Zagazig University

Faculty of Pharmacy

Biochemistry 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 **Biochemistry**

2- Program type: Monodisciplinary.

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

4- Department: Biochemistry

5- Coordinator: Prof. Dr. Sousou Ibrahim

6- Date of program specification approval: 2012

B- Professional Information

1- Program aims:

The Biochemistry master's program aims to provide the postgraduate students with a special and advanced education in the field of biochemistry sciences and to enable them to gain the skills and attributes required for the responsible practice of biochemistry field from the pharmaceutical view.

2-Intended Learning Outcomes (ILOs):

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

2-1- Knowledge and Understanding :

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

A.1- Illustrate properly the principle of biochemistry and their widely growing subjects including molecular biology, biotechnology, routes and chemistry of the metabolism.

A.2- Identify the mutual interaction between professional practices on one hand and community and surrounding environment on the other hand.

A.3- Express clearly the up to date information and methods in biochemistry, genomics and applications of biotechnology in different fields.

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

A.5- Identify the essentials and committance to good laboratory practice and quality assurance in the wide field of biochemistry.

A.6- Demonstrate full awareness of ethics in all aspects of scientific research.

2-2 - Intellectual Skills:

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

B.1- Analyze and interpret quantitative data obtained from biochemistry research in a specific and suitable form.

B.2- Suggest significant solutions for biochemical results and outcome errors based on a wide academic background.

B.3- Acquire the needed pharmaceutical knowledge to manage professional problems.

B.4- Write concrete reports on the obtained results with conclusive significances.

B.5-Recognize possible hazards during work and how to deal with.

B.6- Design a laboratory protocol for a requested biochemical issue.

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- Recognize with personal command the recent laboratory techniques in medical laboratories and academic biochemical research as well.

C.2- Write with confidence reliable scientific reports in biochemical research and medical laboratories.

C.3- Conduct various methods and biochemical techniques of analysis and assure the quality and suitability of instruments.

2-4 - General and Transferable Skills:

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

D.1- Interact effectively with patient and biochemistry professionals.

D.2- Acquire computer skills such as internet, word processing, SPSS and data sheet.

D.3- Practice self assessment of learning needs in the field of biochemistry.

D.4- Retrieve information from various sources in the field of biochemistry.

D.5- Set rules for judging others performance in the field of biochemistry and molecular biology.

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

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

D.8- Study independently and plan research studies.

3- Academic Standards:

- NARS (National Academic Reference Standards)

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

	NARS	Program ILOs
Knowledge and Understanding	2.1.1- Theories and fundamentals related to the field of learning as well as in related areas.	A.1- Illustrate properly the principle of biochemistry and their widely growing subjects including molecular biology, biotechnology, routes and chemistry of the metabolism.
	2.1.2- Mutual influence between professional practice and its impact on the environment.	A.2- Identify the mutual interaction between professional practices on one hand and community and surrounding environment on the other hand.
	2.1.3- Scientific developments in the area of specialization.	A.3- Express clearly the up to date information and methods in biochemistry, genomics and applications of biotechnology 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 essentials and committance to good laboratory practice and quality assurance in the wide field of biochemistry.
	2.1.6- The fundamentals and ethics of scientific research.	A.6- Demonstrate full awareness of ethics in all aspects of scientific research.

Intellectual Skills	2.2.1- Analyze and evaluate information in the field of specialization and analogies to solve problems	B.1- Analyze and interpret quantitative data obtained from biochemistry research in a specific and suitable form.
	2.2.2- Solve specified problems in the lack or missing of some information.	B.2- Suggest significant solutions for biochemical results and outcome errors based on a wide academic background.
	2.2.3-Correlate and integrate different pharmaceutical knowledge to solve professional problems.	B.3- Acquire the needed pharmaceutical knowledge to manage professional problems.
	2.2.4- Conduct research and write scientific report on research specified topics.	B.4- Write concrete reports on the obtained results with conclusive significances.
	2.2.5- Evaluate and manage risks and potential hazards in professional practices in the area of specialization	B.5-Recognize possible hazards during work and how to deal with.
	2.2.6- Plan to improve performance in the field of specialization.	B.6- Design a laboratory protocol for a requested biochemical issue.
	2.2.7- Professional decision-making in the contexts of diverse disciplines.	B.7- Take professional decisions in the area of specialization.

