Zagazig University

Faculty of Pharmacy

Pharmaceutics 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 **Pharmaceutics**

2- Program type: Monodisciplinary.

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

4- Department: Pharmaceutics

5- Coordinator: Prof. Dr. Hanaa El-Ghamry

6- Date of program specification approval: 2012

B- Professional Information

1- Program aims:

The Pharmaceutics master's program aims to provide the post graduate master students with advanced and up to date knowledge in the field of pharmaceutics and related subjects, enable students to gain required practical skills for conducting research and qualify the students for PhD degree.

2-Intended Learning Outcomes (ILOs):

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

2-1- Knowledge and Understanding :

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

A.1- Understand the basics and principles of pharmaceutics and different related subjects.

A.2- Identify the impact of pharmaceutics and industrial pharmacy on the environment.

A.3- Illustrate the continuous development in pharmaceutics and applications of pharmaceutical industries in different fields.

A.4- Understand the legal aspects for professional practices.

A.5- Identify the basics of good laboratory practice and quality assurance in the wide field of pharmaceutics.

A.6- Define ethics and relevant law of scientific research and professional work.

2-2 - Intellectual Skills:

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

B.1- Analyze and evaluate the information gained in the field of pharmaceutics to solve problems.

B.2- Suggest proper and logic solutions to the research problems using the available information.

B.3- Plan to solve possible problems based on the integration of required pharmaceutical knowledge.

B.4- Conduct research and write reports and papers on the obtained data.

B.5-Deal effectively with risks and hazards during professional practice.

B.6- Evaluate the studied topic and plan to improve the performance.

B.7- Take professional decisions in the area of specialization.

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-Acquire and apply different basic and modern skills in formulation, improving properties and bioavailability of different dosage forms.

C.2- Write and evaluate research projects and reports in the field of pharmaceutics.

C.3- Evaluate and improve methods and tools and use advanced technology in the practical work.

2-4 - General and Transferable Skills:

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

D.1- Communicate effectively with professors, colleagues and technicians.

D.2- Acquire computer skills in analyzing results and presenting them.

D.3-Self assessment and plan to cover the needs.

D.4-Practice how to retrieve information from a variety of sources including libraries, databases and internet.

D.5- Evaluate performance of others and help them to develop the performance.

D.6- Work effectively as a member of team.

D.7- Get maximum use of time to achieve goals.

D.8- Continuous learning to improve the career.

3- Academic Standards:

- NARS (National Academic Reference Standards)

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

	NARS	Program ILOs
2.1	2.1.1- Theories and fundamentals related to the field of learning as well as in related areas.	A.1- Understand the basics and principles of pharmaceutics and different related subjects.

	2.1.2- Mutual influence between professional practice and its impact on the environment.	A.2- Identify the impact of pharmaceutics and industrial pharmacy on the environment.
	2.1.3- Scientific developments in the area of specialization.	A.3-Illustrate the continuous development in pharmaceutics and applications of pharmaceutical industries in different fields.
	2.1.4- Moral and legal principles for professional practice in the area of specialization.	A.4- Understand the legal aspects for professional practices.
	2.1.5- Principles and the basics of quality in professional practice in the area of specialization.	A.5- Identify the basics of good laboratory practice and quality assurance in the wide field of pharmaceutics.
	2.1.6- The fundamentals and ethics of scientific research.	A.6- Define ethics and relevant law of scientific research and professional work.
2.2	2.2.1- Analyze and evaluate information in the field of specialization and analogies to solve problems	B.1- Analyze and evaluate the information gained in the field of pharmaceutics to solve problems.
	2.2.2- Solve specified problems in the lack or missing of some information.	B.2- Suggest proper and logic solutions to the research problems using the available information.
	2.2.3-Correlate and integrate different pharmaceutical knowledge to solve professional problems.	B.3- Plan to solve possible problems based on the integration of required pharmaceutical knowledge.

	2.2.4- Conduct research and write scientific report on research specified topics.	B.4- Conduct research and write reports and papers on the obtained data.
	2.2.5- Evaluate and manage risks and potential hazards in professional practices in the area of specialization	B.5-Deal effectively with risks and hazards during professional practice.
	2.2.6- Plan to improve performance in the field of specialization.	B.6- Evaluate the studied topic and plan to improve the performance.
	2.2.7- Professional decision-making in the contexts of diverse disciplines.	B.7- Take professional decisions in the area of specialization.
2.3	2.3.1- Master basic and modern professional skills in the area of specialization.	C.1-Acquire and apply different basic and modern skills in formulation, improving properties and bioavailability of different dosage forms.
	2.3.2- Write and evaluate professional reports.	C.2- Write and evaluate research projects and reports in the field of pharmaceutics.
	2.3.3- Assess methods and tools existing in the area of specialization.	C.3- Evaluate and improve methods and tools and use advanced technology in the practical work.
2.4	2.4.1- Communicate effectively.	D.1- Communicate effectively with professors, colleagues and technicians.
	2.4.2- Effectively use information technology in professional practices	D.2- Acquire computer skills in analyzing results and presenting them.

	2.4.3- Self-assessment and define his personal learning needs.	D.3-Self assessment and plan to cover the needs.
	2.4.4- Use variable sources to get information and knowledge.	D.4-Practice how to retrieve information from a variety of sources including libraries, databases and internet.
	2.4.5- Set criteria and parameters to evaluate the performance of others	D.5- Evaluate performance of others and help them to develop the performance.
	2.4.6- Work in a team and lead teams carrying out various professional tasks.	D.6- Work effectively as a member of team.
	2.4.7- Manage time effectively.	D.7- Get maximum use of time to achieve goals.
	2.4.8- Continuous and self learning.	D.8- Continuous learning to improve the career.

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:		
M103	1- Physical Pharmacy	2	A1, A3, A5, B5 D2, D4
M104	2- Biopharmaceutics and Pharmacokinetics	2	A1, A3, B1, D2, D4
ME1	3- Pharmaceutical technology	2	A1, A3, A5, B3 D2, D4, D6
M111	4- Biostatistics	2	A1, A2, A3, B1, B6, D2
M102	5- Instrumental analysis	4	A1, A2, B2, B3, D2, D5, D6
ME4	6- Elective A Biotechnology	4	A1, A2, A3, B3 D2, D4,D6, D8
	7- Elective B	4	A1, A2, B3, B7,

ME5 ME7	Applied Pharmacology Drug induced diseases	4	D3 A1, A2, B2, B3, D4
	Special Courses:		
Esp1	Controlled release dosage forms	4	A1, A3, B3 D2, D4
Esp2	Drug stability	4	A1, A2, A5, B1, B2 D2, D4
Esp3	Transdermal drug delivery systems	4	A1, A2, A5, B1 D2, D4
	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. Hanaa El-Ghamry	Program evaluation Courses evaluation	Program report Courses report
External evaluator: Professor Dr. Osama Hassan	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. Hanaa El-Ghamry **Prof. Dr. Mahmoud Abdul Ghany**

Biopharmaceutics and pharmacokinetics

Course specification of Biopharmaceutics and pharmacokinetics

Course specifications:

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

1- Basic information:

Title: **Biopharmaceutics and pharmacokinetics** Code: M 104
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 describe the principles of Biopharmaceutics and pharmacokinetics and estimate bioavailability and rate of drug release and calculate drug doses.

3- Intended learning outcome s (ILOs) of Biopharmaceutics and pharmacokinetics:

Knowledge and Understanding	
a1	Describe the effects of different factors on the rate of absorption, distribution, biotransformation and elimination of drugs.
a2	Illustrate methods of estimation of bioavailability and principles of drug clearance
a3	State applications of pharmacokinetics in clinical situations.
Intellectual skills	
b1	Apply methods for estimation of bioavailability and drug clearance in the body
General and Transferable skills	
d1	Use computer skills to present information
d2	Collect information from a variety of sources

4. Course Content of Biopharmacutics and pharmacokinetics (Master degree):

Week number	Lecture content (2 hrs/week)
1	• Basic pharmacokinetic relationships • Major pharmacokinetic parameters
2	• Absorption • 1st pass effect
3	• Enterohepatic circulation
4	• P-Glycoprotein
5	• Distribution
6	• Clearance
7	• Cytochrome P-450 **(Presentation)**
8	• Pharmacogenetics
9	• Non-linear pharmacokinetics
10	• Non-compartmental pharmacokinetics
11	• Popular pharmacokinetic in therapeutic drug monitoring

12	• Drug dosing in renal disease
13	• Pharmacokinetic in hepatic disease
14	• Revision
15	• Open Discussion **(Final Presentation)**

5- Teaching and Learning Methods:

- Lectures
- Self learning
- Open discussion

6- Student Assessment methods:

Written exams to assess: a1, a2, a3, b1
Oral exam to assess: a1, a2, a3, b1, d1
Activities to assess: d1, d2

Assessment schedule:

Assessment (1): Activity	Week 7-15
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: Text book of biopharmaceutics and clinical pharmacokinetics, Safaris Niazi, Appleton-century-crofts, 292 Madison Avenue, New York, USA (1979).

C- Suggested books: Applied Biopharmaceutics and Pharmacokinetics Shargel, L., and Andrew B.C.,VU. 3rd edition, East Norwalk, Connecticut, USA (1993).

