.	B.2-Postulate solutions to pharmacological problems in the lack of information.	b1	Hepatotoxicity of specific drugs (Acetaminophen) Hepatotoxicity of specific drugs (NSAIDs) Hepatotoxicity of specific drugs (Anticonvulsants) Hepatotoxicity of specific drugs (Drugs of abuse) Hepatotoxicity of specific drugs (Antiviral drugs) Hepatotoxicity of specific drugs (Natural medicine) Hepatotoxicity of specific drugs (Cancer Chemotherapy)	Scientific papers, text books and Internet	x	X	x	x	

	2.2.3- Correlate and integrate different pharmaceutical knowledge to solve professional problems.	B.3- Combine information from different sources and disciplines and apply it in innovative ways to solve professional problems.	b2	Diagnosis and management of liver injury Animal models of hepatotoxicity	Scientific papers, text books and Internet	x	X	x	x	
General & Transferable skills	2.4.4- Use variable sources to get information and knowledge.	D.4-Get access of pharmacological information from a variety of sources.	d1	Activity	Scientific papers, text books and Internet	x	X		x	x

Applied Pharmacology

Course specification of Applied Pharmacology

A- Course specifications:

- Program on which the course is given: Master of Pharmaceutical Sciences
- Major or Minor element of program: Major
- Department offering the program: Pharmacology Dept.
- Department offering the course: Pharmacology Dept.
- Date of specification approval: 2012/2013

1- Basic information:

Title: **Applied Pharmacology** Code: ME5
Lectures: 4 hrs/week Credit hours: 4 hrs/week
Total: 4hrs/week

2- Overall aim of the course:

On completion of the course, the students will be able to mention the actions and uses of a number of pharmacologically active drug classes and explain the mechanisms by which different classes of drugs act.

3. Intended learning outcome s (ILOs) of Applied Pharmacology:

Knowledge and Understanding	
a1	Demonstrate sufficient knowledge about classes of drugs used to treat different diseases.
a2	Relate applied pharmacology to community health practices.
Intellectual skills	
b1	Integrate different aspects of pharmacology to suggest solutions for professional problems.
b2	Decide the suitable solution for unpredictable situations.
General and Transferable skills	
d1	Recognize learning needs and how to fulfill them.

4. Course Content of Applied Pharmacology:

Week number	Lecture contents (4hrs/week)
1	Drugs used in Parkinson's disease
2	Drugs used in Alzheimer disease
3	Antiepileptic drugs 1
4	Antiepileptic drugs 2
5	Antidepressants
6	Analgesics 1
7	Analgesics 2
8	Antipsychotics
9	Antihypertensive 1 Activity
10	Antihypertensive 2
11	Diuretics 1
12	Diuretics 2
13	Anti diabetic drugs 1
14	Anti diabetic drugs 2
15	Revision

5- Teaching and Learning Methods:

- Lectures
- Self learning
- noissucsid nepO

6- Student Assessment methods:

- Written exam to assess: a1, a2, b1and b2
- Oral exam to assess: a1, a2, b1, b2 and d1.
- Activity to assess: d1

Assessment schedule:

Assessment (1): Activity	Week 9
Assessment (2): Written exam	Week 16
Assessment (3): oral exam	Week 16

Weighting of Assessment:

Assessment method	Marks	Percentage
• Activity	10	10 %
• Written exam	75	75 %
• oral exam	15	15 %
TOTAL	**100**	**100%**

7- References and books:

A-Scientific papers

B- Essential books:

- Basic and clinical Pharmacology; 10th Edition, Katzung B.G. McGraw Hill Medical Publishing Division 2007.
- Clinical Pharmacology; 8th Edition, Laurence D.R, Bennett P.N, Brown M.J, Churchill livingstone 1997.

C- Suggested books:

- Integrated Pharmacology; 3rd Edition, Page P.C; J.M; Walker U.M; Hoffman B.B. Elsevier Mosby 2006.

- Rang and Dales Pharmacology; Rang P.H., Dale M.M., Ritter M.J., Flower J.R. Churchill livingstone Elsevier 2007.

Facilities required for teaching and learning:

1. **For lectures:** Black (white) boards, computer, data show.

- **Course Coordinators: Prof Dr/ Rasha Hassan**
- **Head of Department: Prof Dr/ Hassan El-Fayoumy**
- **Date: 2012-9-3 تم اعتماده فى مجلس القسم بتاريخ**

Matrix I of Applied Pharmacology course						
Week number	Course Contents	Knowledge and understanding		Intellectual skills		General & Transferable skills
		a1	a2	b1	b2	d1
1	Drugs used in Parkinson's disease	X	X	x	X	
2	Drugs used in Alzheimer disease	X	X	x	X	
3	Antiepileptic drugs 1	X	X	x	X	
4	Antiepileptic drugs 2	X	X	x	X	
5	Antidepressants	X	X	x	X	
6	Analgesics 1	X	X	x	X	
7	Analgesics 2	X	X	x	X	
8	Antipsychotics	X	X	x	X	
9	Antihypertensive 1- Activity	X	X	x	X	X
10	Antihypertensive 2	X	X	x	X	
11	Diuretics 1	X	X	x	x	
12	Diuretics 2	X	X	x	x	
13	Anti diabetic drugs 1	X	X	x	x	
14	Anti diabetic drugs 2	X	X	x	x	
15	Revision	X	X	x	x	X

Matrix II of Applied pharmacology

NARS		Program ILOs	Course ILOs	Course content	Source	Teaching and learning methods		Method of Assessment		
						Lectures	Self learning	Written exam	Oral exam	Activity
Knowledge and Understanding	2.1.1- Theories and fundamentals related to the field of learning as well as in related areas.	A.1-Understand all relevant knowledge of pharmacology.	a1	All topics	Scientific papers, text books and Internet	X	x	x	x	
	2.1.2- Mutual influence between professional practice and its impact o the environment.	A.2-Understand the interrelationships between pharmacology and the society in the field of human health.	a2	All topics	Scientific papers, text books and Internet	X	x	x	x	

Intellectual Skills	2.2.3- Correlate and integrate different pharmaceutical knowledge to solve professional problems.	B.3- Combine information from different sources and disciplines and apply it in innovative ways to solve professional problems.	b1	All topics	Scientific papers, text books and Internet	X	x	x	x	
	2.2.7- Professional decision-making in the contexts of diverse disciplines.	B.7-Make decisions in complex and unpredictable situations.	b2	All topics	Scientific papers, text books and Internet	X	x	X	x	

General & Transferable Skills	2.4.3- Self-assessment and define his personal learning needs.	D.3-Recognize learning needs and how to fulfill them.	d1	Activity-Revision and open discussion	Scientific papers, text books and Internet	X	x		x	x

Courses offered by other departments

Instrumental Analysis II

Course specification of Instrumental Analysis II

A- Course specifications:

- Program on which the course is given: Master's of Pharmaceutical Sciences
- Major or Minor element of program: Major
- Department offering the program: Pharmacology
- Department offering the course: Analytical Chemistry.

- Date of specification approval: 2012/2013

1- Basic information:

Title: Instrumental Analysis II Code: M102
Lectures: 4 hrs/week Credit hours: 4 hrs/ week
Total: 4 hrs/ week

2- Overall aim of the course:

On completion of the course, the students will be able to outline the basis and applications of instrumental analysis and describe theories, operation, pharmaceutical and biological applications of instrumental techniques.

3. Intended learning outcome s (ILOs):

A- Knowledge and Understanding	
a1	Outline the basis, theory and operation of the different instrumental techniques of analysis.
a2	Describe different pharmaceutical and biological applications of instrumental techniques.
B- Intellectual skills	
b_1	Decide the use of most appropriate instrumental technique in pharmaceutical and biological assay.
b_2	Integrate the knowledge gained by studying different instrumental techniques in designing analytical system for analytes of complex nature
D- General and Transferable skills	
d_1	Acquire Computer skills like preparing presentations and collecting information through different data-bases.
d_2	Work effectively as a member of team
d_3	Improve scientific brain storming capabilities of team members

4. Course Contents:

Week number	Content
1	Introduction Principles
2	**Spectroscopy [**Ultraviolet (UV)‑visible spectrophotometry, Fluorometry] Basis Pharmaceutical and biological applications.
3	**Spectroscopy: [**Infrared (IR) spectroscopy]. Basis Pharmaceutical and biological applications

4	**Spectroscopy: [**Atomic absorption spectroscopy]. Basis Pharmaceutical and biological applications
5	**Nuclear magnetic resonance (NMR).** Basis Pharmaceutical and biological applications
6	**Conductometry, Potentiometry.** Basis Pharmaceutical and biological applications.
7	**Mass-spectrometry (MS)** Basis Pharmaceutical and biological applications.
8	**Polarography and Voltammetry** Basis Pharmaceutical and biological applications.
9	**Chromatography:** Introduction Classification
10	**Quantitative and Qualitative TLC** Basis Pharmaceutical and biological applications
11	**HPLC** Basis Types
12	**HPLC** Isocratic flow and gradient elution Parameters Internal diameter Particle size Pore size Pump pressure
13	**HPLC** Detectors Applications
14	**Gas Chromatography** Basis Pharmaceutical and biological applications
15	**Revision and Open discussion**

5- Teaching and Learning Methods:

- Lectures
- Self learning
- Open discussion

6- Student Assessment methods:

Written exams to assess: a1, a2, b1, b2
Oral exam to assess: a1, a2, b1 and b2
Activity to assess: d1, d2 and d3

Assessment (1): Activity	Week 9
Assessment (2): Written exam	Week 16
Assessment (3): oral exam	Week 16

Weighting of Assessment:

Assessment method	Marks	Percentage
• Activity	10	10 %
• Written exam	75	75 %
• oral exam	15	15 %
TOTAL	**100**	**100%**

7- References and books:

A-Scientific papers
B- Essential books:
1-Modern Analytical Chemistry, David Harvey, McGraw-Hill Companies, first edition, 2002
2-Guidance for Industry: Q2B of Analytical Procedures; Methodololgy: International Conference of Harmonization (ICH). Nov. 1996 (http:/ www.fda.gov/eder/guidance /1320fnl.pdf)
3- Techniques and instrumentation in analytical chemistry, vol.5, John Edward

4- Comprehensive Analytical Chemistry, XLV, M.L.Marina, A. Rios, (EDS)
5- Handbook of instrumental techniques of analytical chemistry, Frank A. Settle

C- Suggested books:
1- Wilson, Charles Owens; Beale, John Marlowe; Block, John H.; Block, John H.; Gisvold, Ole "Wilson & Gisvold's Textbook of Organic :Medicinal and Pharmaceutical
2- British Pharmacopoeia, HM Stationery Office, London, UK, PA, 2007,
3- Martindale: The Complete Drug Reference, Pharmaceutical Press;35 edition (2007)

D- Websites:
www.tandfonline.com/toc/lanl20/current (Analytical Letters)
www.rsc.org

Facilities required for teaching and learning:

For lectures: Black (white) boards, data show.