Professional and Practical Skills	2.3.1- Master basic and modern professional skills in the area of specialization.	C.1- Recognize with personal command the recent laboratory techniques in medical laboratories and academic biochemical research as well.
	2.3.2- Write and evaluate professional reports.	C.2- Write with confidence reliable scientific reports in biochemical research and medical laboratories.
	2.3.3- Assess methods and tools existing in the area of specialization.	C.3- Conduct various methods and biochemical techniques of analysis and assure the quality and suitability of instruments.
General and Transferable Skills	2.4.1- Communicate effectively.	D.1- Interact effectively with patient and biochemistry professionals.
	2.4.2- Effectively use information technology in professional practices	D.2- Acquire computer skills such as internet, word processing, SPSS and data sheet.
	2.4.3- Self-assessment and define his personal learning needs.	D.3- Practice self assessment of learning needs in the field of biochemistry.
	2.4.4- Use variable sources to get information and knowledge.	D.4- Retrieve information from various sources in the field of biochemistry.

	2.4.5- Set criteria and parameters to evaluate the performance of others	D.5- Set rules for judging others performance in the field of biochemistry and molecular biology.
	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- Study independently and plan research studies.

4-Curriculum Structure and Contents:

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

b- Program structure:

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

1- Courses: General (1 year) and Special

No. of credit hours for program courses:

Compulsory: 12

Elective: (2x4) 8

Special: (3x4) 12

2- Thesis: 30 hours

The candidate must complete a research project on an approved topic in the Pharmaceutical Sciences. To fulfill this requirement the

student must present (written and orally) a research proposal and write a thesis.

3- General University Requirements: 10 credit hours including:

a- TOEFL (400 units)

b- Computer course

c-Program Curriculum:

Course Code	Course Title	Credit hours	Program ILOs Covered
	General Courses:		
M110	1- Molecular Biology	4	A1, A2, A3, B3,D2, D4.D8
M112	2- Physiology	2	A1, A2, B3, D1
M111	3- Biostatistics	2	A1, A2, A3, B1, B6, D2
M102	4- Instrumental analysis	4	A1, A2, B2, B3, D2, D5, D6
ME4	5- Elective A Biotechnology	4	A1, A2, A3, B3 D2, D4,D6, D8
ME5	6- Elective B Applied Pharmacology	4	A1, A2, B3, B7, D3
ME7	Drug induced diseases	4	A1, A2, B2, B3, D4
	Special Courses:		

Bsp1	Metabolism of individual tissues	4	A1, A2, A3, B1, B3 D2, D4,D8
Bsp3	Integration of metabolism	4	A1, B3 D2, D4,D8
Bsp2	Advanced Biochemistry	4	A1, A2, A4, A5, B3, B5, D2, D4.D8
	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. Hoda El-sayed	Program evaluation Courses evaluation	Program report Courses report
External evaluator: Professor Dr. Mamdouh El-sheshtawy	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. Sousou Ibrahim **Prof. Dr. Mervat Asker**

Molecular Biology

Course specification of Molecular Biology

Course Specification:

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

1-Basic information:

Title: Molecular biology Code: M110

Lectures: 4 hrs/ week Credit hrs: 4 hrs

Total: 4 hrs/week

2-Overall aim of the course:

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

3- Intended learning outcomes (ILOs) of Molecular biology

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

4- Course Content of Molecular Biology

Week number	Lecture contents (4hrs/week)
1	• DNA ,RNA structure, function. • Difference between DNA and RNA
2	• DNA replication steps
3	• Types of RNA • Genetic code
4	• Protein synthesis • Alteration of nucleotide sequence
5	• Genetic engineering • DNA cloning • Applications of cloning in treatment of diseases • Activity
6	• Genomic DNA libraries, c DNA • PCR, LCR and their applications
7	• RFLP • Linkage of polymorphism with gene mutation • Prenatal diagnosis, Diagnosis of sickle cell disease • Case studies
8	• Sequencing of DNA (chemical method)
9	• Sequencing of DNA (enzymatic method)
10	• Electrophoresis
11	• Sothern, western and northern blotting
12	• Sequencing of proteins
13	• Synthesis of genes
14	• Monoclonal antibodies + activity (reports)

15	• Revision and open discussion

5- Teaching and learning methods:

- Lectures
- Self learning
- Open discussion and presentations

6- Student assessment methods:

Written exam assess: a1, a2, a3, a4

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

Activity assess: d1, d2, d3

Assessment schedule:

Assessment (1): Activity	Week 4-15
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: Lippencott's biochemistry

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

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

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

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

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

Old, R.W. and Primrose, S.B. (1989).Principles of Gene Manipulation. 4th Edn. Black Well Scientific Pub. London.