D- Websites: Pubmed, Sciencedirect, Nejm, Weily interscience

Facilities required for teaching and learning:

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

- **Course Coordinators: Prof Dr/ Fakhr El-din Ghazy**
- **Head of Department: Prof Dr/ Mahmoud Abdul-Ghany Mahdy**
- **Date: 2012-9-3 تم اعتماد التوصيف بمجلس القسم بتاريخ**

Matrix I of Biopharmaceutics and Pharmacokinetics for (2012-2013)							
Course Contents		ILOs of Bipopharmaceutics and Pharmacokinetics course					
		Knowledge and understanding			Intellectual skills	Transferable and general skills	
		a1	a2	a3	b1	d1	d2
1	Basic pharmacokinetic relationships Major pharmacokinetic parameters	X					
2	Absorption 1st pass effect	X					
3	Enterohepatic circulation		x				
4	P-Glycoprotein	X					
5	Distribution	X					
6	Clearance	X					
7	Cytochrome P-450 **(Presentation)**	X				x	x
8	Pharmacogenetics		x		X		
9	Non-linear pharmacokinetics		x				
10	Non-compartmental pharmacokinetics		x				
11	Popular pharmacokinetic in therapeutic drug monitoring		x				
12	Drug dosing in renal disease		x				
13	Pharmacokinetic in hepatic disease			x	X		
14	Revision	x	x	x	X		
15	Open Discussion **(Final Presentation)**	X	x	x	X	x	

Matrix II of Biopharmaceutics and pharmacokinetics (2012-2013)

NARS		Program ILOs	Course ILOs	Course contents	Sources	Teaching and learning methods		Method of assessment		
						Lecture	Self learning	Written exam	Oral exam	Activity
2.1	2.1.1- Theories and fundamentals related to the field of learning as well as in related areas.	A.1- Understand the basics and principles of pharmaceutics and different related subjects.	a1	Basic pharmacokinetic relationships Major pharmacokinetic parameters Enterohepatic circulation Clearance Popular pharmacokinetic in therapeutic drug monitoring	Textbooks, Scientific papers and self learning	x	x	x	x	

	2.1.3- Scientific developments in the area of specialization.	A.3- Illustrate the continuous development in pharmaceutics and applications of pharmaceutical industries in different fields.	a2	Absorption 1st pass effect P-Glycoprotein Cytochrome P-450 Drug dosing in renal disease Pharmacokinetic in hepatic disease	Textbooks, Scientific papers and self learning	x	x	x	x	
			a3	Pharmacogenetics Non-linear pharmacokinetics Non-compartmental pharmacokinetics	Textbooks, Scientific papers and self learning	x	x	x	x	
2.2	2.2.1- Analyze and evaluate information in the field of specialization and analogies to solve problems	B.1-Analyze and evaluate the information gained in the field of pharmaceutics to solve problems.	b1	Order of reactions Applications of pharmacokinetics in clinical situations	Textbooks, Scientific papers and self learning	x	x	x		

2.4	2.4.2- Effectively use information technology in professional practices	D.2- Acquire computer skills in analyzing results and presenting them.	d1	Activity	Textbooks, Scientific papers and self learning		x			**x**
	2.4.4- Use variable sources to get information and knowledge.	D.4-Practice how to retrieve information from a variety of sources including libraries, databases and internet.	d2	Activity	Textbooks, Scientific papers and self learning		x			**x**

Pharmaceutical Technology

Course specification of Pharmaceutical Technology

Course specifications:

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

1- Basic information:

Title: **Pharmaceutical technology** Code: ME1
Lectures: 2 hrs/week Credit hours: 2 hrs/week
Total: 2 hrs/week

2- Overall aim of the course:

On completion of the course, the students will be able to illustrate the principles and mechanisms of different apparatus for pharmaceutical processes, apply the principles that should be followed during drug manufacture, design, labeling and storing, choose the appropriate methods for quality assurance and assay of raw materials and pharmaceutical preparations during manufacture and interact effectively and work as a member of a team.

3- Intended learning outcome s (ILOs) of Pharmaceutical Technology:

Knowledge and Understanding	
a_1	Identify principles and mechanisms of different pharmaceutical processes.
a_2	Ensure quality during pharmaceutical manufacturing.
a_3	Illustrate recent apparatus used in pharmaceutical manufacturing
Professional and Practical skills	
b1	Apply the needed pharmaceutical knowledge for solving problems in manufacturing
General and Transferable skills	
d1	Use computer skills to present information
d2	Collect information from a variety of sources
d3	Work as a member of a team

4. Course Content of Pharmaceutical Technology (Master degree):

Week number	Lecture content (2 hr/w)
1	• Types and classes of tablets
2	• Manufacturing of compressed tablets
3	• Methods of tablet manufacturing
4	• Evaluation of tablets
5	• Types of tablet coating film, coating solution and film coating process
6	• Filtration • Factors affecting filtration • Methods used to improve filtration rate
7	• Cake compressibility and filter aid • **(Presentation)**
8	• Apparatus for continuous and patch filtration
9	• Membrane filter
10	• Sterilization

11	• Methods of sterilization
12	• Powders and granules
13	• Granulation
14	• Powder flow
15	• Open discussion and revision • **(Final Presentation)**

5- Teaching and Learning Methods:

- Lectures
- Self learning
- Open discussion

6- Student Assessment methods:

Written exams to assess: a1, a2, a3, b1
Oral exam to assess: a1, a2, a3, b1
Activities to assess: d1, d2, d3

Assessment schedule:

Assessment (1): Activity	Week 7-15
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- Essential books: Bentley's text book of Pharmaceutics by Rawlins, E. A. 8th ed (1984).

B- Suggested books: The theory and Practice of Industrial Pharmacy (1976) by Lachman, L., Lieberman, H. A., Kanig, J. L., Lea and Febiger, Philidelphia, USA.

C- Websites: Pubmed, Sciencedirect, Nejm, Weily interscience

Facilities required for teaching and learning:

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

- **Course Coordinators: Prof Dr/ Fakhr El-din Ghazy**
- **Head of Department: Prof Dr/ Mahmoud Abdul-Ghany Mahdy**
- **Date: 2012-9-3 تم اعتماد التوصيف بمجلس القسم بتاريخ**

Matrix I of Pharmaceutical technology for (2012-2013)

Course Contents		ILOs of Pharmaceutical technology course						
		Knowledge and understanding			Intellectual skills	Transferable and general skills		
		a1	a2	a3	b1	d1	d2	d3
1	Types and classes of tablets	x						
2	Manufacturing of compressed tablet			x				
3	Methods of tablet manufacturing			x	x			
4	Evaluation of tablets		x		x			
5	Types of tablet coating film, coating solution and film coating process	x						
6	Filtration - Factors affecting filtration -Methods used to improve filtration rate	x						
7	Cake compressibility and filter aid - Presentation	x				x	x	x
8	Apparatus for continuous and patch filtration		x		x			
9	Membrane filter	x						
10	Sterilization			x	x			
11	Methods of sterilization			x	x			
12	Powders and granules	x						
13	Granulation	x						
14	Powder flow	x						
15	Open discussion and revision Presentation	x	x	x	x	x	x	x

Matrix II of Pharmaceutical technology for 2012-2013										
NARS		Program ILOs	Course ILOs	Course contents	Sources	Teaching and learning methods		Method of assessment		
						Lecture	Self learning	Written exam	Oral exam	Activity
2.1	2.1.1- Theories and fundamentals related to the field of learning as well as in related areas.	A.1- Understand the basics and principles of pharmaceutics and different related subjects.	a1	Types and classes of tablets Types of tablet coating film, coating solution and film coating process Filtration Cake compressibility and filter aid Membrane filter Powders and granules Granulation Powder flow	Textbooks, Scientific papers and self learning	x	x	x	x	

	2.1.3- Scientific developments in the area of specialization.	A.3-Illustrate the continuous development in pharmaceutics and applications of pharmaceutical industries in different fields.	a3	Manufacturing of compressed tablet Methods of tablet manufacturing Apparatus for continuous and patch filtration	Textbooks, Scientific papers and self learning	x	x	x	x	
	2.1.5- Principles and the basics of quality in professional practice in the area of specialization	A.5- Identify the basics of good laboratory practice and quality assurance in the wide field of pharmaceutics.	a2	Evaluation of tablets Sterilization Methods of sterilization	Textbooks, Scientific papers and self learning	x	x	x	x	
	2.2.3-Correlate and integrate different pharmaceutical knowledge to solve professional problems.	B.3- Plan to solve possible problems based on the integration of required pharmaceutical knowledge.	b1	Methods of tablet manufacturing - Evaluation of tablets -Apparatus for continuous and patch filtration - Sterilization - Methods of sterilization	Textbooks, Scientific papers and self learning	x	x	x	x	

2.4	2.4.2- Effectively use information technology in professional practices	D.2- Acquire computer skills in analyzing results and presenting them.	d1	Activity	Textbooks, Scientific papers and self learning		x			**x**
	2.4.4- Use variable sources to get information and knowledge.	D.4-Practice how to retrieve information from a variety of sources including libraries, databases and internet.	d2	Activity	Textbooks, Scientific papers and self learning		x			**x**
	2.4.6- Work in a team and lead teams carrying out various professional tasks.	D.6- Work effectively as a member of team.	d3	Activity	Textbooks, Scientific papers and self learning		x			**x**

Physical Pharmacy

Course specification of Physical Pharmacy

Course specifications:

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

1- Basic information:

Title: **Physical pharmacy** Code: M103
Lectures: 2 hrs/week Credit hours: 2 hrs/week
Total: 2 hrs/week

2- Overall aim of the course:

On completion of the course, the students will be able to acquire knowledge of the principles of physical pharmacy, to be able to design, evaluate and interpret the therapeutic efficacy of homogenous and heterogeneous dosage forms and understand the implications of the physical interactions on the outcome of the drug product.

3- Intended learning outcomes (ILOs) of Physical Pharmacy:

A-Knowledge and Understanding	
a1	Illustrate the principles of physical pharmacy including equilibrium phenomena, dissolution, phase equilibrium, phase rule and disperse systems
a2	Explain the polymer science controlling the formulation modification and use
a3	Mention types of complexation that may occur during preparation of different dosage forms and method of analysis of each type.
B-Intellectual skills	
b1	Apply the knowledge of properties of different ingredients and possible complexation that may occur in improving the formulation of different dosage forms
D- General and Transferable skills	
d1	Use computer skills to present information
d2	Collect information from a variety of sources

4. Course Content of Physical pharmacy (Master degree):

Week number	Lecture content (2 hr/w)
1	• Equilibrium phenomena (Strong and weak acid, bases, buffers, distribution).
2	• Complexation and protein binding.
3	• Drug release &dissolution.
4	• Types of flow
5	• Surface and interfacial phenomena
6	• Metal complexes &Organic molecular complexes
7	• Occlusion compounds, Complexation and method of analysis • **(Presentation)**
8	• State of matter • Ideal gas law
9	• Colligative properties of solutions

10	• Phase rule
11	• Disperse systems
12	• Phase equilibria
13	• Polymer science
14	• Revision
15	• Open discussion • **(Final Presentation)**

5- Teaching and Learning Methods:

- Lectures
- Self learning
- Open discussion

6- Student Assessment methods:

Written exams to assess: a1, a2, a3, b1
Oral exam to assess: a1, a2, a3, b1
Activities to assess: d1, d2

Assessment schedule:

Assessment (1): Activity	Week 7-15
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- Essential books:

i- Physical pharmacy, Martin. A, 4th edition, Philadelphia, London. (1993).

ii- Pharmaceutical calculations, Stoklosa, M and Ansel, H., Philadelphia, London. (1997).

B- Recommended books: Martin's physical pharmacy and pharmaceutical sciences: Patrick J. Sinko, Alfred N. Martin, Lippincott Williams & Wilkins, (2006).