- **Course Coordinators: Prof Dr/ Hanaa Saleh**
- **Head of Department: Prof Dr/ Mohamed Nageb El-Balkeny**
- **Date: 2012-8-28 تم اعتماده فى مجلس القسم بتاريخ**

Molecular Biology

Course specification of Molecular Biology

Course Specification:

- Program on which the course is given: Master degree of pharmaceutical science.
- Major or minor Element of program: Major
- Department offering the program : Pharmacology department
- Department offering the course: Biochemistry department in conjunction with Microbiology department
- Date of specification approval: 2012/2013

1-Basic information:

Title: Molecular biology Code: M110

Lectures: 4 hrs/ week Credit hrs: 4 hrs

Total: 4 hrs/week

2-Overall aim of the course:

On completion of the course, the students will be able to outline principle information on DNA and RNA and illustrate the basis of genetic engineering and its applications.

3- Intended learning outcomes (ILOs) of Molecular biology

A-Knowledge and Understanding	
a1	Outline principles of DNA structure, synthesis and sequencing.
a2	Illustrate RNA functions , protein synthesis and separation process.
a3	Summarize basis of genetic engineering , DNA cloning and PCR techniques.
a4	Identify the applications of genetic engineering in diagnosis and treatment of genetic diseases.
B-Intellectual skills	
b1	Apply molecular biology background to solve professional problems
D- General and transferable skills	
d1	Use computer skills as internet and power point in the activities.
d2	Gain information from various sources as text books, scientific journals, internet……..
d3	Search on various topics and write reports.

4- Course Content of Molecular Biology

Week number	Lecture contents (4hrs/week)
1	• DNA ,RNA structure, function. • Difference between DNA and RNA
2	• DNA replication steps
3	• Types of RNA • Genetic code

4	• Protein synthesis • Alteration of nucleotide sequence
5	• Genetic engineering • DNA cloning • Applications of cloning in treatment of diseases • Activity
6	• Genomic DNA libraries, c DNA • PCR, LCR and their applications
7	• RFLP • Linkage of polymorphism with gene mutation • Prenatal diagnosis, Diagnosis of sickle cell disease • Case studies
8	• Sequencing of DNA (chemical method)
9	• Sequencing of DNA (enzymatic method)
10	• Electrophoresis
11	• Sothern, western and northern blotting
12	• Sequencing of proteins
13	• Synthesis of genes
14	• Monoclonal antibodies + activity (reports)
15	• Revision and open discussion

5- Teaching and learning methods:

- Lectures
- Self learning
- Open discussion and presentations

6- Student assessment methods:

Written exam assess: a1, a2, a3, a4

Oral exam assess: a1, a2, a3, a4, b1, d3

Activity assess: d1, d2, d3

Assessment (1): Activity	Week 9
Assessment (2): Written exam	Week 16
Assessment (3): oral exam	Week 4-14

Weighting of Assessment:

Assessment method	Marks	Percentage
• Activity	10	10 %
• Written exam	75	75 %
• oral exam	15	15 %
TOTAL	**100**	**100%**

7- References and books:

A- Scientific papers

B- Essential books: Lippencott's biochemistry

Brown, T.A. (1991). Essential Molecular Biology - A Practical approach. Vol-I, Vol - n , Oxford Univ. Press. Oxford.

David, J., Ulley and Eckstein, F. (1992). Nucleic Acids and Molecular Biology. Vol-6, Springer-verlag Berlin Heidelberg.

Desmond, S.T., and Nicholl. (1994). An Introduction to genetic Engineering Cambridge Univ. Press. Cambridge.

Freifelder, D. (1990). Microbial genetics. Narosa Pub. Home. India.

Gardner, E.J. (1991). Principles of Genetcis. John Wiley and Sons Inc. NY.

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Watson, J.D., Hopkins, N.H., Roberts, J.W.. Steitz, J.A- and Weiner, A.M. (1987). Molecular biology of the gene. 4th Edn. The Benjanun/cummmgs Publishing Company Inc. NY.

Pollard ,Thomas D.and ; William C. Earnshaw (2004) .Cell Biology . Philadelphia: Saunders.
Lodish, Harvey, Arnold Berk, S. Lawrence Zipursky, Paul Matsudaira, David Baltimore, James Darnell Molecular Cell Biology, 4th ed (2000), New York
Watson, JB., Gflnian, M., Witkowshi, J. and Zoller, M. (1992). Recombinant DNA. 2nd Edn.

C- Suggested books: Molecular cell biology, Lodish

D- Websites: pubmed, Sciencedirect, Nejm, Weilyinterscience

Facilities required for teaching and learning:

1. **For lectures:** Black (white) boards, computer, data show.

- **Course Coordinators: Prof Dr/ Mohamed Mahmoud El-Seweidy and Prof. Dr. Fathy serry**
- **Head of Department: Prof Dr/ Mervat Asker**
- **Date: 2012-9-2 تم اعتماده فى مجلس القسم بتاريخ**

Biotechnology

Course specification of Biotechnology

Course specifications:

- Program on which the course is given: Master of Pharmaceutical Sciences
- Major or Minor element of program: Major
- Department offering the program: Pharmacology department
- Department offering the course: Biochemistry department in conjunction with Microbiology department.
- Date of specification approval: 2012/2013

1- Basic information:

Title: Biotechnology Code: ME4

Lectures: 4 hrs/week Credit hours: 4 hrs

Total: 4 hrs/week

2-Overall aim of the course:

- On completion of the course, the students will be able to illustrate principles of biotechnology and cell culture, outline recent medical biotechnology applications and apply biotechnology and genetic engineering in developing and improving drugs, vaccines other useful compounds.

3. Intended learning outcome s (ILOs) of biotechnology:

A- Knowledge and Understanding	
a1	Understand the principles of biotechnology techniques
a2	Understand how to manage and exploit knowledge of DNA cloning, recombinant DNA, and applied technology.
a3	Summarize recent medical biotechnology applications.
B- Intellectual skills	
b1	Apply biotechnology in medicine, agriculture and pollution control.
D- General and transferable skills	
d1	Use computer skills as internet and power point in the activities.
d2	Gain information from various sources as text books, scientific journals, internet……..
d3	Search on various topics and write reports.

4- Course Content of ygolonhcetoiB

Week number	Lecture contents (4hrs/week)
1	• Introduction to biotechnology
2	• Bioprocess
3	• Downstream processing
4	• Cell culture • Activity (reports)

5	• Hybridoma technology
6	• Medical biotechnology
7	• Medicine from cultured cells
8	DNA Recombination & Application of genetic engineering
9	• Principle of PCR technology and gene amplification.
10	• Applications and advances in PCR
11	• Hybridoma technology& Monoclonal antibody(MAb)- technology & Production Nomenclature of MAbs
12	• Global Marketing Pharmaceutically useful monoclonal antibodies
13	• Applications and advances in PCR
14	• Vaccine preparations • Stem cells technology & • Regenerative medicine. • Activity (presentation of reports)
15	• Revision and open discussion

5- Teaching and Learning Methods:

- Lectures

- Self learning
- Open discussion and presentations

6-Student Assessment methods:

Written exams to assess: a1, a2, a3, b1

Oral exam assess: a1, a2, a3, b1, d3

Activity assess: d1, d2, d3

Assessment schedule:

Assessment (1): Activity	Week 9
Assessment (2): Written exam	Week 16
Assessment (3): oral exam	Week 7-14

Weighting of Assessment:

Assessment method	Marks	Percentage
• Activity	10	10 %
• Written exam	75	75 %
• oral exam	15	15 %
TOTAL	**100**	**100%**

7- References and books:

A- Scientific papers

B- Essential books: - Biotechnology&pharmacy

1. Crommelin, D.A.; and Sindeler, R.D. (1997). Pharmaceutical Biotechnology. Hartwood Academic Publishers. The Netherlands.

2. Glick, B.P.; and Pasterternak, J.J. (1994). Molecular Biotechnology-Principles Applications of recombinant DNA. AS Press, Washington, D.C., USA.

3. Watson, J.D.; Gilman,M.; Witkowski, J.; and Zoller; . (1992). Recombinant DNA, second Edition. Printed in Scientific American Books, Subsidiary of Scientific American, Inc., N.Y., USA.

C- Suggested books: Biotechnology in health care: an introduction to biopharmaceuticals

D- Websites: pubmed, Sciencedirect, Nejm, Weilyinterscience

Facilities required for teaching and learning:

1. **For lectures:** Black (white) boards, computer, data show.

- **Course Coordinators: Prof Dr/ Mohamed El-Seweidy and Prof. Dr. Ashraf Ahmed Kadry**
- **Head of Department: Prof Dr/ Mervat Asker**
- **Date: 2012-9-2 تم اعتماده فى مجلس القسم بتاريخ**

Special Courses

Advanced Pharmacology Techniques

Course specification of Advanced Pharmacology Techniques

A- Course specifications:

- Program on which the course is given: Master of Pharmaceutical Sciences
- Major or Minor element of program: Major
- Department offering the program: Pharmacology Dept.
- Department offering the course: Pharmacology Dept.
- Date of specification approval: 2012/2013

1- Basic information:

Title: **Advanced Pharmacology Techniques** Code: Lsp1
Lectures: 4 hrs/week Credit hours: 4 hrs/week
Total: 4hrs/week

2- Overall aim of the course:

On completion of the course, the students will be able to summarize the principle of some of the advanced techniques in pharmacology and molecular biology and discuss the precautions that should be noticed while performing certain techniques.

3. Intended learning outcome s (ILOs) of Advanced Pharmacology Techniques:

Knowledge and Understanding	
a1	Discuss scientific developments related to some advanced pharmacological techniques.
a2	Illustrate principles and basics of quality in professional practice in modern pharmacological laboratory setting.
Intellectual skills	
b1	Analyze information and results concerned with some advanced pharmacological techniques.
b2	Evaluate and manage risks and potential hazards in a pharmacology lab.
General and Transferable skills	
d1	Develop rules and indicators for assessing the performance of others.

4. Course Content of Advanced Pharmacology Techniques:

Week number	Lecture contents (4hrs/week)
1	Lab safety measures and handling and disposal of dangerous materials.
2	Extraction, purification and identification of nucleic acids (DNA and RNA)
3	Reverse transcription
4	Polymerase chain reaction (conventional PCR, RT-PCR and real time RT-PCR)
5	Separation of PCR products and analysis of PCR results
6	Extraction and quantification of proteins
7	Western blotting
8	Analysis of western blot results
9	Measurement of blood pressure (invasive and non invasive) - Activity
10	Measurement of blood glucose level
11	Assessment of liver function
12	Assessment of kidney function
13	Complete blood count

14	Anatomy and dissection of laboratory animals
15	Revision

5- Teaching and Learning Methods:

- Lectures
- Self learning
- noissucsid nepO

6- Student Assessment methods:

- Written exam to assess: a1, a2, b1 and b2
- Oral exam to assess: a1, a2, b1, b2 and d1.
- Activity to assess: d1

Assessment schedule:

Assessment (1): Activity	Week 7-14
Assessment (2): Written exam	Week 16
Assessment (3): oral exam	Week 16

Weighting of Assessment:

Assessment method	Marks	Percentage
• Activity	10	10 %
• Written exam	75	75 %
• oral exam	15	15 %
TOTAL	**100**	**100%**

7- References and books:

A-Scientific papers
B- Essential books:
Advances in pharmacology, S.J. Enaa, M. Williams, volume 57,2009

Facilities required for teaching and learning:

1. **For lectures:** Black (white) boards, computer, data show.