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

Pollard ,Thomas D.and ; William C. Earnshaw (2004) .Cell Biology . Philadelphia: Saunders.

Lodish, Harvey, Arnold Berk, S. Lawrence Zipursky, Paul Matsudaira, David Baltimore, James Darnell Molecular Cell Biology, 4th ed (2000), New York

C- Suggested books: Molecular cell biology, Lodish

D- Websites: pubmed, Sciencedirect, Nejm, Weilyinterscience

Facilities required for teaching and learning:

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

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

Matrix I of Molecular Biology (2012-2013)									
Course Contents		ILOs of Molecular Biology course							
		Knowledge and Understanding				Intellectual skills	General and transferable skills		
		a1	a2	a3	a4	b1	d1	d2	d3
1	• DNA ,RNA structure, function. • Difference between DNA and RNA	x	x						
2	• DNA replication steps	x							
3	• Types of RNA • Genetic code		x						
4	• Protein synthesis • Alteration of nucleotide sequence		x						
5	• Genetic engineering • DNA cloning • Applications of cloning in treatment of diseases -activity			x	x	X	x	x	X
6	• Genomic DNA libraries, c DNA			x		X			

	• PCR, LCR and their applications								
7	• RFLP • Linkage of polymorphism with gene mutation • Prenatal diagnosis, Diagnosis of sickle cell disease			x	x	X			
8	• Sequencing of DNA (chemical method)	x							
9	• Sequencing of DNA (enzymatic method)	x							
10	• Electrophoresis	x							
11	• Sothern, western and northern blotting	x							
12	• Sequencing of proteins		X						
13	• Synthesis of genes	x							
14	• Monoclonal antibodies activity (reports)				X		x	x	x
15	• Revision and open discussion	x	X	x	X	X	x	x	x

Matrix II of Molecular Biology (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 biochemistry and their widely growing subjects including molecular biology, biotechnology, routes and chemistry of the metabolism.	a1	• DNA structure, function. • DNA replication steps • Genomic DNA libraries, c DNA • Sequencing of DNA (chemical method)	Textbooks, Scientific papers and self learning	**x**	**X**	**x**	**x**	

				• Sequencing of DNA (enzymatic method) • Electrophoresis • Sothern, western and northern blotting • Synthesis of genes						
			a2	• RNA structure, function. • Difference between DNA and RNA • Types of RNA • Genetic code	Textbooks, Scientific papers and self learning	**x**	**X**	**x**	**x**	

				• Protein synthesis • Alteration of nucleotide sequence • Sequencing of proteins						
	2.1.2- Mutual influence between professional practice and its impact on the environment.	A.2- Identify the mutual interaction between professional practices on one hand and community and surrounding environment on the other hand	a4	• Applications of cloning in treatment of diseases • Prenatal diagnosis, Diagnosis of sickle cell disease • Monoclonal antibodies	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 biochemistry, genomics and applications of biotechnology in different fields.	a3	• Genetic engineering • DNA cloning • PCR, LCR and their applications • RFLP • Linkage of polymorphism with gene mutation	Textbooks, Scientific papers and self learning	**x**	**x**	**x**	**x**	
2.2	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	• Genetic engineering • DNA cloning • PCR, LCR and their applications • RFLP	Textbooks, Scientific papers and self learning	**x**	**x**	**x**	**x**	

				• Linkage of polymorphism with gene mutation • Applications of cloning in treatment of diseases • Prenatal diagnosis, Diagnosis of sickle cell disease • Monoclonal antibodies						

	2.4.2- Effectively use information technology in professional practices	D.2- Acquire computer skills such as internet, word processing, SPSS and data sheet.	d1	• Revision and open discussion	Textbooks, Scientific papers and self learning	x	x			x
2.4	2.4.4- Use variable sources to get information and knowledge.	D.4- Retrieve information from various sources in the field of biochemistry.	d2							
	2.4.8- Continuous and self learning.	D.8- Study independently and plan research studies	d3						x	