C- Websites: Pubmed, Sciencedirect, Weilyinterscience

Facilities required for teaching and learning:

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

- **Course Coordinators: Prof Dr/ Mahmoud Abdul-Ghany Mahdy**
- **Head of Department: Prof Dr/ Mahmoud Abdul-Ghany Mahdy**
- **Date: 2012-9-3 تم اعتماد التوصيف بمجلس القسم بتاريخ**

Matrix I of Physical Pharmacy for (2012-2013)							
Course Contents		ILOs of Physical pharmacy course					
		Knowledge and understanding			Intellectual skills	Transferable and general skills	
		a1	a2	a3	b1	d1	d2
1	Equilibrium phenomena (Strong and weak acid, bases, buffers, distribution).	x					
2	Complexation and protein binding.			X	x		
3	Drug release &dissolution.	x					
4	Types of flow						
5	Surface and interfacial phenomena	x					
6	Metal complexes &Organic molecular complexes			X	x		
7	Occlusion compounds, Complexation and method of analysis Presentation			X	x	x	x
8	State of matter Ideal gas law	x					
9	Colligative properties of solutions	x			x		
10	Phase rule	x					
11	Disperse systems	x					
12	Phase equilibria	x					
13	Polymer science		x				
14	Revision	x	x	X	x		
15	Open Discussion Presentation	x	x	X	x	x	x

Matrix II of Physical Pharmacy for 2012-2013										
NARS		**Program ILOs**	**Course ILOs**	**Course contents**	**Sources**	**Teaching and learning methods**		**Method of assessment**		
						Lecture	Self learning	Written exam	Oral Exam	Activity
2.1	2.1.1- Theories and fundamentals related to the field of learning as well as in related areas.	A.1- Understand the basics and principles of pharmaceutics and different related subjects.	a1	Equilibrium phenomena (Strong and weak acid, bases, buffers, distribution). Drug release &dissolution. Surface and interfacial phenomena State of matter Ideal gas law Colligative properties of solutions Phase rule Disperse systems Phase equilibria	Textbooks, Scientific papers and self learning	x	x	x	x	

	2.1.3- Scientific developments in the area of specialization.	A.3-Illustrate the continuous development in pharmaceutics and applications of pharmaceutical industries in different fields.	a2	Polymer science	Textbooks, Scientific papers and self learning	x	x	x	x	
	2.1.5- Principles and the basics of quality in professional practice in the area of specialization.	A.5- Identify the basics of good laboratory practice and quality assurance in the wide field of pharmaceutics.	a3	Complexation and protein binding. Metal complexes &Organic molecular complexes Occlusion compounds, Comlexation and method of analysis	Textbooks, Scientific papers and self learning	x	x	x	x	
	2.2.5- Evaluate and manage risks and potential hazards in professional practices in the area of specialization	B.5-Deal effectively with risks and hazards during professional practice.	b1	Colligative properties of solutions Complexation and protein binding. Metal complexes &Organic molecular complexes Occlusion compounds, Complexation and method of analysis	Textbooks, Scientific papers and self learning	x	x	x	X	

2.4	2.4.2- Effectively use information technology in professional practices	D.2- Acquire computer skills in analyzing results and presenting them.	d1	Activity	Textbooks, Scientific papers and self learning		x			**x**
	2.4.4- Use variable sources to get information and knowledge.	D.4-Practice how to retrieve information from a variety of sources including libraries, databases and internet.	d2	Activity	Textbooks, Scientific papers and self learning		x			**x**

Course 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: Pharmaceutics
- 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 schedule:

Assessment (1): Activity	Week 8
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/ Hisham Ezzat Abdellatef**
- **Date: 2012-8-28 تم اعتماده فى مجلس القسم بتاريخ**

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: Pharmaceutics
- 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**

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: Pharmaceutics
- 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:

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**

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: Pharmaceutics
- 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:

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**

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: Pharmaceutics
- 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 4-14
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: - 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.

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

Controlled Release Dosage Forms

Course specification of Controlled release dosage forms

Course specifications:

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

1- Basic information:

Title: **Controlled-release dosage forms** Code: Esp1
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 illustrate the principles of design, properties, and mechanisms of controlled-release dosage forms, propose modifications on existing formulations of controlled-release dosage forms, analyze the best method for preparation and determine the ideal character for each and interact effectively and work as a member of a team.

3- Intended learning outcome s (ILOs) of Controlled-release dosage forms:

Knowledge and Understanding	
a1	Illustrate the properties and principles of design of controlled-release drug delivery systems and factors affecting it
a2	Mention up to date methods used for developing non- oral controlled-release dosage forms
a3	Enumerate method of preparation and modification of colloidal drug delivery systems
Intellectual skills	
b1	Modify the structure of a given dosage form to obtain the desired release duration.
General and Transferable skills	
d1	Use computer skills to present information
d2	Collect information from a variety of sources

4. Course Content of Controlled-release dosage forms (Master degree):

Week number	Lecture content (4 hr/w)
1	• General design principle for controlled-release drug delivery systems
2	• Physicochemical factors influencing design and performance of controlled-release formulations
3	• Biological factors influencing design and performance of controlled-release formulations
4	• Controlled-release oral dosage forms
5	• Diffusion, dissolution and osmotic controlled drug delivery systems
6	• Microencapsulation
7	• Nanostructure-mediated controlled-release dosage forms • **(Presentation)**
8	• Liposomes
9	• Niosomes

10	• Technologies for developing transdermal dosage forms
11	• Ocular controlled-release dosage forms
12	• Vaginal and uterine controlled-release dosage forms
13	• Release of drugs from time-controlled-release dosage forms
14	• Release of drugs from stimuli-induced controlled-release systems
15	• Revision and open discussion • **(Final Presentation)**

5- Teaching and Learning Methods:

- Lectures
- Self learning
- Open discussion

6- Student Assessment methods:

Written exams to assess: a1, a2, a3, b1
Oral exam to assess: a1, a2, a3, b1
Activities to assess: d1, d2

Assessment schedule:

Assessment (1): Activity	Week 7-15
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- Essential books: Colloidal drug delivery systems Jörg Kreuter, M. Dekker, 1994 - 353 pages

B- Suggested books: Martin's physical pharmacy and pharmaceutical sciences: Patrick J. Sinko, Alfred N. Martin, Lippincott Williams & Wilkins, (2006).

C- Websites: Pubmed, Sciencedirect, Weilyinterscience

Facilities required for teaching and learning:

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

- **Course Coordinators: Dr/ Mahmoud Mokhtar Ibrahim**
- **Head of Department: Prof Dr/ Mahmoud Abdul-Ghany Mahdy**
- **Date: 2012-9-3 تم اعتماد التوصيف بمجلس القسم**

Matrix I of Controlled release dosage forms for (2012-2013)

	Course Contents	ILOs of Controlled release dosage forms course					
		Knowledge and understanding			Intellectual skills	Transferable and general skills	
		a1	a2	a3	b1	d1	d2
1	General design principle for controlled-release drug delivery systems	x					
2	Physicochemical factors influencing design and performance of controlled-release formulations	x		x			
3	Biological factors influencing design and performance of controlled-release formulations	x					
4	Controlled-release oral dosage forms	x					
5	Diffusion, dissolution and osmotic controlled drug delivery systems	x			x		
6	Microencapsulation	x					
7	Nanostructure-mediated controlled-release dosage forms Presentation			x		x	x
8	Liposomes	x		x			
9	Niosomes	x		x			
10	Technologies for developing transdermal dosage forms	x					
11	Ocular controlled-release dosage forms	x					
12	Vaginal and uterine controlled-release dosage forms	x					
13	Release of drugs from time-controlled-release dosage forms		x				
14	Release of drugs from stimuli-induced controlled-release systems		x				
15	Revision and open discussion Presentation	x	x	x	x	x	x

Matrix II of Controlled release dosage forms for (2012-2013)										
NARS		Program ILOs	Course ILOs	Course contents	Sources	Teaching and learning methods		Method of assessment		
						Lecture	Self learning	Written exam	Oral exam	Activity
2.1	2.1.1- Theories and fundamentals related to the field of learning as well as in related areas.	A.1- Illustrate properly the principle of pharmaceutics and their widely growing subjects i	a1	General design principle for controlled-release drug delivery systems,Liposomes,niosomes, Ocular controlled-release dosage forms Physicochemical factors influencing design and performance of controlled-release formulations Biological factors influencing design and performance of controlled-release formulations Technologies for developing transdermal dosage forms	Textbooks, Scientific papers and self learning	x	x	x	x	

	2.1.3- Scientific developments in the area of specialization.	A.3- Express clearly the up to date information and methods in pharmaceutics and applications of pharmaceutical industries in different fields.	a2	Release of drugs from time-controlled-release dosage forms Release of drugs from stimuli-induced controlled-release systems	Textbooks, Scientific papers and self learning	x	x	x	x	
			a3	Physicochemical factors influencing design and performance of controlled-release formulations Nanostructure-mediated controlled-release dosage forms Niosomes Liposomes	Textbooks, Scientific papers and self learning	x	x	x	x	
	2.2.3-Correlate and integrate different pharmaceutical knowledge to solve professional problems.	B.3- Acquire the needed pharmaceutical knowledge to manage professional problems	b1	Diffusion, dissolution and osmotic controlled drug delivery systems	Textbooks, Scientific papers and self learning	x	x	x		

2.4	2.4.2- Effectively use information technology in professional practices	D.2- Acquire computer skills in analyzing results and presenting them.	d1	Activity	Textbooks, Scientific papers and self learning		x			**x**
	2.4.4- Use variable sources to get information and knowledge.	D.4-Practice how to retrieve information from a variety of sources including libraries, databases and internet.	d2	Activity	Textbooks, Scientific papers and self learning		x			**x**

Drug Stability

Course specification of Drug stability

Course specifications:

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

1- Basic information:

Title: **Drug stability** Code: Esp2
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 describe the degradation of drugs and the methods to determine the order of reaction, illustrate the stability programs for pharmaceutical products and the latest regulations for stability testing and ability to predict the degradation pathways of a drug design a stabilization protocol and predict a product shelf-life.

3- Intended learning outcome s (ILOs) of Drug stability:

Knowledge and Understanding	
a1	Illustrate the principles of order of reactions and methods of determination order of reactions
a2	Describe the principles of physical and chemical degradation of drugs in different dosage forms
a3	Mention stability testing of different dosage forms
Intellectual skills	
b1	Suggest suitable stabilization methods for drugs in the various dosage forms.
b2	Design in a self-directed and original research investigations on drug stability in dosage forms from degradation pathways
General and Transferable skills	
d1	Use computer skills to present information
d2	Collect information from a variety of sources

4. Course Content of Drug stability (Master degree):

Week number	Lecture content (4 hr/w)
1	• Rate of chemical reactions
2	• Orders of reactions • Zero order
3	• First order
4	• Second order
5	• Apparent zero order reaction • Pseudo first order reaction
6	• Determination of order of reaction • Substitution method
7	• Graphical method • **(Presentation)**
8	• Half-life method
9	• Routes of degradation • Hydrolysis • Oxidation
10	• Photochemical degradation • Incompatibility

11	• Physical degradation routes • Vaporization • Aging • Adsorption
12	• Complex reactions
13	• Stability testing
14	• Revision
15	• Open discussion • **(Final Presentation)**

5- Teaching and Learning Methods:

- Lectures
- Self learning
- Open discussion

6- Student Assessment methods:

Written exams to assess: a1, a2, a3, b1, b2
Oral exam to assess: a1, a2, a3, b1, b2
Activities to assess: d1, d2

Assessment schedule:

Assessment (1): Activity	Week 7-15
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- Essential books: Drug Stability: Principles and Practices (Drugs and the Pharmaceutical Sciences) by Jens T. Carstensen and Christopher Rhodes (2000).