- **Course Coordinators: Dr/ Waleed Barakat**
- **Head of Department: Prof Dr/ Hassan El-Fayoumy**
- **Date: 2012-9-3 تم اعتماده فى مجلس القسم بتاريخ**

Matrix I of Advanced Pharmacology Techniques course

Week number	Course Contents	Knowledge and understanding		Intellectual skills		General & Transferable skills
		a1	**a2**	**b1**	**b2**	**d1**
1	Lab safety measures and handling and disposal of dangerous materials.		x		X	
2	Extraction, purification and identification of nucleic acids (DNA and RNA)	X				
3	Reverse transcription	X				
4	Polymerase chain reaction (conventional PCR, RT-PCR and real time RT-PCR)	X				
5	Separation of PCR products and analysis of PCR results			x		
6	Extraction and quantification of proteins	X				
7	Western blotting	X				
8	Analysis of western blot results		x			
9	Measurement of blood pressure (invasive and non invasive) - Activity	X	x	x		X
10	Measurement of blood glucose level	X	x	x		
11	Assessment of liver function	X	x	x		
12	Assessment of kidney function	X	x	x		
13	Complete blood count	X	x	x		
14	Anatomy and dissection of laboratory animals	X				
15	Revision	X	x	x	X	X

Matrix II of Advanced Pharmacology Techniques

NARS		Program ILOs	Course ILOs	Course content	Source	Teaching and learning methods		Method of Assessment		
						Lectures	Self learning	Written exam	Oral exam	Activity
Knowledge and Understanding	2.1.3- Scientific developments in the area of specialization.	A.3-Update the information in the field of pharmacology and related subjects.	a1	Extraction, purification and identification of nucleic acids (DNA and RNA) - Reverse transcription- Polymerase chain reaction (conventional PCR, RT-PCR and real time RT-PCR) - Extraction and quantification of proteins - Western blotting- Measurement of blood pressure (invasive and non invasive)- Measurement of blood glucose level - Assessment of liver function- Assessment of kidney function - Complete blood count - Anatomy and dissection of laboratory animals	Scientific papers, text books and Internet	X	X	x	x	

	2.1.5- Principles and the basics of quality in professional practice in the area of specialization.	A.5-Know the principles and fundamentals of quality of professional practice in the field of pharmacology.	a2	Lab safety measures and handling and disposal of dangerous materials - Analysis of western blot results - Measurement of blood pressure (invasive and non invasive)- Measurement of blood glucose level - Assessment of liver function- Assessment of kidney function - Complete blood count	Scientific papers, text books and Internet	X	X	x	x	
Intellectual Skills	2.2.1- Analyze and evaluate information in the field of specialization and analogies to solve problems	B.1- Analyze and interpret data obtained from pharmacological study in a specific and suitable form.	b1	Separation of PCR products and analysis of PCR results - Measurement of blood pressure (invasive and non invasive)- Measurement of blood glucose level - Assessment of liver function- Assessment of kidney function - Complete blood count	Scientific papers, text books and Internet	X	x	x	x	
	2.2.5- Evaluate and manage risks and potential hazards in professional practices in the area of specialization	B.5-Manage all emergencies and risks properly.	b2	Lab safety measures and handling and disposal of dangerous materials	Scientific papers, text books and Internet	X	x	x	x	

General & Transferable Skills	2.4.5- Set criteria and parameters to evaluate the performance of others	D.5-Develop rules and indicators for assessing the performance of others.	d1	Activity- Revision	Scientific papers, text books and Internet	X	x		x	X

Drug Targeting

Course specification of gnitegraT gurD

A- Course specifications:

- Program on which the course is given: Master of Pharmaceutical Sciences
- Major or Minor element of program: Major
- Department offering the program: Pharmacology Dept.
- Department offering the course: Pharmacology Dept.
- Date of specification approval: 2012/2013

1- Basic information:

Title: **Drug Targeting** Code: Lsp2
Lectures: 4 hrs/week Credit hours: 4 hrs/week
Total: 4hrs/week

2- Overall aim of the course:

On completion of the course, the students will be able to understand diseases of different body organs and have special and advanced education in the field of drug targeting.

3. Intended learning outcome s (ILOs) of Drug Targeting:

Knowledge and Understanding	
a1	Be aware of various diseases and traditional methods of treatment.
a2	Describe the influence of drug targeting on treatment of different diseases and on human health.
Intellectual skills	
b1	Link available information of the disease and the treatment to target the drug and get maximum benefit of it.
General and Transferable skills	
d1	Appreciate team working.

4. Course Content of Drug Targeting:

Week number	Lecture contents (4hrs/week)
1	Diseases of the CNS
2	Traditional treatment for the CNS diseases
3	Drug targeting in CNS
4	Drug targeting in CNS
5	Diseases and traditional treatment of the Liver
6	Drug targeting in the Liver
7	Drug targeting in the Liver
8	Diseases and traditional treatment of the Kidney
9	Drug targeting in the Kidney Activity
10	Drug targeting in the Kidney
11	Diabetic vascular complications
12	Traditional treatment for Diabetic vascular complications
13	Drug targeting in Diabetic vascular complications

14	Drug targeting in Diabetic vascular complications
15	Revision

5- Teaching and Learning Methods:

- Lectures
- Self learning
- noissucsid nepO

6- Student Assessment methods:

- Written exam to assess: a1, a2 and b1.
- Oral exam to assess: a1, a2, b1 and d1.
- Activity to assess: d1

Assessment schedule:

Assessment (1): Activity	Week 9
Assessment (2): Written exam	Week 16
Assessment (3): oral exam	Week 16

Weighting of Assessment:

Assessment method	Marks	Percentage
• Activity	10	10 %
• Written exam	75	75 %
• oral exam	15	15 %
TOTAL	**100**	**100%**

7- References and books:

A-Scientific papers
B- Essential books:

Drug targeting, strategies, principles and applications, edited by G.E. Francis and Cristina Delgado

Facilities required for teaching and learning:

1. **For lectures:** Black (white) boards, computer, data show.

- **Course Coordinators: Dr/ Mona Fouad**
- **Head of Department: Prof Dr/ Hassan El-Fayoumy**
- **Date: 2012-9-3 تم اعتماده فى مجلس القسم بتاريخ**

Matrix I of Drug Targeting course					
Week number	Course Contents	Knowledge and understanding		Intellectual skills	General & Transferable skills
		a1	**a2**	**b1**	**d1**
1	Diseases of the CNS	X			
2	Traditional treatment for the CNS diseases	X			
3	Drug targeting in CNS		X	X	
4	Drug targeting in CNS		X	X	
5	Diseases and traditional treatment of the Liver	X			
6	Drug targeting in the Liver		X	X	
7	Drug targeting in the Liver		X	X	
8	Diseases and traditional treatment of the Kidney	X			
9	Drug targeting in the Kidney-Activity		X	X	X
10	Drug targeting in the Kidney		X	X	
11	Diabetic vascular complications	X			
12	Traditional treatment for Diabetic vascular complications	X			
13	Drug targeting in Diabetic vascular complications		x	X	
14	Drug targeting in Diabetic vascular complications		x	X	
15	Revision	X	x	X	X

Matrix II of Drug Targeting

NARS		Program ILOs	Course ILOs	Course content	Source	Teaching and learning methods		Method of Assessment		
						Lectures	Self learning	Written exam	Oral exam	Activity
Knowledge and Understanding	2.1.1- Theories and fundamentals related to the field of learning as well as in related areas.	A.1-Understand all relevant knowledge of pharmacology.	a1	Diseases and traditional treatment of (CNS- Liver- Kidney- Diabetic vascular complications)	Scientific papers, text books and Internet	x	x	x	x	
	2.1.2- Mutual influence between professional practice and its impact on the environment.	A.2-Understand the interrelationships between pharmacology and the society in the field of human health.	a2	Drug targeting to (CNS- Liver- Kidney- Diabetic vascular complications)	Scientific papers, text books and Internet	x	x	x	x	

Intellectual Skills	2.2.3-Correlate and integrate different pharmaceutical knowledge to solve professional problems.	B.3- Combine information from different sources and disciplines and apply it in innovative ways to solve professional problems.	b1	Drug targeting to (CNS- Liver- Kidney- Diabetic vascular complications)	Scientific papers, text books and Internet	x	x	x	x	
General & Transferable Skills	2.4.6- Work in a team and lead teams carrying out various professional tasks.	D.6-Appreciate team working.	d1	Activity- Revision	Scientific papers, text books and Internet	x	x		x	X

Pathophysiology

Course specification of Pathophysiology

A- Course specifications:

- Program on which the course is given: Master of Pharmaceutical Sciences
- Major or Minor element of program: Major
- Department offering the program: Pharmacology Dept.
- Department offering the course: Pharmacology Dept.
- Date of specification approval: 2012/2013

1- Basic information:

Title: **Pathophysiology** Code: Lsp3
Lectures: 4 hrs/week Credit hours: 4 hrs/week
Total: 4hrs/week

2- Overall aim of the course:

On completion of the course, the students will be able to provide the master students with a special and advanced education in the field of pathophysiology.

3. Intended learning outcome s (ILOs) of Pathophysiology:

Knowledge and Understanding	
a1	Illustrate thoroughly the basics of pathophysiological processes and related topics.
a2	Understand the recent mechanisms of the pathophysiology of different diseases.
Intellectual skills	
b1	Correlate and integrate data in order to identify the pathophysiological mechanisms of diseases, and the possible therapeutic interventions.
General and Transferable skills	
d1	Manage time effectively.

4. Course Content of Pathophysiology:

Week number	Lecture contents (4hrs/week)
1	Diabetes-1
2	Diabetes-2
3	Hypertension-1
4	Hypertension-2
5	Heart failure-1
6	Heart failure-2
7	Hepatitis-1
8	Hepatitis-2
9	Inflammation-1 Activity
10	Psychosis
11	Asthma
12	Parkinsonism-1
13	Parkinsonism-2
14	Alzehimer disease
15	Revision

5- Teaching and Learning Methods:

- Lectures

- Self learning
- noissucsid nepO

6- Student Assessment methods:

- Written exam to assess: a1, a2 and b1.
- Oral exam to assess: a1, a2, b1 and d1.
- Activity to assess: d1

Assessment schedule:

Assessment (1): Activity	Week 9
Assessment (2): Written exam	Week 16
Assessment (3): oral exam	Week 16

Weighting of Assessment:

Assessment method	Marks	Percentage
• Activity	10	10 %
• Written exam	75	75 %
• oral exam	15	15 %
TOTAL	**100**	**100%**

7- References and books:

A-Scientific papers
B- Essential books:
Color Atlas of Pathophysiology. Silbernagl S and Lang F (eds.), Thieme, Stuttgart.

Facilities required for teaching and learning:

1. **For lectures:** Black (white) boards, computer, data show.