B- Suggested books: Handbook of Stability Testing in Pharmaceutical Development: Regulations, Methodologies, and Best Practices, Kim Huynh-Ba, 389 (2008).

C- Websites: Pubmed, Sciencedirect, Weilyinterscience

Facilities required for teaching and learning:

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

- **Course Coordinators: Dr/ Hanaa Abd El-Fattah El-Ghamry**
- **Head of Department: Prof Dr/ Mahmoud Abdul-Ghany Mahdy**
- **Date: 2012-9-3 تم اعتماد التوصيف بمجلس القسم**

Matrix I of Drug Stability for (2012-2013)								
Course Contents		ILOs of drug stability course						
		Knowledge and understanding			Intellectual skills		Transferable and general skills	
		a1	a2	a3	b1	b2	d1	d2
1	Rate of chemical reactions	x						
2	Zero order	x						
3	First order	x						
4	Second order							
5	Apparent zero order reaction Pseudo first order reaction	x						
6	Determination of order of reaction -Substitution method	x						
7	Graphical method Presentation	x					x	x
8	Half-life method	x						
9	Routes of degradation -Hydrolysis -Oxidation		x			X		
10	Photochemical degradation -Incompatibility		x			X		
11	Physical degradation routes -Vaporization -Aging - adsorption		x			X		
12	Complex reactions		x	x				
13	Stability testing			x	x	X		
14	Revision	x	x	x	x	X		
15	Open discussion Presentation	x	x	x	x	X	x	x

Matrix II of Drug stability for 2012-2013

NARS		Program ILOs	Course ILOs	Course contents	Sources	Teaching and learning methods		Method of assessment		
						Lecture	Self learning	Written exam	Oral Exam	Activity
2.1	2.1.1- Theories and fundamentals related to the field of learning as well as in related areas.	A.1- Illustrate properly the principle of pharmaceutics and their widely growing subjects.	a1	Rate of chemical reactions Zero order First order Second order Apparent zero order reaction Pseudo first order reaction Determination of order of reaction -Substitution method Graphical method Half-life method	Textbooks, Scientific papers and self learning	x	x	x	x	

	2.1.2- Mutual influence between professional practice and its impact on the environment.	A.2- Identify the impact of pharmaceutics and industrial pharmacy on the environment.	a2	Routes of degradation -Hydrolysis -Oxidation Photochemical degradation -Incompatibility Physical degradation routes -Vaporization -Aging - adsorption Complex reactions	Textbooks, Scientific papers and self learning	x	x	x	x	
	2.1.5- Principles and the basics of quality in professional practice in the area of specialization.	A.5- Identify the basics of good laboratory practice and quality assurance in the wide field of pharmaceutics.	a3	Stability testing Complex reactions	Textbooks, Scientific papers and self learning	x	x	x	x	
	2.2.1- Analyze and evaluate information in the field of specialization and analogies to solve problems	B.1- Analyze and interpret quantitative data obtained from pharmaceutical research in a specific and suitable form.	b1	Stability testing	Textbooks, Scientific papers and self learning	x	x	x	x	

2.2	2.2.2- Solve specified problems in the lack or missing of some information.	B.2- Suggest significant solutions for pharmaceutical results and outcome errors based on a wide academic background.	b2	Stability testing Routes of degradation -Hydrolysis -Oxidation Photochemical degradation -Incompatibility Physical degradation routes -Vaporization -Aging - adsorption	Textbooks, Scientific papers and self learning	x	X	x	x	
2.4	2.4.2- Effectively use information technology in professional practices	D.2- Acquire computer skills in analyzing results and presenting them.	d1	Activity	Textbooks , Scientific papers and self learning		x			**x**

	2.4.4- Use variable sources to get information and knowledge.	D.4-Practice how to retrieve information from a variety of sources including libraries, databases and internet.	d2	Activity	Textbooks , Scientific papers and self learning		x			**x**

Transdermal Drug Delivery System

Course specification of Transdermal drug delivery systems

Course specifications:

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

1- Basic information:

Title: **Transdermal drug delivery systems** Code: Esp3
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 have an overview on different types of transdermal drug delivery systems and their therapeutic uses and interact effectively and work as a member of a team.

3- Intended learning outcome s (ILOs) of Transdermal drug delivery systems:

Knowledge and Understanding	
a1	Describe the basic considerations of transdermal drug delivery systems.
a2	Understand the formulation of different transdermal drug delivery systems.
a3	Identify therapeutic uses of transdermal drug delivery systems.
a4	Ensure quality of transdermal drug delivery systems.
Intellectual skills	
b1	Achieve the ideal product formulation through proper selecting of the composition.
General and Transferable skills	
d1	Use computer skills to present information
d2	Collect information from a variety of sources

4. Course Content of Transdermal drug delivery (Master degree):

Week number	Lecture content (4 hr/w)
1	• Skin • Advantages and disadvantages of transdermal drug delivery system
2	• Kinetics of transdermal permeation
3	• Basic components of transdermal drug delivery system
4	• Factors affecting transdermal bioavailability
5	• Various methods for preparation of transdermal drug delivery system
6	• Types of transdermal patches
7	• Mechanism of action of transdermal patches • **(Presentation)**
8	• Evaluation parameters
9	• Transdermal market

10	• Advance developments in transdermal drug delivery system
11	• Formulation of semisolid dosage forms(Ointments) and equipments used
12	• Formulation of semisolid dosage forms(Creams) and equipments used
13	• Formulation of semisolid dosage forms(Gels) and equipments used
14	• Formulation of semisolid dosage forms(Pastes)
15	• Revision and open discussion • **(Final Presentation)**

5- Teaching and Learning Methods:

- Lectures
- Self learning
- Open discussion

6- Student Assessment methods:

Written exams to assess: a1, a2, a3, a4, b1
Oral exam to assess: a1, a2, a3, a4, b1
Activities to assess: d1, d2

Assessment schedule:

Assessment (1): Activity	Week 7-15
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- Essential books: Aulton's Pharmaceutics: The Design and Manufacture of Medicines. Aulton, M. E., Taylor, K. (2002)

B- Suggested books: Transdermal and Topical Drug Delivery Systems. Ghosh T. K., Pfister W., Su Il Yum (1997).

C- Websites: Pubmed, Sciencedirect, Nejm, Weilyinterscience

Facilities required for teaching and learning:

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

- **Course Coordinators: Dr/ Mahmoud Mokhtar Ahmed**
- **Head of Department: Prof Dr/ Mahmoud Abdul-Ghany Mahdy**
- **Date: 2012-9-3 تم اعتماد التوصيف بمجلس القسم**

Matrix I of Transdermal drug delivery systems for (2012-2013)

Course Contents		ILOs of Transdermal drug delivery systems course						
		Knowledge and understanding				Intellectual skills	Transferable and general skills	
		a1	a2	a3	a4	b1	d1	d2
1	Skin Advantages and disadvantages of transdermal drug delivery system	x						
2	Kinetics of transdermal permeation	x						
3	Basic components of transdermal drug delivery system	x				X		
4	Factors affecting transdermal bioavailability	x						
5	Various methods for preparation of transdermal drug delivery system		x			X		
6	Types of transdermal patches	x						
7	Mechanism of action of transdermal patches Presentation	x					x	x
8	Evaluation parameters				X			
9	Transdermal market			X				
10	Advance developments in transdermal drug delivery system			X				
11	Formulation of semisolid dosage forms(Ointments) and equipments used		x			X		
12	Formulation of semisolid dosage forms(Creams) and equipments used		x			X		
13	Formulation of semisolid dosage forms(Gels) and equipments used		x			X		
14	Formulation of semisolid dosage forms(Pastes)		x			X		
15	Revision and open discussion Presentation	x	x	X	X	X	x	x

Matrix II of Transdermal drug delivery systems for 2012-2013										
NARS		Program ILOs	Course ILOs	Course contents	Sources	Teaching and learning methods		Method of assessment		
						Lecture	Self learning	Written exam	Oral exam	Activity
2.1	2.1.1- Theories and fundamentals related to the field of learning as well as in related areas.	A.1- Understand the basics and principles of pharmaceutics and different related subjects.	a1	Skin Advantages and disadvantages of transdermal drug delivery system Kinetics of transdermal permeation - Basic components of transdermal drug delivery system Factors affecting transdermal bioavailability Types of transdermal patches Mechanism of action of transdermal patches	Textbooks, Scientific papers and self learning	X	x	x	x	
			a2	Various methods for preparation of transdermal drug delivery system Formulation of semisolid dosage forms and equipments used |(Ointments, creams, gels,					

				pastes)						
	2.1.2- Mutual influence between professional practice and its impact on the environment.	A.2- Identify the impact of pharmaceutics and industrial pharmacy on the environment.	a3	Transdermal market Advance developments in transdermal drug delivery system	Textbooks, Scientific papers and self learning	X	x	x	x	
	2.1.5- Principles and the basics of quality in professional practice in the area of specialization	A.5- Identify the basics of good laboratory practice and quality assurance in the wide field of pharmaceutics	a4	Evaluation parameters	Textbooks, Scientific papers and self learning	X	x	x	x	

2.2	2.2.1- Analyze and evaluate information in the field of specialization and analogies to solve problems	B.1- Analyze and evaluate the information gained in the field of pharmaceutics to solve problems.	b1	Basic components of transdermal drug delivery systems Various methods for preparation of transdermal drug delivery system - Formulation of semisolid dosage forms and equipments used |(Ointments, creams, gels, pastes)	Textbooks, Scientific papers and self learning	X	x	x		
2.4	2.4.2- Effectively use information technology in professional practices	D.2- Acquire computer skills in analyzing results and presenting them.	d1	Activity	Textbooks, Scientific papers and self learning		x			**x**

	2.4.4- Use variable sources to get information and knowledge.	D.4-Practice how to retrieve information from a variety of sources including libraries, databases and internet.	d2	Activity	Textbooks, Scientific papers and self learning		x			**x**

Thesis Specification

Master Thesis in Pharmaceutics

Course specifications:

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

1- Basic information:

Title: **Master of Pharmaceutical sciences (pharmaceutics)**
Credit hours: 30hrs

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
- To identify and perform different techniques and methods used in the experimental work according to the designed protocol
- To derive and present the results of the study from the data collected
- To 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	Outline theoretical and advanced bases of pharmaceutics
a2	Demonstrate the importance of knowledge of modern techniques used during working in the area of specialization of research
a3	Define the up to date professional and academic practices
a4	Demonstrate the legal aspects during professional and academic practices
a5	Illustrate the importance of quality assurance during the formulation of different dosage forms
a6	Identify and apply scientific experimental ethics.
Intellectual skills	
b1	Solve problems related to practical work by obtained quantitative data from the practical work
b2	Discuss professional problems and suggest solutions rely on different pharmaceutical knowledge and recent information
b3	Plan a research in the field of drug delivery or targeting that allow discovery of modern and efficient techniques for drug targeting
b4	Manage risks and hazards related to professional practical area
b5	Outline principles that should be followed in research to develop laboratory performance
b6	Decide what to do with full responsibility in scientific research
Professional and practical skills	
c1	Apply different techniques related to practical thesis work.
c2	Use and evaluate practical data to write report
c3	Estimate laboratory techniques used in pharmaceutics and industrial pharmacy labs
General and Transferable skills	
d1	Interact with health care professional.
d2	Use information technology in review and thesis preparation
d3	Study independently and evaluate learning needs in pharmaceutics
d4	Reprocess up-to-date information in different areas under study

	and research
d5	Implement tasks as a member of a team.
d6	Set rules for evaluation and judging others performance.
d7	Acquire time management skills

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. 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 under study. Design the protocol including the steps of work following the suitable timetable. Increase the awareness of the recent pharmaceutical techniques that will be used during practical work and determined by the protocol. Integrate different knowledge (Pharmaceutics, industrial pharmacy, GMP, Hospital pharmacy, incompatibilities ……..) to solve suggested problem. Continuous evaluation to the thesis outcome according to the schedule.
2nd	Identify different practical techniques and methods to assess pharmacokinetic parameters related to the subject under study. Perform various techniques to improve physical and chemical characters of drugs under research Formulate many classes of drugs in new dosage forms

	(suppositories, capsules, tablets, …….) 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). Induction of some diseases in experimental animals (Hypertension, inflammation, seizures…….). Separate biological samples (e.g. blood, plasma). Apply ethical recommendations during dealing with experimental animals
3rd	Collect raw data for the tested pharmacokinetic parameters. Interpret raw data to get valuable information. Perform statistical analysis 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 Work effectively as a member of a team (e.g. Supervisors, various professionals and Technicians). Present the results periodically in seminars. Define ethics of scientific research. 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:** U.V spectrophotometer, centrifuge, Dissolution, Vortex, HPLC, Analytical balance (4digit), Thermostatic water bath, Vacuum Oven

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- **Head of Department: Prof Dr/ Mahmoud Abdul-Ghany Mahdy**

Matrix for Master Thesis in Pharmaceutics

	NARS	Program ILOs	Thesis ILO's	Thesis contents
2.1	2.1.1- Theories and fundamentals related to the field of learning as well as in related areas.	A.1- Understand the basics and principles of pharmaceutics and different related subjects.	Outline theoretical and advanced bases of pharmaceutics	• 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- Identify the impact of pharmaceutics and industrial pharmacy on the environment.	Demonstrate the importance of knowledge of modern techniques used during working in the area of specialization of research	• Increase the awareness of the recent pharmaceutical techniques that will be used during practical work and determined by the protocol.
	2.1.3- Scientific developments in the area of specialization.	A.3-Illustrate the continuous development in pharmaceutics and applications of pharmaceutical industries in different fields.	Define the up to date professional and academic practices	• Formulate many classes of drugs in new dosage forms (suppositories, capsules, tablets, …….)Define ethics of scientific research.

	2.1.4- Moral and legal principles for professional practice in the area of specialization.	A.4- Understand the legal aspects for professional practices.	Demonstrate the legal aspects during professional and academic practices	Apply ethical recommendations during dealing with experimental animals
	2.1.5- Principles and the basics of quality in professional practice in the area of specialization.	A.5- Identify the basics of good laboratory practice and quality assurance in the wide field of pharmaceutics.	Illustrate the importance of quality assurance during the formulation of different dosage forms	• Integrate different knowledge (Pharmaceutics, industrial pharmacy, GMP, Hospital pharmacy, incompatibilities ……..) to solve suggested problem.
	2.1.6- The fundamentals and ethics of scientific research.	A.6- Define ethics and relevant law of scientific research and professional work.	Identify and apply scientific experimental ethics.	• Apply ethical recommendations during dealing with humans/ experimental animals.
2.2	2.2.1- Analyze and evaluate information in the field of specialization and analogies to solve problems	B.1- Analyze and evaluate the information gained in the field of pharmaceutics to solve problems.	Solve problems related to practical work by obtained quantitative data from the practical work	• Collect raw data for the tested pharmacokinetic parameters. • Interpret raw data to get valuable information. • Perform statistical analysis for the results. • Present and describe the results graphically. • Suggest solution to the problem under study based on this presented data.

	2.2.2- Solve specified problems in the lack or missing of some information.	B.2- Suggest proper and logic solutions to the research problems using the available information.	Discuss professional problems and suggest solutions rely on different pharmaceutical knowledge and recent information	• Perform various techniques to improve physical and chemical characters of drugs under research • Formulate many classes of drugs in new dosage forms (suppositories, capsules, tablets, …….)
	2.2.3-Correlate and integrate different pharmaceutical knowledge to solve professional problems.	B.3- Plan to solve possible problems based on the integration of required pharmaceutical knowledge.		
	2.2.4- Conduct research and write scientific report on research specified topics.	B.4- Conduct research and write reports and papers on the obtained data.	Plan a research in the field of drug delivery or targeting that allow discovery of modern and efficient techniques for drug targeting	• Design the protocol including the steps of work following the suitable timetable.
	2.2.5- Evaluate and manage risks and potential hazards in professional practices in the area of specialization	B.5-Deal effectively with risks and hazards during professional practice.	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- Evaluate the studied topic and plan to improve the performance.	Outline principles that should be followed in research to develop laboratory performance	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- Take professional decisions in the area of specialization.	Decide what to do with full responsibility in scientific research	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. • Suggest possible recommendations based on the outcome of the thesis and decide future plans.
2.3	2.3.1- Master basic and modern professional skills in the area of specialization.	C.1-Acquire and apply different basic and modern skills in formulation, improving properties and bioavailability of different dosage forms.	Apply different techniques related to practical thesis work.	• Perform various techniques to improve physical and chemical characters of drugs under research

	2.3.2- Write and evaluate professional reports.	C.2- Write and evaluate research projects and reports in the field of pharmaceutics.	Use and evaluate practical data to write 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- Evaluate and improve methods and tools and use advanced technology in the practical work .	Estimate laboratory techniques used in pharmaceutics and industrial pharmacy labs	• Perform various techniques to improve physical and chemical characters of drugs under research • Operate scientific instruments according to instructions. • Induction of some diseases in experimental animals (Hypertension, inflammation, seizures…….). • Separate biological samples (e.g. blood, plasma).

2.4	2.4.1- Communicate effectively.	D.1- Communicate effectively with professors, colleagues and technicians.	Interact with health care professional.	• Communicate with supervisors to discuss results
	2.4.2- Effectively use information technology in professional practices	D.2- Acquire computer skills in analyzing results and presenting them.	Use information technology in review and thesis preparation	• Continuous evaluation to the thesis outcome according to the schedule.
	2.4.3- Self-assessment and define his personal learning needs.	D.3-Self assessment and plan to cover the needs.	Study independently and evaluate learning needs in pharmaceutics	Continue self-learning throughout the experimental work and writing scientific papers.
	2.4.4- Use variable sources to get information and knowledge.	D.4-Practice how to retrieve information from a variety of sources including libraries, databases and internet.	Reprocess up-to-date information in different areas under study and research	• Use internet, journals, books and others thesis to get previous and recent information about the subject under study.
	2.4.5- Set criteria and parameters to evaluate the performance of others	D.5- Evaluate performance of others and help them to develop the performance.	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- Work effectively as a member of team.	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- Manage time effectively.	D.7- Get maximum use of time to achieve goals.	Acquire time management skills	• Design the protocol including the steps of work following the suitable timetable.

PhD Degree

Program Specification

Program Specification

A- Basic Information

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

2- Program type: Monodisciplinary.

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

4- Department: Pharmaceutics

5- Coordinator: Prof. Dr. Hanaa El-Ghamry

6- Date of program specification approval: 2012

B- Professional Information

1- Program aims:

The Pharmaceutics PhD program aims to provide the PhD students with a special and advanced education in the field of Pharmaceutics and enable students to gain the skills and attitudes required for conducting planned research in the field of Pharmaceutics.

2-Intended Learning Outcomes (ILOs):

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

2-1- Knowledge and Understanding :

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

A.1- Illustrate the orientation of different topics in pharmaceutics and their related subjects including their applications.

A.2- Outline methods and techniques used in out coming a scientific research.

A.3- Illustrate ethical and legal principles in academic practices.

A.4- Outline different aspects and principles that are followed in quality assurance during manufacturing of different dosage forms.

A.5- Identify the influence of different pharmaceutical practices on the development of the surrounding environment and society and helping patients.

2-2 - Intellectual Skills:

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

B.1- Analyze information in the field of pharmaceutics and data obtained from specific and suitable research.

B.2- Suggest possible and applicable solutions for different problems in the field of pharmaceutics and that may be observed during the research.

B.3- Acquire the needed knowledge to perform proper pharmaceutical researches in different areas.

B.4- Write reports and scientific papers on the results obtained from different pharmaceutical researches.

B.5- Outline the possible hazards that may rise during research and how to overcome them.

B.6- Write a planned protocol that should be followed during research to improve performance.

B.7- Take important decisions and enhance the responsibility of each individual to improve the pharmaceutical research.

B.8- Apply new ideas and applications in different pharmaceutical researches.

B.9- Discuss the obtained results in open sessions and revealed errors and how to avoid them.

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- Acquire the basic professional skills and modern pharmaceutical technologies during research.

C.2- Write monthly reports about the pharmaceutical researches and make evaluation to these reports.

C.3- Perform up to date methods and techniques during different pharmaceutical researches.

C.4- Use technology e.g. computer skills, internet…. to obtain better results during research.

C.5- Suggest a recent protocols to improve work in pharmaceutical laboratories.

2-4 - General and Transferable Skills:

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

D.1- Communicate effectively during research with technicians and team of work.

D.2- Apply modern techniques to improve pharmaceutical researches including computer skills, Language, others.

D.3- Enhance self learning with evaluations of the trained persons in pharmaceutics fields.

D.4- Collect and evaluate information in the field of pharmaceutics continuously.

D.5- Collect up to date and the required information from different sources like Books, journals, papers and internet for improving knowledge.

D.6- Work effectively as a member of team.

D.7- Take advantage of the time and attend scientific meetings in the area of specialization.