- **Course Coordinators: Dr/ Amr Abdel Raouf**

- **Head of Department: Prof Dr/ Hassan El-Fayoumy**
- **Date: 2012-9-3 تم اعتماده فى مجلس القسم بتاريخ**

Matrix I of Pathophysiology course

Week number	Course Contents	Knowledge and understanding		Intellectual skills	General & Transferable skills
		a1	**a2**	**b1**	**d1**
1	Diabetes-1	X		X	
2	Diabetes-2		X		
3	Hypertension-1	X		X	
4	Hypertension-2		X		
5	Heart failure	X		X	
6	Activity		X		
7	Hepatitis-1	X		X	
8	Hepatitis-2		X		
9	Inflammation-Activity	X	X		X
10	Activity	X		X	
11	Psychosis	X	X	X	
12	Asthma	X	X		
13	Parkinsonism			X	
14	Alzheimer disease	X	X		
15	Revision	X	X	X	X

Matrix II of Pathophysiology

NARS		Program ILOs	Course ILOs	Course content	Source	Teaching and learning methods		Method of Assessment		
						Lectures	Self learning	Written exam	Oral exam	Activity
Knowledge and Understanding	2.1.1- Theories and fundamentals related to the field of learning as well as in related areas.	A.1-Understand all relevant knowledge of pharmacology.	a1	Diabetes 1- Hypertension 1- Hear failure- Hepatitis 1- Inflammation- Activity- Psychosis- Asthma- Alzheimer disease	Scientific papers, text books and Internet	x	x	x	x	
	2.1.3- Scientific developments in the area of specialization.	A.3-Update the information in the field of pharmacology and related subjects.	a2	Diabetes 2- Hypertension 2- Activity- Hepatitis 2- Inflammation- Psychosis- Alzheimer disease	Scientific papers, text books and Internet	x	x	x	x	

Intellectual Skills	2.2.3-Correlate and integrate different pharmaceutical knowledge to solve professional problems.	B.3- Combine information from different sources and disciplines and apply it in innovative ways to solve professional problems.	b1	Diabetes 1- Hypertension 1- Hear failure- Hepatitis 1- Activity- Psychosis- Parkinsonism	Scientific papers, text books and Internet	x	x	x	x	
General & Transferable Skills	2.4.7- Manage time effectively.	D.7-Manage time effectively.	d1	All lectures	Scientific papers, text books and Internet	x	x		x	x

Thesis Specification

Thesis of Master Degree

A- Thesis specifications:

- **Program on which the course is given:** Master of Pharmaceutical sciences (Pharmacology)
- **Major or Minor element of program:** Major
- **Department offering the program:** Pharmacology Dept.
- **Department offering the thesis:** Pharmacology Dept.
- **Date of specification approval:** 2012/2013

1- Basic information:

Title: Master Thesis in Pharmacology
Credit hours: 30 hrs

2- Overall aim of the thesis:

On completion of the thesis, the students will be able to:

- Design a robust study to answer the research question
- Identify and perform different techniques and methods used in the experimental work according to the designed protocol
- Collect all the data needed to answer the research question using the developed study design
- Analyze the results of the study in the light of prior knowledge
- Draw conclusions about the contribution to knowledge made by the study.

3- Intended learning outcome's (ILOs):

Knowledge and Understanding	
a1	Understand all required pharmacological knowledge related to main objectives of the thesis.
a2	Select the point of the thesis according to the problems present in the community.
a3	Update the information in the specified area of the work.
a4	Understand any legal aspects related to the thesis work.
a5	Demonstrate GLP and quality assurance related to practical work of the thesis.
a6	Identify and apply scientific experimental ethics.
Intellectual skills	
b1	Analyze and interpret the experimental data in a suitable form to solve the suggested problem.
b2	Discuss professional problems and suggest solutions relay on different pharmaceutical knowledge and recent information.
b3	Integrate all required knowledge to solve problems that may rise during practical work.
b4	Conduct a research project and write scientific reports.
b5	Manage risks and hazards related to professional practical area.
b6	Design a laboratory protocol for the work.
b7	Make decisions related to recent and future studies.
Professional and practical skills	
c1	Perform practical experiments related to the point understudy.
c2	Report the work in a written report.
c3	Asses used methods, tools and instruments in pharmacological research.
General and Transferable skills	
d1	Communicate effectively with all people related to the work.
d2	Use information technology in review and thesis preparation.
d3	Evaluate the work and learning needs.

d4	Use various sources to get information about the subject understudy.
d5	Set rules for evaluation and judging others performance.
d6	Work effectively as a member of a team.
d7	Acquire time management skills.
d8	Study independently and plan research studies.

4. Thesis Content:

Steps	Content
1st	• Suggest the possible points/ problems of research that the candidate can work on in the frame of the aim of work and choose proper point related to the problems of the community and surrounding environment. • Collect all available information about this subject by all possible means. • Use internet, journals, books and others thesis to get previous and recent information about the subject understudy. • Design the protocol including the steps of work following the suitable timetable. • Increase the awareness of the recent pharmacological techniques that will be used during practical work and determined by the protocol. • Integrate different knowledge including (basic pharmacology, clinical pharmacology, pathophysiology of diseases, biochemical basis, major concepts in anatomy and physiology, biostatistics, chemical analysis…….) to solve suggested problem. • Continuous evaluation to the thesis outcome according to the schedule.
2nd	• Master a wide range of pharmacological techniques either in vivo or in vitro. • Record vital data either by invasive or non invasive

	techniques e.g. blood pressure, ECG…… • Perform basic surgical and anesthetic skills on experimental animals. • Identify pharmacological actions and toxicological profile of active principles. • Induction of some diseases in experimental animals (obesity, diabetes…….) • Separate biological samples and tissues (e.g. blood, plasma, csf, urine, kidney, liver……). • Operate scientific instruments according to instructions. • Evaluate and manage hazards (chemical and biological) throughout the whole practical work. • Organize the experimental work according to the designed protocol (either individual, parallel or sequential experiments) • Apply ethical recommendations during dealing with humans/ experimental animals. • Understand any legal aspects related to the thesis work.
3rd	• Collect raw data from the designed model. • Interpret raw data to get valuable information. • Perform statistical analysis and biological correlation for the results. • Present and describe the results graphically. • Suggest solution to the problem understudy based on this presented data. •
4th	• Communicate with supervisors to discuss results and with patients to collect case history and samples. • Work effectively as a member of a team (e.g.

	Supervisors, various professionals and Technicians). • Present the results periodically in seminars. • Write scientific reports on the obtained results with conclusive significance. • Discuss obtained results in comparison with pervious literatures. • Suggest possible recommendations based on the outcome of the thesis and decide future plans. • Summarize the thesis in an understandable Arabic language for non professionals. • Write references in the required form (Thesis, Paper…….). • Demonstrate the thesis in a final power point presentation. • Continue self-learning throughout the experimental work and writing scientific papers.

5- Teaching and Learning Methods:

- Self learning (Activities, Research….)
- Open discussion

6- References:

- Websites: Pubmed, Sciencedirect, Weilyinterscience

Facilities required for:

1. **For practical work:** RT PCR- Fluorescent microscope- Spectroflorometer- Cryostat- No invasive blood pressure recorder

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- **Head of Department: Prof. Dr. Hassan El-Fayoumy**

Master Thesis (Pharmacology)				
NARS		Program ILOs	Thesis ILOs	Thesis content
Knowledge and Understanding	2.1.1- Theories and fundamentals related to the field of learning as well as in related areas.	A.1-Understand all relevant knowledge of pharmacology.	Understand all required pharmacological knowledge related to main objectives of the thesis.	• Collect all available information about this subject by all possible means.
	2.1.2- Mutual influence between professional practice and its impact on the environment.	A.2-Understand the interrelationships between pharmacology and the society in the field of human health.	Select the point of the thesis according to the problems present in the community.	• Suggest the possible points/ problems of research that the candidate can work on in the frame of the aim of work and choose proper point related to the problems of the community and surrounding environment.
	2.1.3- Scientific developments in the area of specialization.	A.3-Update the information in the field of pharmacology and related subjects.	Update the information in the specified area of the work	• Increase the awareness of the recent pharmacological techniques that will be used during practical work and determined by the protocol.
	2.1.4- Moral and legal principles for professional practice in the area of specialization.	A.4-Act purposefully, legally, respectfully and responsibly in the field of practice.	Understand any legal aspects related to the thesis work.	• Understand any legal aspects related to the thesis work.

	2.1.5- Principles and the basics of quality in professional practice in the area of specialization.	A.5-Know the principles and fundamentals of quality of professional practice in the field of pharmacology.	Demonstrate GLP and quality assurance related to practical work of the thesis	• Record vital data either by invasive or non invasive techniques e.g. blood pressure, ECG…… • Operate scientific instruments according to instructions.
	2.1.6- The fundamentals and ethics of scientific research.	A.6-Recognize social and national responsibility and ethics in scientific research.	Identify and apply scientific experimental ethics.	• Apply ethical recommendations during dealing with humans/ experimental animals.
Intellectual Skills	2.2.1- Analyze and evaluate information in the field of specialization and analogies to solve problems	B.1- Analyze and interpret data obtained from pharmacological study in a specific and suitable form.	Analyze and interpret the experimental data in a suitable form to solve the suggested problem	• Collect raw data from the designed model. • Interpret raw data to get valuable information. • Perform statistical analysis and biological correlation for the results. • Present and describe the results graphically. • Suggest solution to the problem understudy based on this presented data.

	2.2.2- Solve specified problems in the lack or missing of some information.	B.2-Postulate solutions to pharmacological problems in the lack of information.	Discuss professional problems and suggest solutions relay on different pharmaceutical knowledge and recent information	• Discuss obtained results in comparison with pervious literatures. • Suggest possible recommendations based on the outcome of the thesis and decide future plans.
	2.2.3-Correlate and integrate different pharmaceutical knowledge to solve professional problems.	B.3- Combine information from different sources and disciplines and apply it in innovative ways to solve professional problems.	Integrate all required knowledge to solve problems that may rise during practical work	• Integrate different knowledge including (basic pharmacology, clinical pharmacology, pathophysiology of diseases, biochemical basis, major concepts in anatomy and physiology, biostatistics, chemical analysis…….) to solve suggested problem.
	2.2.4- Conduct research and write scientific report on research specified topics.	B.4-Carry out an extended research project involving a literature review, problem specification, research outputs and analysis and write a thesis.	Conduct a research project and write scientific reports	• Write scientific reports on the obtained results with conclusive significance.

	2.2.5- Evaluate and manage risks and potential hazards in professional practices in the area of specialization	B.5-Manage all emergencies and risks properly.	Manage risks and hazards related to professional practical area	Evaluate and manage hazards(chemical and biological) throughout the whole practical work.
	2.2.6- Plan to improve performance in the field of specialization.	B.6-Improve the performance in the field of pharmacology through modifying the process or procedure used.	Design a laboratory protocol for the work	• Design the protocol including the steps of work following the suitable timetable.
	2.2.7- Professional decision-making in the contexts of diverse disciplines.	B.7-Make decisions in complex and unpredictable situations.	Make decisions related to recent and future studies	•Suggest the possible points/ problems of research that the candidate can work on in the frame of the aim of work and choose proper point related to the problems of the community and surrounding environment. Suggest possible recommendations based on the outcome of the thesis and decide future plans.

Professional and Practical Skills	2.3.1- Master basic and modern professional skills in the area of specialization.	C.1-Master a wide range of pharmacological experiments either in vivo or in vitro and other required skills for scientific research.	Perform practical experiments related to the point understudy	• Master a wide range of pharmacological techniques either in vivo or in vitro. • Record vital data either by invasive or non invasive techniques e.g. blood pressure, ECG…… • Perform basic surgical and anesthetic skills on experimental animals. • Identify pharmacological actions and toxicological profile of active principles. • Induction of some diseases in experimental animals (obesity, diabetes…….) • Separate biological samples and tissues (e.g. blood, plasma, csf, urine, kidney, liver……). • Operate scientific instruments according to instructions.