3- Academic Standards:

- NARS (National Academic Reference Standards)

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

	NARS	Program ILOs for pharmaceutics department
Knowledge and Understanding	2.1.1- Fundamental and in-depth knowledge and basic theories in the field of specialty and the closely related areas of pharmaceutical sciences.	A.1- Illustrate the orientation of different topics in pharmaceutics and their related subjects including their applications
	2.1.2- Fundamentals, methods, techniques, tools and ethics of scientific research.	A.2- Outline methods and techniques used in out coming a scientific research
	2.1.3- The ethical and legal principles in pharmacy and academic practices.	A.3- Illustrate ethical and legal principles in academic practices .
	2.1.4- The principles and bases of quality assurance in professional practice in the field of specialization.	A.4- Outline different aspects and principles that are followed in quality assurance during manufacturing of different dosage forms
	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- Identify the influence of different pharmaceutical practices on the development of the surrounding environment and society and helping patients

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- Analyze information in the field of pharmaceutics and data obtained from specific and suitable research
	2.2.2- Propose solutions to specified problems in the light of the available data (information).	B.2- Suggest possible and applicable solutions for different problems in the field of pharmaceutics and that may be observed during the research
	2.2.3- Conduct research studies that add to the current knowledge.	B.3- Acquire the needed knowledge to perform proper pharmaceutical researches in different areas
	2.2.4- Formulate scientific papers.	B.4- Write reports and scientific papers on the results obtained from different pharmaceutical researches
	2.2.5- Asses hazards and risks in professional practice in his \ her areas of specialization.	B.5- Outline the possible hazards that may rise during research and how to overcome them
	2.2.6- Plan to improve performance in the pharmaceutical area of interest.	B.6- Write a planned protocol that should be followed during research to improve performance
	2.2.7- Take Professional decisions and bears responsibility in wide array of pharmaceutical fields.	B.7- Take important decisions and enhance the responsibility of each individual to improve the pharmaceutical research
	2.2.8- Be creative and innovative.	B.8- Apply new ideas and applications in different pharmaceutical researches

	2.2.9- Manage discussions and arguments based on evidence and logic.	B.9- Discuss the obtained results in open sessions and revealed errors and how to avoid them.
Professional and Practical Skills	2.3.1- Master basic and modern professional skills in the area of specialization.	C.1- Acquire the basic professional skills and modern pharmaceutical technologies during research.
	2.3.2- Write and critically evaluate professional reports.	C.2- Write monthly reports about the pharmaceutical researches and make evaluation to these reports
	2.3.3- Evaluate and develop methods and tools existing in the area of specialization.	C.3- Perform up to date methods and techniques during different pharmaceutical researches
	2.3.4- Properly use technological means in a better professional practice.	C.4- Use technology e.g. computer skills, internet…. To obtain better results during research
	2.3.5- Plan to improve professional practice and to improve the performance of other scholars.	C.5- Suggest a recent protocols to improve work in pharmaceutical laboratories
General and Transferable Skills	2.4.1- Effective Communication in its different forms.	D.1- Communicate effectively during research with technicians and team of work
	2.4.2- Effective use of information technologies to improve professional practices.	D.2- Apply modern techniques to improve pharmaceutical researches including computer skills, Language, others.

	2.4.3- Help others to learn and evaluate their performance.	D.3- Enhance self learning with evaluations of the trained persons in pharmaceutics fields.
	2.4.4- Self-assessment and continuous learning.	D.4- Collect and evaluate information in the field of pharmaceutics continuously
	2.4.5- Use various sources to get information and knowledge.	D.5- Collect up to date and the required information from different sources like Books, journals, papers and internet for improving knowledge.
	2.4.6- Work as a member and lead a team of workers.	D.6- Work effectively as a member of team.
	2.4.7- Direct scientific meetings and to manage time effectively.	D.7- Take advantage of the time and attend scientific meetings in the area of specialization

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:		
Esp4	Drug targeting	4	A1, A4, A5, B1, B2
Esp5	Packaging	4	A1, A3, A4, B7
Esp6	Solid oral dosage forms	4	A2, A4, B1, B2
	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. Hanaa El-Ghamry	Program evaluation Courses evaluation	Program report Courses report
External evaluator: Professor Dr. Osama Hassan	Program evaluation Courses evaluation	Program report Courses report
Others methods	Matrix with	The Matrix

	NARS Questionnaires	Results of the questionnaires

Program coordinator **Head of Department**

Prof. Dr. Hanaa El-Ghamry **Prof. Dr. Mahmoud Abdul Ghany**

Drug Targeting

Course specification of Drug Targeting

Course specifications:

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

1- Basic information:

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

2- Overall aim of the course:

On completion of the course, the students will be able to illustrate characters of different colloidal drug delivery systems and their processing steps, perform techniques for preparation of different colloidal drug delivery systems and apply pharmaceutical knowledge in finding reasonable quantitative methods for drug analysis in dosage forms and specification of incompatibilities.

3- Intended learning outcome s (ILO's) of Drug Targeting:

Knowledge and Understanding	
a1	Mention steps of development and design of liposomes, niosomes and nanoparticles
a2	Describe the properties of different types of ingredients used in formulation of liposomes, niosomes and nanoparticles
a3	Illustrate the principles of Artificial DNA nanostructures
Intellectual skills	
b1	Evaluate the results obtained from using different ingredients in formulation of liposomes, niosomes and nanoparticles
b2	Propose solutions for certain problems occurring in manufacture of liposomes, niosomes and nanoparticles
General and Transferable skills	
d1	Use information technology to collect and present information.
d2	Work effectively as a member of a team

4. Course Content of Drug Targeting (PhD degree):

Week	Lecture content (4 hr/w)
1st	• Colloidal drug delivery systems
2nd	• (Liposomes)
3rd	• Formulation of liposomes
4th	• Methods of Loading of drugs within liposomes
5th	• (Niosomes)
6th	• Formulation of niosomes
7th	• Methods of Loading of drugs within niosomes • **(Presentation)**
8th	• (nanoparticles)
9th	• Formulation of nanopartilces
10th	• Methods of Loading of drugs within nanoparticles
11th	• Micelles and dendrimers
12th	• Biodegradable particles
13th	• Artificial DNA nanostructures
14th	• Problems encountered during manufacture and how to overcome

15th	• Revision and Open discussion • **(Final Presentation)**

5- Teaching and Learning Methods:

- Lectures
- Self learning
- Open discussion

6- Student Assessment methods:

Written exams to assess: a1, a2, a3, b1, b2
Oral exam to assess: a1, a2, a3, b1, b2
Activities to assess: d1, d2

Assessment schedule:

Assessment (1): Activity	Week 7-15
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 Delivery and Targeting: For Pharmacists and Pharmaceutical Scientists. Hillery A. M., Andrew W. Loyd and James Swarbrick (2001)

C- Suggested books: Remington's Pharmaceutical Science. Alfonso, R. Gennaro, 17 th edn, Mack Publishing Company, USA. (1985).

D- Websites: Pubmed, Sciencedirect, Nejm, Weily interscience

Facilities required for teaching and learning:

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

- **Course Coordinators: Prof. Dr/ Fakhr El Din Ghazy**
- **Head of Department: Prof Dr/ Mahmoud Abdul-Ghany Mahdy**
- **Date: 2012-9-3 تم اعتماد التوصيف بمجلس القسم بتاريخ**

Matrix I of Drug targeting for (2012-2013)

Course Contents		ILOs of Drug targeting course						
		Knowledge and understanding			Intellectual skills		Transferable and general skills	
		a1	a2	a3	b1	b2	d1	d2
1	Colloidal drug delivery systems	x						
2	Liposomes	x						
3	Formulation of liposomes		x		x			
4	Methods of Loading of drugs within liposomes		x					
5	Niosomes	x						
6	Formulation of niosomes		x		x			
7	Methods of Loading of drugs within niosomes Presentation		x				x	x
8	Nanoparticles	x						
9	Formulation of nanopartilces		x		x			
10	Methods of Loading of drugs within nanoparticles		x					
11	Micelles and dendrimers		x					
12	Biodegradable particles			x				
13	Artificial DNA nanostructures			x				
14	Problems encountered during manufacture and how to overcome		x			x		
15	Revision and Open Discussion Presentation	x	x	x	x	x	x	x

Matrix II of Drug Targeting for 2012-2013

NARS		Program ILOs	Course ILOs	Course contents	Sources	Teaching and learning methods		Method of assessment		
						Lecture	Self learning	Written exam	Oral exam	Activity
2.1	2.1.1- Fundamental and in-depth knowledge and basic theories in the field of specialty and the closely related areas of pharmaceutical sciences.	A.1- Illustrate the orientation of different topics in pharmaceutics and their related subjects including their application	a3	Artificial DNA nanostructures Biodegradable particles	Textbooks, Scientific papers and self learning	x	x	X	X	
	2.1.4- The principles and bases of quality assurance in professional practice in the field of specialization.	A.4- Outline different aspects and principles that followed in quality assurance during manufacturing of different dosage forms	a2	Methods of Loading of drugs within liposomes Methods of Loading of drugs within niosomes Methods of Loading of drugs within nanoparticles Micelles and dendrimers Formulation of liposomes, niosomes and nanoparticles Problems encountered during manufacture and how to overcome	Textbooks, Scientific papers and self learning	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- Identify the influence of different pharmaceutical practices on the development of the surrounding environment and society	a1	Colloidal drug delivery systems Liposomes, niosomes and nanoparticles	Textbooks, Scientific papers and self learning	x	x	X	X	
	2.2.1- Analyze and evaluate the data in his\her specified area and utilize them in logical inference processes (induction/deduction).	B.1- Analyze data obtained from specific and suitable research in different pharmaceutical applications	b1	Formulation of liposomes, niosomes and nanoparticles	Textbooks, Scientific papers and self learning	x	x	X		
	2.2.2- Propose solutions to specified problems in the light of the available data (information).	B.2- Suggest possible applicable solutions for different problems that may be observed during the research and determined upon the obtained data	b2	Problems encountered during manufacture and how to overcome	Textbooks, Scientific papers and self learning	x	x	X		
2.4	2.4.2- Effective use of information technologies to improve professional practices.	D.2- Apply modern techniques to improve pharmaceutical researches including computer skills, Language, others.	d1	Activity	Textbooks, Scientific papers and self learning		x			x

	2.4.6- Work as a member and lead a team of workers.	D.6- Work effectively as a member of team.	d2	Activity	Textbooks, Scientific papers and self learning		x			x

Packaging

Course specification of Packaging

Course specifications:

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

1- Basic information:

Title: **Packaging** Code: ESP 5
Credit hours: 4 hrs/week Lectures: 4 hrs/week
Total: 4 hrs/week

2- Overall aim of the course:

On completion of the course, the students will be able to describe types, properties, problems and evaluation of packaging materials, discuss certain topics related to packaging and prepare reports on certain topics of packaging.