	2.3.2- Write and evaluate professional reports.	C.2-Report the work in a written report.	Report the work in a written report	• Summarize the thesis in an understandable Arabic language for non professionals. • Write references in the required form (Thesis, Paper…….).
	2.3.3- Assess methods and tools existing in the area of specialization.	C.3-Asses used methods, tools and instruments in pharmacological research.	Asses used methods, tools and instruments in pharmacological research.	• Perform basic surgical and anesthetic skills on experimental animals. • Identify pharmacological actions and toxicological profile of active principles. • Induction of some diseases in experimental animals (obesity, diabetes…….) • Separate biological samples and tissues (e.g. blood, plasma, csf, urine, kidney, liver……). • Operate scientific instruments according to instructions.

General and Transferable Skills	2.4.1- Communicate effectively.	D.1- Communicate effectively and present ideas and findings clearly in oral and written forms.	Communicate effectively with all people related to the work	• Communicate with supervisors to discuss results and with patients to collect case history and samples.
	2.4.2- Effectively use information technology in professional practices	D.2-Demonstrate competence in the use of information technology broad enough to meet personal, academic and professional needs.	Use information technology in review and thesis preparation	• Present the results periodically in seminars • Demonstrate the thesis in a final power point presentation.
	2.4.3- Self-assessment and define his personal learning needs.	D.3-Recognize learning needs and how to fulfil them.	Evaluate the work and learning needs	• Continuous evaluation to the thesis outcome according to the schedule.
	2.4.4- Use variable sources to get information and knowledge.	D.4-Get access of pharmacological information from a variety of sources.	Use various sources to get information about the subject understudy	• Use internet, journals, books and others thesis to get previous and recent information about the subject understudy.
	2.4.5- Set criteria and parameters to evaluate the performance of others	D.5-Develop rules and indicators for assessing the performance of others.	Set rules for evaluation and judging others performance.	• Discuss obtained results in comparison with pervious literatures.
	2.4.6- Work in a team and lead teams carrying out various professional tasks.	D.6-Appreciate team working.	Work effectively as a member of a team	• Work effectively as a member of a team (e.g. Supervisors, various professionals and Technicians).

	2.4.7- Manage time effectively.	D.7-Manage time effectively.	Acquire time management skills	· Organize the experimental work according to the designed protocol (either individual, parallel or sequential experiments).
	2.4.8- Continuous and self learning.	D.8-Strive for excellence in life-long learning by planning for the future, participating in continuing education or professional development activities.	Study independently and plan research studies.	• Continue self-learning throughout the experimental work and writing scientific papers.

PhD Degree

Program Specification

Program Specification

A- Basic Information

1- Program title: PhD. Pharm. Sci Degree in **Pharmacology**

2- Program type: Monodisciplinary.

3- Faculty/ University: Faculty of Pharmacy, Zagazig University

4- Department: Biochemistry

5- Coordinator: Prof. Dr. Hassan El-Fayoumy

6- Date of program specification approval: 2012

B- Professional Information

1- Program aims:

The Pharmacology PhD program provides excellent opportunities for students to demonstrate knowledge and understanding qualities and develop skills appropriate for **Pharmacology** PhD of sciences degree.

2-Intended Learning Outcomes (ILOs):

The Program provides excellent opportunities for students to demonstrate knowledge and understanding qualities and develop skills appropriate for **Pharmacology** PhD of sciences degree.

2-1- Knowledge and Understanding :

On successful completion of the PhD degree Program, students will be able to:

A.1-Have great depth and systematic understanding of theoretical concepts and recent advances in the field of pharmacology and related subjects.

A.2-Understand relevant methodologies and techniques and their appropriate application within the field of study.

A.3-Carry out professional duties in accordance with legal and ethical guidelines.

A.4-Understand quality issues and demonstrate responsible working practices.

A.5-Describe the impact of pharmacology and related sciences on human health and the society.

2-2 - Intellectual Skills:

On successful completion of the PhD degree Program, students will be able to:

B.1-Interpret and evaluate the suitability, accuracy, and reliability of information from different sources.

B.2-Select the right methods to solve problems according to available information.

B.3-Contribute to the development of the profession through applied study or research.

B.4-Develop writing skills such as clarity and presenting results to formulate scientific papers.

B.5- Work safely in a laboratory environment and avoid risks.

B.6-Improve the performance in the field of pharmacology through modifying the process or procedure used.

B.7-Make balanced decisions and carry responsibility during the research.

B.8-Be creative, innovative and original in one's approach to research.

B.9-Construct coherent arguments and articulate ideas clearly to a range of audiences, formally and informally through a variety of techniques.

2-3 - Professional and Practical Skills:

It is intended that, on successful completion of the PhD degree Program, students will be able to:

C.1-Master all laboratory procedures and techniques required in the field of study.

C.2-Write and critically evaluate professional reports.

C.3-Evaluate the suitability of methods and instruments used during research.

C.4-Consider developments in technology and how to use to enhance learning.

C.5-Plan to improve professional practice and to improve the performance of other scholars.

2-4 - General and Transferable Skills:

On successful completion of the PhD degree Program, students will be able to:

D.1-Develop verbal and non verbal communication.

D.2-Be competent in the use of computers for data analysis, word-processing, and production of thesis-quality graphics.

D.3-Assist professional colleagues with their learning and professional development.

D.4-Recognize self-limitations and areas for improvement and seek for continuous learning.

D.5-Gather, summarize, and organize information from different sources.

D.6-Share experiences with members of the team and encourage participation.

D.7-Direct scientific meetings and to manage time effectively.

3- Academic Standards:

- NARS (National Academic Reference Standards)

Matrix: Comparison between PhD degree program ILOs and the National Academic Reference Standards

NARS vs. Program ILOs of PhD in Pharmacology		
	NARS	Program ILOs
Knowledge and Understanding	2.1.1- Fundamentals and in-depth knowledge and basic theories in the field of specialty and the closely related areas of pharmaceutical sciences.	A.1-Have great depth and systematic understanding of theoretical concepts and recent advances in the field of pharmacology and related subjects.
	2.1.2- Fundamentals, methods, techniques, tools and ethics of scientific research.	A.2-Understand relevant methodologies and techniques and their appropriate application within the field of study.
	2.1.3- The ethical and legal principles in pharmacy and academic practices.	A.3-Carry out professional duties in accordance with legal and ethical guidelines.
	2.1.4- The principles and bases of quality assurance in professional practice in the field of specialization.	A.4-Understand quality issues and demonstrate responsible working practices.
	2.1.5- All relevant knowledge concerning the impact of professional practice on society and environment and the ways of their conservation and development.	A.5-Describe the impact of pharmacology and related sciences on human health and the society.
Intellectual Skills	2.2.1- Analyze and evaluate the data in his\her specified area and utilize them in logical inference processes (induction/deduction).	B.1-Interpret and evaluate the suitability, accuracy, and reliability of information from different sources.

	2.2.2- Propose solutions to specified problems in the light of the available data (information).	B.2-Select the right methods to solve problems according to available information.
	2.2.3- Conduct research studies that add to the current knowledge.	B.3-Contribute to the development of the profession through applied study or research.
	2.2.4- Formulate scientific papers.	B.4-Develop writing skills such as clarity and presenting results to formulate scientific papers.
	2.2.5- Asses hazards and risks in professional practice in his \ her areas of specialization.	B.5- Work safely in a laboratory environment and avoid risks.
	2.2.6- Plan to improve performance in the pharmaceutical area of interest.	B.6-Improve the performance in the field of pharmacology through modifying the process or procedure used.
	2.2.7- Take Professional decisions and bears responsibility in wide array of pharmaceutical fields.	B.7-Make balanced decisions and carry responsibility during the research.
	2.2.8- Be creative and innovative.	B.8-Be creative, innovative and original in one's approach to research.
	2.2.9- Manage discussions and arguments based on evidence and logic.	B.9-Construct coherent arguments and articulate ideas clearly to a range of audiences, formally and informally through a variety of techniques.
al and Practical	2.3.1- Master basic and modern professional skills in the area of specialization.	C.1-Master all laboratory procedures and techniques required in the field of study.

	2.3.2- Write and critically evaluate professional reports.	C.2-Write and critically evaluate professional reports.
	2.3.3- Evaluate and develop methods and tools existing in the area of specialization.	C.3-Evaluate the suitability of methods and instruments used during research.
	2.3.4- Properly use technological means in a better professional practice.	C.4-Consider developments in technology and how to use to enhance learning.
	2.3.5- Plan to improve professional practice and to improve the performance of other scholars.	C.5-Plan to improve professional practice and to improve the performance of other scholars.
General and Transferable Skills	2.4.1- Effective Communication in its different forms.	D.1-Develop verbal and non verbal communication.
	2.4.2- Effective use of information technologies to improve professional practices.	D.2-Be competent in the use of computers for data analysis, word-processing, and production of thesis-quality graphics.
	2.4.3- Help others to learn and evaluate their performance.	D.3-Assist professional colleagues with their learning and professional development.
	2.4.4- Self-assessment and continuous learning.	D.4-Recognize self-limitations and areas for improvement and seek for continuous learning.
	2.4.5- Use various sources to get information and knowledge.	D.5-Gather, summarize, and organize information from different sources.
	2.4.6- Work as a member and lead a team of workers.	D.6-Share experiences with members of the team and encourage participation.

	2.4.7- Direct scientific meetings and to manage time effectively.	D.7-Direct scientific meetings and to manage time effectively.

4-Curriculum Structure and Contents:

a- Program duration: **3- 5** years

b- Program structure:

- The PhD program can be completed in 3-5 years.
- The Faculty of pharmacy implements the credit hour system.
- The program is structured as:

1- Courses:

No. of credit hours for program courses:

Special: (3x4) 12

2- Thesis: 30 hours

The candidate must complete a research project on an approved topic in the Pharmaceutical Sciences. To fulfill this requirement the student must present (written and orally) a research proposal and write a thesis.

3- General University Requirements: 10 credit hours including:

a- TOEFL (500 units)

b- Computer course

c-Program Curriculum:

Course Code	Course Title	Credit hours	Program ILOs Covered
	Special Courses:		

Lsp4	Advanced trends in pharmacology	4	A1, A2, A5, B1, B6, D3 and D4
Lsp5	Management of chronic diseases	4	A1, A5, B1, B2, D1 and D5
Lsp6	Pharmacology of natural products	4	A1, A5, B6, B8, D2 and D7
	Thesis	30	A1, A2, A3, A4, A5, B1, B2, B3, B4, B5, B6, B7, B8, B9, C1, C2, C3,C4, C5, D1, D2, D3, D4, D5, D6 and D7

5-Program admission requirements:

- Candidate should have obtained the certificate of Master degree in pharmaceutical sciences in the same specialty from one of the Egyptian universities or an equivalent certificate from a foreign institute recognized by the university.

6- Admission Policy:

The faculty complies with the admission regulations and requirements of the Egyptian Supreme Council of Universities (ESCU).

7-Student assessment methods:

Method	ILOS
Written exam	Knowledge and Understanding and Intellectual Skills
Oral exam	Knowledge and Understanding ,Intellectual Skills and General and Transferable Skills
Activity	Intellectual Skills and General and Transferable Skills
Seminars	Knowledge and Understanding ,Intellectual Skills & General and Transferable Skills
Follow up	Professional and practical Skills & General and Transferable Skills
Thesis and oral presentation	Knowledge and Understanding, Intellectual Skills, Professional and practical Skills & General and Transferable Skills

Grade Scale	Grade point average value (GPA)	Numerical scale
A+	5	≥ 95%
A	4.5	90- < 95%
B+	4	85- < 90%
B	3.5	80- < 85%
C+	3	75- < 80%
C	2.5	70- < 75%
D+	2	65- < 70%

D	1.5	60- < 65%

8-Failure in Courses:

Students who fail to get 60% (1 point)

9-Methods of program evaluation

Evaluator	Method	Sample
Internal evaluator: Professor Dr. Hassan El-Fayoumy	Program evaluation Courses evaluation	Program report Courses report
External evaluator: Professor Dr.	Program evaluation Courses evaluation	Program report Courses report
Others methods	Matrix with NARS Questionnaires	The Matrix Results of the questionnaires

Program coordinator **Head of Department**

Prof. Dr. Mohamed Nageb Zakaria **Prof. Dr. Hassan El-Fayoumy**

Management of Chronic Diseases

Course specification of Management of Chronic Diseases

A- Course specifications:

- Program on which the course is given: PhD in Pharmaceutical Sciences
- Major or Minor element of program: Major
- Department offering the program: Pharmacology Dept.
- Department offering the course: Pharmacology Dept.
- Date of specification approval: 2012/2013

1- Basic information:

Title: **Management of Chronic Diseases** Code: Lsp4
Lectures: 4 hrs/week Credit hours: 4 hrs/week
Total: 4hrs/week

2- Overall aim of the course:

On completion of the course, the students will be able to discuss in detail chronic diseases and manage chronic diseases by all possible means.

3. Intended learning outcome s (ILOs) of Management of Chronic Diseases:

Knowledge and Understanding	
a1	Describe in detail the principles of chronic diseases and related topics.
a2	Mention the influence of chronic diseases on the health of individuals in society and ways of their management
Intellectual skills	
b1	Analyze and evaluate data regarding symptoms and signs of chronic diseases in order to identify different diseases.
b2	Select proper methods of management of chronic diseases according to available information about the disease.
General and Transferable skills	
d1	Develop verbal and non verbal communication.
d2	Gather, summarize, and organize information from different sources.

4. Course Content of Management of Chronic Diseases:

Week number	Lecture contents (4hrs/week)
1	Metabolic diseases-1
2	Metabolic diseases-2
3	Cardiovascular system disorders-1
4	Cardiovascular system disorders-2
5	Cardiovascular system disorders-3
6	Cardiovascular system disorders-4
7	Chronic obstructive pulmonary diseases
8	Immune deficiency disorders
9	Liver diseases-1 Activity
10	Liver diseases-2
11	Neurodegenerative diseases-1
12	Neurodegenerative diseases-2
13	Neurodegenerative diseases-3
14	Psychiatric disorders-1
15	Psychiatric disorders-1

5- Teaching and Learning Methods:

- Lectures
- Self learning
- noissucsid nepO

6- Student Assessment methods:

- Written exam to assess: a1, a2, b1 and b2.
- Oral exam to assess: a1, a2, b1, b2, d1 and d2.
- Activity to assess: d1 and d2

Assessment schedule:

Assessment (1): Activity	Week 9
Assessment (2): Written exam	Week 16
Assessment (3): oral exam	Week 16

Weighting of Assessment:

Assessment method	Marks	Percentage
• Activity	10	10 %
• Written exam	75	75 %
• oral exam	15	15 %
TOTAL	**100**	**100%**

7- References and books:

A-Scientific papers
B- Essential books:
-Goodman and Gilman's: The pharmacological basics of therapeutics. Brunton L and Lazo J (eds.).
-Basic & Clinical Pharmacology. Katzung B, Masters S and Trevor A (eds.).
-Textbook of therapeutics: Drug and disease management. Helms R, Quan D, Herfindal E and Gourley D (eds.).

Facilities required for teaching and learning:

1. **For lectures:** Black (white) boards, computer, data show.

- **Course Coordinators: Prof. Dr.**
- **Head of Department: Prof Dr/ Hassan El-Fayoumy**
- **Date: 2012-9-3 تم اعتماده فى مجلس القسم بتاريخ**

Matrix I of Management of Chronic Diseases course

Week number	Course Contents	Knowledge and understanding		Intellectual skills		General & Transferable skills	
		a1	**a2**	**b1**	**b2**	**d1**	**d2**
1	Metabolic diseases-1	x		X			
2	Metabolic diseases-2		X		x		
3	Cardiovascular system disorders-1	x		X			
4	Cardiovascular system disorders-2	x		X			
5	Cardiovascular system disorders-3		X		x		
6	Cardiovascular system disorders-4		X		x		
7	Chronic obstructive pulmonary diseases	x		X	x		
8	Immune deficiency disorders	x		X			
9	Liver diseases-1 Activity	x	X			X	X
10	Liver diseases-2			X	x		
11	Neurodegenerative diseases-1	x	x				
12	Neurodegenerative diseases-2	x	x				
13	Neurodegenerative diseases-3			X	x		
14	Psychiatric disorders-1	x		X			
15	Psychiatric disorders-1		x		x		

Matrix II of Management of Chronic Diseases

NARS		Program ILOs	Course ILOs	Course content	Source	Teaching and learning methods		Method of Assessment		
						Lectures	Self learning	Written exam	Oral exam	Activity
Knowledge and Understanding	2.1.1- Fundamentals and in-depth knowledge and basic theories in the field of specialty and the closely related areas of pharmaceutical sciences.	A.1-Have great depth and systematic understanding of theoretical concepts and recent advances in the field of pharmacology and related subjects.	a1	Metabolic diseases-1- Cardiovascular system disorders-1- Cardiovascular system disorders-2- Chronic obstructive pulmonary diseases- Immune deficiency disorders- Liver diseases-1- Neurodegenerative diseases-1- Neurodegenerative diseases-2- Psychiatric disorders-1	Scientific papers, text books and Internet	x	x	x	x	

	2.1.5- All relevant knowledge concerning the impact of professional practice on society and environment and the ways of their conservation and development.	A.5-Describe the impact of pharmacology and related sciences on human health and the society.	a2	Metabolic diseases-2- Cardiovascular system disorders-3- Cardiovascular system disorders-4- Liver diseases-1- Neurodegenerative diseases-1- Neurodegenerative diseases-2- Psychiatric disorders-1	Scientific papers, text books and Internet	x	x	x	x	
Intellectual Skills	2.2.1- Analyze and evaluate the data in his\her specified area and utilize them in logical inference processes (induction/deduction).	B.1-Interpret and evaluate the suitability, accuracy, and reliability of information from different sources.	b1	Metabolic diseases-1- Cardiovascular system disorders-1- Cardiovascular system disorders-2- Chronic obstructive pulmonary diseases- Immune deficiency disorders- Liver diseases-2- Neurodegenerative diseases-3- Psychiatric disorders-1	Scientific papers, text books and Internet	x	x	x	x	
	2.2.2- Propose solutions to specified problems in the light of the available data (information).	B.2-Select the right methods to solve problems according to available information.	b2	Metabolic diseases-2- Cardiovascular system disorders-3- Cardiovascular system disorders-4- Chronic obstructive pulmonary diseases- Liver diseases-2- Neurodegenerative diseases-3- Psychiatric disorders-1	Scientific papers, text books and Internet	x	x	x	x	

General & Transferable Skills	2.4.1- Effective Communication in its different forms.	D.1-Develop verbal and non verbal communication.	d1	Activity	Scientific papers, text books and Internet	x	x		x	x
	2.4.5- Use various sources to get information and knowledge.	D.5-Gather, summarize, and organize information from different sources.	d2	Activity	Scientific papers, text books and Internet	x	x		x	x

Pharmacology of Natural Products

Course specification of Pharmacology of Natural Products

A- Course specifications:

- Program on which the course is given: PhD in Pharmaceutical Sciences
- Major or Minor element of program: Major
- Department offering the program: Pharmacology Dept.
- Department offering the course: Pharmacology Dept.
- Date of specification approval: 2012/2013

1- Basic information:

Title: **Pharmacology of Natural Products** Code: Lsp5
Lectures: 4 hrs/week Credit hours: 4 hrs/week
Total: 4hrs/week

2- Overall aim of the course:

On completion of the course, the students will be able to understand the importance of herbs and natural products and their ability to treat different diseases.

3. Intended learning outcome s (ILOs) of Pharmacology of Natural Products:

Knowledge and Understanding	
a1	Illustrate principles of pharmacology of natural products.
a2	Demonstrate the mechanism of action of different types of natural products.
Intellectual skills	
b1	Develop ways to improve the performance and human health.
b2	Be productive and creative.
General and Transferable skills	
d1	Be competent in the use of computers for data analysis, word-processing, and production of thesis-quality graphics.
d2	Direct scientific meetings and to manage time effectively.

4. Course Content of Pharmacology of Natural Products:

Week number	Lecture contents (4hrs/week)
1	Anti-diabetic natural products-1
2	Anti-diabetic natural products-2
3	Anti-hypertensive natural products-1
4	Anti-hypertensive natural products-2
5	Anti-inflammatory natural products-1
6	Anti-inflammatory natural products-2
7	Anti-cancer natural products-1
8	Anti-cancer natural products-2
9	Anti-depressants natural products-1 Activity
10	Anti-depressants natural products-2
11	Analgesic natural products-1
12	Analgesic natural products-2
13	Diuretic natural products
14	Cardiotonic natural products
15	Hepato-protective natural products

5- Teaching and Learning Methods:

- Lectures
- Self learning
- noissucsid nepO

6- Student Assessment methods:

- Written exam to assess: a1, a2, b1 and b2.
- Oral exam to assess: a1, a2, b1,b2, d1 and d2.
- Activity to assess: d1and d2

Assessment schedule:

Assessment (1): Activity	Week 9
Assessment (2): Written exam	Week 16
Assessment (3): oral exam	Week 16

Weighting of Assessment:

Assessment method	Marks	Percentage
• Activity	10	10 %
• Written exam	75	75 %
• oral exam	15	15 %
TOTAL	**100**	**100%**

7- References and books:

A-Scientific papers
B- Essential books:
Comprehensive natural products II, David J. Newman, Gordon M. Cragg, volume 2, 2010

Facilities required for teaching and learning:

1. **For lectures:** Black (white) boards, computer, data show.