3- Intended learning outcome s (ILO's) of Packaging:

Knowledge and Understanding	
a1	Mention different types of packaging materials and their properties
a2	Mention Package-related contents in the official compendia
a3	Illustrate techniques used in packaging
Intellectual skills	
b1	Discuss recent modifications carried out on packaging materials to match the desired quality
General and Transferable skills	
d1	Use information technology to collect and present information.
d2	Work effectively as a member of a team

4. Course Content of Packaging (PhD degree):

Week number	Lecture content (4 hr/w)
1	• Properties of good packaging • Factors affecting packaging
2	• Moisture, Volatility, Heat, Light, Oxygen, Sterilization and mechanical shock
3	• Glass Types of glass Protection of light sensitive drugs in glass • Advantages and disadvantages of glass
4	• Plastics • General properties of plastics
5	• Types of plastics • Thermoplastic
6	• Types of plastics • Thermosetting
7	• Drug-plastic possible interactions Permeation • Leaching • **(Presentation)**
8	• Drug-plastic possible interactions Sorption Chemical reactions • Physical alterations
9	• Metals

10	• Rubber
11	• Forms of pharmaceutical package • For liquids
12	• Forms of pharmaceutical package • For semi-solid
13	• Forms of pharmaceutical package • For solid
14	• Pouches, plaster package and unit dose packaging
15	• Revision and open discussion • **(Final Presentation)**

5- Teaching and Learning Methods:

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

6- Student Assessment methods:

Written exams to assess: a1, a2, a3, b1
Oral exam to assess: a1, a2, a3, b1
Activities to assess: d1, d2

Assessment schedule:

Assessment (1): Activity	Week 7-15
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-Handouts

B- Essential books: Package Design Workbook: The Art and Science of Successful Packaging by Steven DuPuis and John Silva (2011).

C- **Suggested books:** Package Design Workbook: The Art and Science of Successful Packaging by Steven DuPuis and John Silva (2011).

D- Websites: Pubmed, Sciencedirect, Nejm, Weily interscience

Facilities required for teaching and learning:

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

- **Course Coordinators: Prof Dr/ Hanaa Abd El-Fattah El-Ghamry**
- **Head of Department: Prof Dr/ Mahmoud Abdul-Ghany Mahdy**
- **Date: 2012-9-3 تم اعتماد التوصيف بمجلس القسم بتاريخ**

Matrix I of Packaging for (2012-2013)

Course Contents		ILOs of Packaging course					
		Knowledge and understanding			Intellectual skills	Transferable and general skills	
		a1	a2	a3	b1	d1	d2
1	-Properties of good packaging - Factors affecting packaging			x			
2	Moisture, Volatility, Heat, Light, Oxygen, Sterilization and mechanical shock	x					
3	Glass - Types of glass - Protection of light sensitive drugs in glass - Advantages and disadvantages of glass	x					
4	• Plastics • General properties of plastics	x					
5	Types of plastics - Thermoplastic	x					
6	Types of plastics - Thermosetting	x					
7	Drug-plastic possible interactions - Permeation - Leaching Presentation		x		X	X	X
8	Drug-plastic possible interactions - Sorption - Chemical reactions - Physical alterations		x		X		
9	Metals	x					
10	Rubber	x					
11	Forms of pharmaceutical package - For liquids		x		X		
12	Forms of pharmaceutical package - For semi-solid		x		X		
13	Forms of pharmaceutical		X		X		

	package - For solid						
14	Pouches, plaster package and unit dose packaging			x			
15	Revision and Open discussion Presentation	x	X	x	X	X	x

Matrix II of packaging for 2012-2013

NARS		Program ILOs	Course ILOs	Course contents	Sources	Teaching and learning methods		Method of assessment		
						Lecture	Self learning	Written exam	Oral exam	Activity
2.1	2.1.1- Fundamental and in-depth knowledge and basic theories in the field of specialty and the closely related areas of pharmaceutical sciences.	A.1- Illustrate the orientation and principles of different topics in pharmaceutics and their related subjects including their application	a1	Moisture, Volatility, Heat, Light, Oxygen, Sterilization and mechanical shock Types of glass - Protection of light sensitive drugs in glass - Advantages and disadvantages of glass Plastics -General properties of plastics Metals and Rubbers Types of plastic	Textbooks, Scientific papers and self learning	x	x	x	x	

	2.1.3- The ethical and legal principles in pharmacy and academic practices.	A.3- Illustrate ethical and legal principles in academic practices .	a3	Properties of good packaging - Factors affecting packaging Pouches, plaster package and unit dose packaging	Textbooks, Scientific papers and self learning	x	x	x	x	
	2.1.4- The principles and bases of quality assurance in professional practice in the field of specialization.	A.4- Outline different aspects and principles that followed in quality assurance during manufacturing of different dosage forms	a2	Drug-plastic possible interactions - Permeation - Leaching - Sorption - Chemical reactions Forms of pharmaceutical package	Textbooks, Scientific papers and self learning	x	x	x	x	
2.2	2.2.7- Take Professional decisions and bears responsibility in wide array of pharmaceutical fields.	B.7- Take important decisions and enhance the responsibility of each individual to improve the pharmaceutical research	b1	Drug-plastic possible interactions Forms of pharmaceutical package - For liquids, solids and semi-solids	Textbooks, Scientific papers and self learning	X	x	x		

2.4	2.4.2- Effective use of information technologies to improve professional practices.	D.2- Apply modern techniques to improve pharmaceutical researches including computer skills, Language, others.	d1	Activity	Textbooks, Scientific papers and self learning		x			x
	2.4.6- Work as a member and lead a team of workers.	D.6- Work effectively as a member of team.	d2	Activity	Textbooks, Scientific papers and self learning		x			x

Solid Dosage Forms

Course specification of Solid Dosage Forms

Course specifications:

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

1- Basic information:

Title: **Solid Dosage Forms** Code: ESP 6
Credit hours: 4 hrs/week Lectures: 4 hrs/week
Total: 4 hrs/week

2- Overall aim of the course:

On completion of the course, the students will be able to describe the properties of different solid dosage forms and their manufacture and evaluation, propose solutions for manufacturing problems and write and evaluate scientific reports on solid dosage forms.

3- Intended learning outcome s (ILO's) of Solid dosage forms:

Knowledge and Understanding	
a1	Mention steps of development and design of tablets and capsules
a2	Describe the properties of different types of ingredients used in formulation of tablets and capsules
a3	Illustrate the different techniques and equipments used in manufacture of different solid dosage forms
Intellectual skills	
b1	Evaluate the results obtained from using different ingredients in formulation of solid dosage forms
b2	Propose solutions for certain problems occurring in manufacture of solid dosage forms
General and Transferable skills	
d1	Use information technology to collect and present information.
d2	Work effectively as a member of a team

4. Course Content of solid dosage forms (PhD degree):

Week	Lecture content (4 hr/w)
1st	• Design and formulation of compressed tablets
2nd	• Tablet manufacture
3rd	• Tableting equipment
4th	• Coated tablets
5th	• Evaluation of tablets
6th	• Recent developments in tableting
7th	• Historical development and role of capsules as a dosage form • **(Presentation)**
8th	• Hard gelatin capsules
9th	• Manufacture of hard gelatin capsules
10th	• Filling of hard gelatin capsules
11th	• Soft gelatin capsules
12th	• Formulation and Manufacture of soft gelatin capsules
13th	• Soft/liquid-filled hard gelatin capsules
14th	• Evaluation of capsules
15th	• Revision and Open discussion • **(Final Presentation)**

5- Teaching and Learning Methods:

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

6- Student Assessment methods:

Written exams to assess: a1, a2, a3, b1, b2
Oral exam to assess: a1, a2, a3, b1, b2
Activities to assess: d1, d2

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: Pharmaceutical dosage forms and drug delivery systems, Ansel, H. c., Popovich, N. G., Allen, L. V. 6 th edn, Williams and Wilkins (1995).

C- Suggested books:

1-Remington's Pharmaceutical Science Alfonso, R. Gennaro, 17 th edn, Mack Publishing Company, USA (1985).

2-Pharmaceutical dosage forms: parenteral medications (1993), Kenneth Kavis, Herbert A.lieberman and Leon lachman, 2 nd edition Marcel Dekker, Inc., 270 Madison Avenue, New York.

D- Websites: Pubmed, Sciencedirect, Nejm, Weily interscience

Facilities required for teaching and learning:

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

- **Course Coordinators: Dr/ Mahmoud Mokhtar Ibrahim**
- **Head of Department: Prof Dr/ Mahmoud Abdul-Ghany Mahdy**
- **Date: 2012-9-3 تم اعتماد التوصيف بمجلس القسم بتاريخ**

Matrix I of Solid Dosage Forms for (2012-2013)								
Course Contents		ILOs of Solid dosage forms course						
		Knowledge and understanding			Intellectual skills		Transferable and general skills	
		a1	a2	a3	b1	b2	d1	d2
1	Design and formulation of compressed tablets	X				x		
2	Tablet manufacture		X			X		
3	Tableting equipment			X				
4	Coated tablets	X						
5	Evaluation of tablets	X						
6	Recent developments in tableting	X			X			
7	Historical development and role of capsules as a dosage form Presentation	X					x	x
8	Hard gelatin capsules	X						
9	Manufacture of hard gelatin capsules		X	X				
10	Filling of hard gelatin capsules		X	X				
11	Soft gelatin capsules	X						
12	Formulation and Manufacture of soft gelatin capsules		X	X		X		
13	Soft/liquid-filled hard gelatin capsules	X						
14	Evaluation of capsules	X						
15	Revision and open discussion Presentation	X	X	X	X	X	X	x

Matrix II of Solid Dosage Forms for 2012-2013

NARS		Program ILOs	Course ILOs	Course contents	Sources	Teaching and learning methods		Method of assessment		
						Lecture	Self learning	Written exam	Oral exam	Activity
2.1	2.1.2- Fundamentals, methods, techniques, tools and ethics of scientific research.	A.2- Outline methods and techniques used in out coming a scientific research	a1	Design and formulation of compressed tablets Coated tablets Recent developments in tableting Soft and hard gelatin capsules Soft/liquid-filled hard gelatin capsules Evaluation of tablets Historical development and role of capsules as a dosage form Evaluation of capsules	Textbooks, Scientific papers and self learning	x	x	x	x	

			a3	Manufacture of hard gelatin capsules Filling of hard gelatin capsules Formulation and Manufacture of soft gelatin capsules Tableting equipment	Textbooks, Scientific papers and self learning	x	x	x	x	
	2.1.4- The principles and bases of quality assurance in professional practice in the field of specialization.	A.4- Outline different aspects and principles that followed in quality assurance during manufacturing of different dosage forms	a2	Tablet manufacture Manufacture of hard gelatin capsules Filling of hard gelatin capsules Formulation and Manufacture of soft gelatin capsules	Textbooks, Scientific papers and self learning	x	x	x	x	
	2.2.1- Analyze and evaluate the data in his\her specified area and utilize them in logical inference processes (induction/deduction).	B.1- Analyze data obtained from specific and suitable research in different pharmaceutical applications	b1	Recent developments in tableting	Textbooks, Scientific papers and self learning	x	x	x		