- **Course Coordinators: Dr/ Mona Foaud**
- **Head of Department: Prof Dr/ Hassan El-Fayoumy**
- **Date: 2012-9-3 تم اعتماده فى مجلس القسم بتاريخ**

Matrix I of Pharmacology of Natural Products course

Week number	Course Contents	Knowledge and understanding		Intellectual skills		General & Transferable skills	
		a1	**a2**	**b1**	**b2**	**d1**	**d2**
1	Anti-diabetic natural products-1	X	x				
2	Anti-diabetic natural products-2	X	x				
3	Anti-hypertensive natural products-1	X					
4	Anti-hypertensive natural products-2	X					
5	Anti-inflammatory natural products-1	X	x				
6	Anti-inflammatory natural products-2	X		x			
7	Anti-cancer natural products-1	X					
8	Anti-cancer natural products-2	X					
9	Anti-depressants natural products-1- Activity	X		x		x	X
10	Anti-depressants natural products-2		x	x			
11	Analgesic natural products-1				X		
12	Analgesic natural products-2				X		
13	Diuretic natural products	X					
14	Cardiotonic natural products	X					
15	Hepato-protective natural products	X		x			

Matrix II of Pharmacology of Natural Products

NARS		Program ILOs	Course ILOs	Course content	Source	Teaching and learning methods		Method of Assessment		
						Lectures	Self learning	Written exam	Oral exam	Activity
Knowledge and Understanding	2.1.1- Fundamentals and in-depth knowledge and basic theories in the field of specialty and the closely related areas of pharmaceutical sciences.	A.1-Have great depth and systematic understanding of theoretical concepts and recent advances in the field of pharmacology and related subjects.	a1	Anti- diabetic natural products- Anti-hypertensive natural products- Anti-inflammatory natural products- Anti- cancer natural products- Anti- depressant natural products- Diuretic natural products- cardio tonic natural products- Hepatoprotective natural products	Scientific papers, text books and Internet	X	x	X	x	

	2.1.5- All relevant knowledge concerning the impact of professional practice on society and environment and the ways of their conservation and development.	A.5-Describe the impact of pharmacology and related sciences on human health and the society.	a2	Anti- diabetic natural products- Anti-inflammatory natural products 1- Anti-depressant natural products 2	Scientific papers, text books and Internet	X	x	X	x	
Intellectual Skills	2.2.6- Plan to improve performance in the pharmaceutical area of interest.	B.6-Improve the performance in the field of pharmacology through modifying the process or procedure used.	b1	Anti-inflammatory natural products 2- Anti-depressant natural products- Hepatoprotective natural products	Scientific papers, text books and Internet	X	x	X	x	
	2.2.8- Be creative and innovative.	B.8-Be creative, innovative and original in one's approach to research.	b2	Analgesic natural products	Scientific papers, text books and Internet	X	x	X	x	
Transferable	2.4.2- Effective use of information technologies to improve professional practices.	D.2-Be competent in the use of computers for data analysis, word-processing, and production of thesis-quality graphics.	d1	Activity	Scientific papers, text books and Internet	X	x		x	x

	2.4.7- Direct scientific meetings and to manage time effectively.	D.7-Direct scientific meetings and to manage time effectively.	d2	Activity	Scientific papers, text books and Internet	X	x		x	x

Advanced Trends in Pharmacology

Course specification of Advanced Trends in Pharmacology

A- Course specifications:

- Program on which the course is given: PhD in Pharmaceutical Sciences
- Major or Minor element of program: Major
- Department offering the program: Pharmacology Dept.
- Department offering the course: Pharmacology Dept.
- Date of specification approval: 2012/2013

1- Basic information:

Title: **Advanced Trends in Pharmacology** Code: Lsp6
Lectures: 4 hrs/week Credit hours: 4 hrs/week
Total: 4hrs/week

2- Overall aim of the course:

On completion of the course, the students will be able to mention the application of advanced techniques and trends in pharmacology, obtain and evaluate information from different sources related to pharmacology and demonstrate suitable experience to establish and/or modify some of the procedures used in pharmacology.

3. Intended learning outcome s (ILOs) of Advanced Trends in Pharmacology:

Knowledge and Understanding	
a1	Describe recent trends in pharmacology.
a2	Mention the application of advanced techniques and trends in pharmacology.
a3	Discuss the impact of pharmacology on human health and the society.
Intellectual skills	
b1	Obtain and evaluate information from different sources related to pharmacology.
b2	Acquire suitable experience to establish and/or modify some of the procedures used in pharmacology.
General and Transferable skills	
d1	Assist professional colleagues with their learning and professional development.
d2	Recognize self-limitations and areas for improvement and seek for continuous learning.

4. Course Content of Advanced Trends in Pharmacology:

Week number	Lecture contents (4hrs/week)
1	Molecular Pharmacology-1
2	Molecular Pharmacology-2
3	Molecular Pharmacology-3
4	Molecular Pharmacology-4
5	Molecular Pharmacology-5
6	Genetic Pharmacology-1
7	Genetic Pharmacology-2
8	Genetic Pharmacology-3
9	Genetic Pharmacology-4

	Activity
10	Genetic Pharmacology-5
11	Stem cells-1
12	Stem cells-2
13	Stem cells-3
14	Stem cells-4
15	Stem cells-5

5- Teaching and Learning Methods:

- Lectures
- Self learning
- noissucsid nepO

6- Student Assessment methods:

- Written exam to assess: a1, a2, a3, b1 and b2.
- Oral exam to assess: a1, a2, a3, b1, b2, d1 and d2.
- Activity to assess: d1 and d2

Assessment schedule:

Assessment (1): Activity	Week 9
Assessment (2): Written exam	Week 16
Assessment (3): oral exam	Week 16

Weighting of Assessment:

Assessment method	Marks	Percentage
• Activity	10	10 %
• Written exam	75	75 %
• oral exam	15	15 %
TOTAL	**100**	**100%**

7- References and books:

A-Scientific papers

B- Essential books:

Manual of pharmacology and therapeutics: Goodman & Gilman's, 2008, McGraw-Hill.

Facilities required for teaching and learning:

1. **For lectures:** Black (white) boards, computer, data show.

- **Course Coordinators: Prof. Dr/ Hassan El-Fayoumy**
- **Head of Department: Prof Dr/ Hassan El-Fayoumy**
- **Date: 2012-9-3 تم اعتماده فى مجلس القسم بتاريخ**

Matrix I of Advanced Trends in Pharmacology course

Week number	Course Contents	Knowledge and understanding			Intellectual skills		General & Transferable skills	
		a1	a2	a3	b1	b2	d1	d2
1	Molecular Pharmacology-1	x						
2	Molecular Pharmacology-2		x					
3	Molecular Pharmacology-3			x				
4	Molecular Pharmacology-4				x			
5	Molecular Pharmacology-5					x		
6	Genetic Pharmacology-1	x						
7	Genetic Pharmacology-2		x					
8	Genetic Pharmacology-3			x				
9	Genetic Pharmacology-4-Activity				x		x	X
10	Genetic Pharmacology-5					x		
11	Stem cells-1	x						
12	Stem cells-2		x					
13	Stem cells-3			X				
14	Stem cells-4				x			
15	Stem cells-5					x		

Matrix II of Advanced Trends in Pharmacology

NARS		Program ILOs	Course ILOs	Course content	Source	Teaching and learning methods		Method of Assessment		
						Lectures	Self learning	Written exam	Oral exam	Activity
Knowledge and Understanding	2.1.1- Fundamentals and in-depth knowledge and basic theories in the field of specialty and the closely related areas of pharmaceutical sciences.	A.1-Have great depth and systematic understanding of theoretical concepts and recent advances in the field of pharmacology and related subjects.	a1	Molecular Pharmacology 1- Genetic Pharmacology 1- Stem Cells 1	Scientific papers, text books and Internet	X	x	x	x	
	2.1.2- Fundamentals, methods, techniques, tools and ethics of scientific research.	A.2-Understand relevant methodologies and techniques and their appropriate application within the field of study.	a2	Molecular Pharmacology 2- Genetic Pharmacology 2- Stem Cells 2	Scientific papers, text books and Internet	X	x	x	x	

	2.1.5- All relevant knowledge concerning the impact of professional practice on society and environment and the ways of their conservation and development.	A.5-Describe the impact of pharmacology and related sciences on human health and the society.	a3	Molecular Pharmacology 3- Genetic Pharmacology 3- Stem Cells 3	Scientific papers, text books and Internet	X	x	x	x	
Intellectual Skills	2.2.1- Analyze and evaluate the data in his\her specified area and utilize them in logical inference processes (induction/deduction).	B.1-Interpret and evaluate the suitability, accuracy, and reliability of information from different sources.	b1	Molecular Pharmacology 4- Genetic Pharmacology 4- Stem Cells 4	Scientific papers, text books and Internet	X	x	x	x	
	2.2.6- Plan to improve performance in the pharmaceutical area of interest.	B.6-Improve the performance in the field of pharmacology through modifying the process or procedure used.	b2	Molecular Pharmacology 5- Genetic Pharmacology 5- Stem Cells 5	Scientific papers, text books and Internet	X	x	x	x	

General and Transferable Skills	2.4.3- Help others to learn and evaluate their performance.	D.3-Assist professional colleagues with their learning and professional development.	d1	Activity	Scientific papers, text books and Internet	X	x		x	x
	2.4.4- Self-assessment and continuous learning.	D.4-Recognize self-limitations and areas for improvement and seek for continuous learning.	d2	Activity	Scientific papers, text books and Internet	X	x		x	x

Thesis Specification

Thesis Specification of PhD Degree

A- Course specifications:

- **Program on which the course is given:** PhD of Pharmaceutical sciences (Pharmacology)
- **Major or Minor element of program:** Major
- **Department offering the program:** Pharmacology Dept.
- **Department offering the thesis:** Pharmacology Dept.
- **Date of specification approval:** 2012/2013

1- Basic information:

Title: PhD Thesis in Pharmacology
Credit hours: 30 hrs

2- Overall aim of the thesis:

On completion of the thesis, the students will be able to:

- Outline the possible protocol for solving harsh problem that the candidate can work after integrating suitable knowledge about this point of research
- Identify and perform different techniques and methods used in the experimental work according to the designed protocol
- Derive and present the results of the study from the data collected
- Analyze the results of the study in the light of prior knowledge
- Draw conclusions about the contribution to knowledge made by the study which may be concerned with the problem under investigation, the methods deployed or the student as researcher

3- Intended learning outcome's (ILOs):

Knowledge and Understanding	
a1	Illustrate fundamentals and advanced knowledge in the field of pharmacology that help to better understand the subject understudy.
a2	Determine methods, tools and techniques used during work.
a3	Carry out professional duties in accordance with legal and ethical guidelines.
a4	Define and apply quality bases during practical work.
a5	Describe the purpose of the research work and its impact on the community and human health.
Intellectual skills	
b1	Interpret and evaluate the suitability, accuracy, and reliability of information obtained from the thesis.
b2	Propose a solution to the point understudy depending on available data.
b3	Carry out the research to add to the area of study.
b4	Develop writing skills such as clarity and presenting results to formulate scientific papers.
b5	Manage risks and hazards related to professional practical area.
b6	Improve the performance during the practical work.
b7	Make decisions related to recent and future studies.
b8	Be creative, innovative and original in one's approach to research.
b9	Construct coherent arguments and articulate ideas clearly to a range of audiences, formally and informally through a variety of techniques.
Professional and practical skills	
c1	Perform practical experiments related to the point understudy.
c2	Report the work in a written report.
c3	Asses used methods, tools and instruments in pharmacological research.

c4	Consider developments in technology and how to use to enhance learning.
c5	Improve the performance during the practical work.
General and Transferable skills	
d1	Communicate effectively in different forms.
d2	Be competent in the use of computers for data analysis, word-processing, and production of thesis-quality graphics.
d3	Evaluate the performance of others and assist them to develop.
d4	Recognize self-limitations and areas for improvement and seek for continuous learning.
d5	Gather, summarize, and organize information from different sources.
d6	Implement tasks as a member of a team.
d7	Utilize time effectively to achieve goals.