	2.2.2- Propose solutions to specified problems in the light of the available data (information).	B.2- Suggest possible applicable solutions for different problems that may be observed during the research and determined upon the obtained data	b2	Design and formulation of compressed tablets- Tablet manufacture- Formulation and Manufacture of soft gelatin capsules	Textbooks, Scientific papers and self learning	X	x	x		
2.4	2.4.2- Effective use of information technologies to improve professional practices.	D.2- Apply modern techniques to improve pharmaceutical researches including computer skills, Language, others.	d1	Activity	Textbooks, Scientific papers and self learning		x			x
	2.4.6- Work as a member and lead a team of workers.	D.6- Work effectively as a member of team.	d2	Activity	Textbooks, Scientific papers and self learning		x			x

Thesis Specification

PhD Thesis in Pharmaceutics

Course specifications:

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

1- Basic information:

Title: **PhD of pharmaceutical sciences (pharmaceutics)**
Credit hours: **30 hrs**

2- Overall aim of the thesis:

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

- To define and plan the project
- To identify and perform different techniques and methods used in the experimental work according to the designed protocol
- To derive and present the results of the study from the data collected
- To 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
- To provide a complete and accurate record of the material used in the study, cited consistently according to a recognized system

3- Intended learning outcome's (ILOs):	
Knowledge and Understanding	
a1	Outline different principles of pharmaceutics and their possible application in the research study
a2	Demonstrate methods and techniques used during working in the area of specialization of research
a3	Understand the legal aspects of for professional and academic practices
a4	Illustrate the importance of quality assurance during the formulation of different dosage forms
a5	Define different practices that can be used in understanding the problem of the research and help in solving it
Intellectual skills	
b1	Solve problems related to practical work by obtained quantitative data from the practical work
b2	Discuss professional problems and suggest solutions rely on different pharmaceutical knowledge and recent information
b3	Plan a research in the field of drug delivery or targeting that allow discovery of modern and efficient techniques for drug targeting
b4	Integrate scientific results and write report following conducting research
b5	Manage risks and hazards related to professional practical area
b6	Outline principles that should be followed in research to develop laboratory performance
b7	Decide what to do with full responsibility in scientific research
b8	Demonstrate creativity and innovation in modifying techniques and in utilization of various therapy
b9	Discuss the obtained results in open sessions and revealed errors and how to avoid them.
Professional and practical skills	
c1	Apply different techniques related to practical thesis work.
c2	Use and evaluate practical data to write report
c3	Estimate laboratory techniques used in pharmaceutics and industrial pharmacy labs.
c4	Apply technology in methodology development during practical work.

c5	Improve performance by all possible means
General and Transferable skills	
d1	Interact with health care professional.
d2	Use information technology in review and thesis preparation
d3	Set rules for evaluation and judge others performance.
d4	Study independently and evaluate learning needs in pharmaceutics
d5	Reprocess up-to-date information in different areas under study and research
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. 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 under study. Design the protocol including the steps of work following the suitable timetable. Increase the awareness of the recent pharmaceutical techniques that will be used during practical work and determined by the protocol. Integrate different knowledge (Pharmaceutics, industrial pharmacy, GMP, Hospital pharmacy, incompatibilities ……..) to solve suggested problem. Continuous evaluation to the thesis outcome according to the schedule.
2nd	Identify different practical techniques and methods to assess pharmacokinetic parameters related to the subject under study. Perform various techniques to improve physical and chemical characters of drugs under research Formulate many classes of drugs in new dosage forms (suppositories, capsules, tablets, …….) 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). Induction of some diseases in experimental animals (Hypertension, inflammation, seizures…….). Separate biological samples (e.g. blood, plasma). Apply ethical recommendations during dealing with experimental animals Modify techniques required for the progression of work
3rd	Collect raw data for the tested pharmacokinetic parameters. Interpret raw data to get valuable information. Perform statistical analysis 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 Work effectively as a member of a team (e.g. Supervisors, various professionals and Technicians). Present the results periodically in seminars. Define ethics of scientific research. 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: U.V spectrophotometer, centrifuge, Dissolution, Vortex, HPLC, Analytical balance (4digit), Thermostatic water bath, Vacuum Oven

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- **Head of Department: Prof/Dr. Mahmoud Abdul Ghany Mahdy**

Matrix of PhD thesis for 2012-2013

NARS		Program ILOs	Thesis ILOs	Course contents
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- Illustrate the orientation of different topics in pharmaceutics and their related subjects including their application	Outline different principles of pharmaceutics and their possible application in the research study	• 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- Outline methods and techniques used in out coming a scientific research	Demonstrate methods and techniques used during working in the area of specialization of research	• Increase the awareness of the recent pharmaceutical 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- Illustrate ethical and legal principles in academic practices .	Understand the legal aspects of for professional and academic practices	Define ethics of scientific research. Apply ethical recommendations during dealing with experimental animals
	2.1.4- The principles and bases of quality assurance in professional practice in the field of specialization.	A.4- Outline different aspects and principles that followed in quality assurance during manufacturing of different dosage forms	Illustrate the importance of quality assurance during the formulation of different dosage forms	• Formulate many classes of drugs in new dosage forms (suppositories, capsules, tablets, …….)

	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- Identify the influence of different pharmaceutical practices on the development of the surrounding environment and society	Define different practices that can be used in understanding the problem of the research and help in solving it	• Integrate different knowledge (Pharmaceutics, industrial pharmacy, GMP, Hospital pharmacy, incompatibilities ……..) to solve suggested problem.
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- Analyze data obtained from specific and suitable research in different pharmaceutical applications	Solve problems related to practical work by obtained quantitative data from the practical work	• Collect raw data for the tested pharmacokinetic parameters. • Interpret raw data to get valuable information. • Perform statistical analysis for the results. • Present and describe the results graphically. • Suggest solution to the problem under study based on this presented data.
	2.2.2-Propose solutions to specified problems in the light of the available data (information).	B.2- Suggest possible applicable solutions for different problems that may be observed during the research and determined upon the obtained data	Discuss professional problems and suggest solutions rely on different pharmaceutical knowledge and recent information	• Perform various techniques to improve physical and chemical characters of drugs under research • Formulate many classes of drugs in new dosage forms (suppositories, capsules, tablets, …….)

2.2.3- Conduct research studies that add to the current knowledge.	B.3- Acquire the needed knowledge to perform proper pharmaceutical researches in different area	Plan a research in the field of drug delivery or targeting that allow discovery of modern and efficient techniques for drug targeting	• Design the protocol including the steps of work following the suitable timetable.
2.2.4- Formulate scientific papers.	B.4- Write reports about the results obtained from different pharmaceutical researches	Integrate scientific results and write report following conducting research	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- Outline the possible hazards that could be appeared during research and how to overcome it	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.	B6- Outline a specific protocol that should be followed during research	Outline principles that should be followed in research to develop laboratory performance	Design the protocol including the steps of work following the suitable timetable- Modify techniques required for the progression of work.
2.2.7- Take Professional decisions and bears responsibility in wide array of pharmaceutical fields.	B.7- Take important decisions and enhance the responsibility of each individual to improve the pharmaceutical research	Decide what to do with full responsibility in scientific research	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. • Suggest possible recommendations based on the outcome of the thesis and decide future plans.

Professional and Practical Skills	2.2.8- Be creative and innovative.	B.8- Courage individuals to apply new ideas and applications in different pharmaceutical researches	Demonstrate creativity and innovation in modifying techniques and in utilization of various therapy.	• Separate biological samples (e.g. blood, plasma).- Modify techniques required for the progression of work
	2.2.9- Manage discussions and arguments based on evidence and logic.	B.9- Discuss the obtained results in open sessions and revealed errors and how to avoid them.	Discuss the obtained results in open sessions and revealed errors and how to avoid them.	Present results periodically in seminars.
	2.3.1- Master basic and modern professional skills in the area of specialization.	C.1- Acquire the basic professional skills and modern pharmaceutical technologies during research.	Apply different techniques related to practical thesis work.	• Perform various techniques to improve physical and chemical characters of drugs under research
	2.3.2- Write and critically evaluate professional reports.	C.2- Write monthly reports about the pharmaceutical researches and make evaluation of these reports.	Use and evaluate practical data to write report	•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- Perform up to date methods and techniques during different pharmaceutical researches	Estimate laboratory techniques used in pharmaceutics and industrial pharmacy labs	• Perform various techniques to improve physical and chemical characters of drugs under research • Operate scientific instruments according to instructions. • Induction of some diseases in experimental animals (Hypertension, inflammation, seizures…….). • Separate biological samples (e.g. blood, plasma).
	2.3.4- Properly use technological means in a better professional practice.	C.4- Apply modern technologies in analyzing the obtained results	Apply technology in methodology development during practical work.	• 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- Suggest a recent protocols to improve work in pharmaceutical laboratories	Improve performance by all possible means	Design the protocol including the steps of work following the suitable timetable- Modify techniques required for the progression of work.

General and Transferable Skills	2.4.1- Effective Communication in its different forms.	D.1- Communicate effectively during research with technicians and team of work	Interact with health care professional.	• Communicate with supervisors to discuss results
	2.4.2- Effective use of information technologies to improve professional practices.	D.2- Apply modern techniques to improve pharmaceutical researches including computer skills, Language, others.	Use information technology in review and thesis preparation	• Continuous evaluation to the thesis outcome according to the schedule.
	2.4.3- Help others to learn and evaluate their performance.	D.3- Enhance self learning with evaluations of the trained persons in pharmaceutics fields.	Set rules for evaluation and judge others performance.	• Discuss obtained results in comparison with pervious literatures.
	2.4.4- Self-assessment and continuous learning.	D.4- Collect and evaluate the information of self learning to improve continuous learning.	Study independently and evaluate learning needs in pharmaceutics	Continue self-learning throughout the experimental work and writing scientific papers.
	2.4.5- Use various sources to get information and knowledge.	D.5- Collect up to date and the required information from different sources like Books, journals, papers and internet for improving knowledge.	Reprocess up-to-date information in different areas under study and research	• Use internet, journals, books and others thesis to get previous and recent information about the subject under study.
	2.4.6- Work as a member and lead a team of workers.	D.6- Work effectively as a member of team.	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- Take advantage of the time the best use through attending scientific meetings in the area of specialization	Utilize time effectively to achieve goals	Organize the experimental work according to the designed protocol (either individual, parallel or sequential experiments).