4. Thesis Content:

Steps	Content
1st	• Suggest the possible points/ problems of research that the candidate can work on in the frame of the aim of work and choose proper point related to the problems of the community and surrounding environment. • Collect all available information about this subject by all possible means. • Use internet, journals, books and others thesis to get previous and recent information about the subject understudy. • Design the protocol including the steps of work following the suitable timetable. • Increase the awareness of the recent pharmacological

	techniques that will be used during practical work and determined by the protocol. • Integrate different knowledge including (basic pharmacology, clinical pharmacology, pathophysiology of diseases, biochemical basis, major concepts in anatomy and physiology, biostatistics, chemical analysis…….) to solve suggested problem. • Continuous evaluation to the thesis outcome according to the schedule.
2nd	• Master a wide range of pharmacological techniques either in vivo or in vitro. • Record vital data either by invasive or non invasive techniques e.g. blood pressure, ECG…… • Perform basic surgical and anesthetic skills on experimental animals. • Identify pharmacological actions and toxicological profile of active principles. • Induction of some diseases in experimental animals (obesity, diabetes…….) • Separate biological samples and tissues (e.g. blood, plasma, csf, urine, kidney, liver……). • Operate scientific instruments according to instructions. • Evaluate and manage hazards (chemical and biological) throughout the whole practical work. • Organize the experimental work according to the designed protocol (either individual, parallel or sequential

	experiments) • Modify methods and experiments used during practical work. • Apply ethical recommendations during dealing with humans/ experimental animals. • Understand any legal aspects related to the thesis work.
3rd	• Collect raw data from the designed model. • Interpret raw data to get valuable information. • Perform statistical analysis and biological correlation for the results. • Present and describe the results graphically. • Suggest solution to the problem understudy based on this presented data.
4th	• Communicate with supervisors to discuss results and with patients to collect case history and samples. • Work effectively as a member of a team (e.g. Supervisors, various professionals and Technicians). • Present the results periodically in seminars. • Write scientific reports on the obtained results with conclusive significance. • Discuss obtained results in comparison with pervious literatures. • Suggest possible recommendations based on the outcome of the thesis and decide future plans.

	• Summarize the thesis in an understandable Arabic language for non professionals. • Write references in the required form (Thesis, Paper…….). • Demonstrate the thesis in a final power point presentation. • Continue self-learning throughout the experimental work and writing scientific papers.

5- Teaching and Learning Methods:

- Self learning (Activities, Research….)
- Open discussion

6- References:

- Websites: Pubmed, Sciencedirect, Weilyinterscience

Facilities required for:

1. **For practical work:** RT PCR- Fluorescent microscope- Spectroflorometer- Cryostat- No invasive blood pressure recorder

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- **Head of Department: Prof. Dr. Hassan El-Fayoumy**

PhD Thesis (Pharmacology)				
NARS		Program ILOs	Thesis ILOs	Thesis content
Knowledge and Understanding	2.1.1- Fundamentals and in-depth knowledge and basic theories in the field of specialty and the closely related areas of pharmaceutical sciences.	A.1-Have great depth and systematic understanding of theoretical concepts and recent advances in the field of pharmacology and related subjects.	Illustrate fundamentals and advanced knowledge in the field of pharmacology that help to better understand the subject understudy.	• Collect all available information about this subject by all possible means.
	2.1.2- Fundamentals, methods, techniques, tools and ethics of scientific research.	A.2-Understand relevant methodologies and techniques and their appropriate application within the field of study.	Determine methods, tools and techniques used during work.	• Increase the awareness of the recent pharmacological techniques that will be used during practical work and determined by the protocol.
	2.1.3- The ethical and legal principles in pharmacy and academic practices.	A.3-Carry out professional duties in accordance with legal and ethical guidelines.	Carry out professional duties in accordance with legal and ethical guidelines.	• Apply ethical recommendations during dealing with humans/ experimental animals. • Understand any legal aspects related to the thesis work.

	2.1.4- The principles and bases of quality assurance in professional practice in the field of specialization.	A.4-Understand quality issues and demonstrate responsible working practices.	Define and apply quality bases during practical work.	• Record vital data either by invasive or non invasive techniques e.g. blood pressure, ECG…… • Operate scientific instruments according to instructions.
	2.1.5- All relevant knowledge concerning the impact of professional practice on society and environment and the ways of their conservation and development.	A.5-Describe the impact of pharmacology and related sciences on human health and the society.	Describe the purpose of the research work and its impact on the community and human health.	• Suggest the possible points/ problems of research that the candidate can work on in the frame of the aim of work and choose proper point related to the problems of the community and surrounding environment.
Intellectual Skills	2.2.1- Analyze and evaluate the data in his\her specified area and utilize them in logical inference processes (induction/deduction).	B.1-Interpret and evaluate the suitability, accuracy, and reliability of information from different sources.	Interpret and evaluate the suitability, accuracy, and reliability of information obtained from the thesis.	• Collect raw data from the designed model. • Interpret raw data to get valuable information. • Perform statistical analysis and biological correlation for the results. • Present and describe the results graphically. • Suggest solution to the problem understudy based on this presented data.

	2.2.2- Propose solutions to specified problems in the light of the available data (information).	B.2-Select the right methods to solve problems according to available information.	Propose a solution to the point understudy depending on available data.	• Integrate different knowledge including (basic pharmacology, clinical pharmacology, pathophysiology of diseases, biochemical basis, major concepts in anatomy and physiology, biostatistics, chemical analysis…….) to solve suggested problem. • Suggest solution to the problem understudy based on this presented data.
	2.2.3- Conduct research studies that add to the current knowledge.	B.3-Contribute to the development of the profession through applied study or research.	Carry out the research to add to the area of study.	• Suggest the possible points/ problems of research that the candidate can work on in the frame of the aim of work and choose proper point related to the problems of the community and surrounding environment. • Design the protocol including the steps of work following the suitable timetable.

	2.2.4- Formulate scientific papers.	B.4-Develop writing skills such as clarity and presenting results to formulate scientific papers.	Develop writing skills such as clarity and presenting results to formulate scientific papers.	• Write scientific reports on the obtained results with conclusive significance.
	2.2.5- Asses hazards and risks in professional practice in his \ her areas of specialization.	B.5- Work safely in a laboratory environment and avoid risks.	Manage risks and hazards related to professional practical area	• Evaluate and manage hazards (chemical and biological) throughout the whole practical work.
	2.2.6- Plan to improve performance in the pharmaceutical area of interest.	B.6-Improve the performance in the field of pharmacology through modifying the process or procedure used.	Improve the performance during the practical work.	· Modify methods and experiments used during practical work.

	2.2.7- Take Professional decisions and bears responsibility in wide array of pharmaceutical fields.	B.7-Make balanced decisions and carry responsibility during the research.	Make decisions related to recent and future studies.	•Suggest the possible points/ problems of research that the candidate can work on in the frame of the aim of work and choose proper point related to the problems of the community and surrounding environment. • Suggest possible recommendations based on the outcome of the thesis and decide future plans.
	2.2.8- Be creative and innovative.	B.8-Be creative, innovative and original in one's approach to research.	Be creative, innovative and original in one's approach to research.	• Modify methods and experiments used during practical work.
	2.2.9- Manage discussions and arguments based on evidence and logic.	B.9-Construct coherent arguments and articulate ideas clearly to a range of audiences, formally and informally through a variety of techniques.	Construct coherent arguments and articulate ideas clearly to a range of audiences, formally and informally through a variety of techniques.	• Communicate with supervisors to discuss results and with patients to collect case history and samples. • Present the results periodically in seminars.

Professional and Practical Skills	2.3.1- Master basic and modern professional skills in the area of specialization.	C.1-Master all laboratory procedures and techniques required in the field of study.	Perform practical experiments related to the point understudy.	• Master a wide range of pharmacological techniques either in vivo or in vitro. • Record vital data either by invasive or non invasive techniques e.g. blood pressure, ECG…… • Perform basic surgical and anesthetic skills on experimental animals. • Identify pharmacological actions and toxicological profile of active principles. • Induction of some diseases in experimental animals (obesity, diabetes…….) • Separate biological samples and tissues (e.g. blood, plasma, csf, urine, kidney, liver……). • Operate scientific instruments according to instructions.

	2.3.2- Write and critically evaluate professional reports.	C.2-Write and critically evaluate professional reports.	Report the work in a written report.	• Write scientific reports on the obtained results with conclusive significance. • Summarize the thesis in an understandable Arabic language for non professionals. • Write references in the required form (Thesis, Paper…….).
	2.3.3- Evaluate and develop methods and tools existing in the area of specialization.	C.3-Evaluate the suitability of methods and instruments used during research.	Asses used methods, tools and instruments in pharmacological research.	• Perform basic surgical and anesthetic skills on experimental animals. • Identify pharmacological actions and toxicological profile of active principles. • Induction of some diseases in experimental animals (obesity, diabetes…….) • Separate biological samples and tissues (e.g. blood, plasma, csf, urine, kidney, liver……). • Operate scientific instruments according to instructions.

	2.3.4- Properly use technological means in a better professional practice.	C.4-Consider developments in technology and how to use to enhance learning.	Consider developments in technology and how to use to enhance learning.	• Collect all available information about this subject by all possible means. • Present the results periodically in seminars • Demonstrate the thesis in a final power point presentation.
	2.3.5- Plan to improve professional practice and to improve the performance of other scholars.	C.5-Plan to improve professional practice and to improve the performance of other scholars.	Improve the performance during the practical work.	• Modify methods and experiments used during practical work.
General and Transferable Skills	2.4.1- Effective Communication in its different forms.	D.1-Develop verbal and non verbal communication.	Communicate effectively in different forms.	• Communicate with supervisors to discuss results and with patients to collect case history and samples.
	2.4.2- Effective use of information technologies to improve professional practices.	D.2-Be competent in the use of computers for data analysis, word-processing, and production of thesis-quality graphics.	Be competent in the use of computers for data analysis, word-processing, and production of thesis-quality graphics.	• Interpret raw data to get valuable information. • Perform statistical analysis and biological correlation for the results. • Present and describe the results graphically. • Demonstrate the thesis in a final power point presentation.

	2.4.3- Help others to learn and evaluate their performance.	D.3-Assist professional colleagues with their learning and professional development.	Evaluate the performance of others and assist them to develop.	• Discuss obtained results in comparison with pervious literatures.
	2.4.4- Self-assessment and continuous learning.	D.4-Recognize self-limitations and areas for improvement and seek for continuous learning.	Recognize self-limitations and areas for improvement and seek for continuous learning.	• Continuous evaluation to the thesis outcome according to the schedule. • Continue self-learning throughout the experimental work and writing scientific papers.
	2.4.5- Use various sources to get information and knowledge.	D.5-Gather, summarize, and organize information from different sources.	Gather, summarize, and organize information from different sources.	• Use internet, journals, books and others thesis to get previous and recent information about the subject understudy.
	2.4.6- Work as a member and lead a team of workers.	D.6-Share experiences with members of the team and encourage participation.	Implement tasks as a member of a team.	• Work effectively as a member of a team (e.g. Supervisors, various professionals and Technicians).
	2.4.7- Direct scientific meetings and to manage time effectively.	D.7-Direct scientific meetings and to manage time effectively.	Utilize time effectively to achieve goals.	• Organize the experimental work according to the designed protocol (either individual, parallel or sequential experiments).