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: Biochemistry department
- Department offering the course: Biochemistry department in conjunction with Microbiology department.
- Date of specification approval: 2012/2013

1- Basic information:

Title: Biotechnology Code: ME4

Lectures: 4 hrs/week Credit hours: 4 hrs

Total: 4 hrs/week

2-Overall aim of the course:

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

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

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

4- Course Content of ygolonhcetoiB

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

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

5- Teaching and Learning Methods:

- Lectures

- Self learning
- Open discussion and presentations

6-Student Assessment methods:

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

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

Activity assess: d1, d2, d3

Assessment schedule:

Assessment (1): Activity	Week 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**

Matrix I of Biotechnology (2012-2013)

Course Contents		ILOs of Biotechnology course						
		Knowledge and Understanding			Intellectual skills	general and transferable skills		
		a1	a2	a3	b1	d1	d2	d3
1	Introduction to biotechnology	x						
2	Bioprocess	x						
3	Downstream process	x						
4	Cell culture -activity	x				x	x	X
5	Hybridoma technology	x						
6	Medical technology	x			x			
7	Medicines from cultured cells	x			x			
8	• Genomic DNA • Differences in Eukaryotic and prokaryotic genes		x					
9	• DNA Recombination • Naturally occurring recombinant DNA through:		x					

	Transformation							
	Transduction							
	Conjugation							
10	• Artificial recombinant DNA Technology (in Lab)		**x**		**x**			
11	• Application of genetic engineering:			**X**				
	o Studies of regulation subcloning							
	o Construction of industrially important bacteria							
	o Genetic engineering of plants							
	o Production of drugs							
	o Synthetic vaccines							
	o Gene therapy							
12	• Principle of PCR technology and gene amplification			**X**				

13	Applications and advances in PCR			**x**				
14	• Pharmaceutically useful monoclonal antibodies - activity presentation of reports			**x**		**x**	**x**	**X**
15	• Revision and open discussion	**x**	**x**	**x**	**X**	**x**	**x**	**X**

Matrix II of Biotechnology (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 biochemistry and their widely growing subjects including molecular biology, biotechnology,	a1	• Introduction to biotechnology • Bioprocess • Downstream processing • Cell culture	Textbooks, Scientific papers and self learning	**X**	**X**	**X**	**X**	

		routes and chemistry of the metabolism.		• Hybridoma technology • Medical biotechnology • Medicine from cultured cells						
			a2	• Genomic DNA • Differences in Eukaryotic and prokaryotic genes • DNA Recombination	Textbooks, Scientific papers and self learning	**X**	**X**	**X**	**X**	

				• Naturally occurring recombinant DNA through:						
				Transformation						
				Transduction						
				Conjugation						
				• Artificial recombinant DNA Technology (in Lab)						

	2.1.2- Mutual influence between professional practice and its impact on the environment.	A.2- Identify the mutual interaction between professional practices on one hand and community and surrounding environment on the other hand	a3	• Application of genetic engineering: o Studies of regulation subcloning o Construction of industrially important bacteria o Genetic engineering of plants o Production of drugs o Synthetic vaccines o Gene therapy	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 biochemistry, genomics and applications of biotechnology in different fields.	a3	• Application of genetic engineering: o Studies of regulation subcloning o Construction of industrially important bacteria o Genetic engineering of plants o Production of drugs o Synthetic vaccines o Gene therapy	Textbooks, Scientific papers and self learning	**X**	**X**	**X**	**X**	

				o Monoclonal antibodies						
2.2	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	• Medical biotechnology • Medicine from cultured cells • Artificial recombinant DNA Technology (in Lab)	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 such as internet, word processing, SPSS and data sheet.	d1	• Activity (presentation of reports)	Textbooks, Scientific papers and self learning	X	X			X
	2.4.4- Use variable sources to get information and knowledge.	D.4- Retrieve information from various sources in the field of biochemistry.	d2							
	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							

	2.4.8- Continuous and self learning.	D.8- Study independently and plan research studies.	d4						X	

Courses offered by other departments

Instrumental Analysis II

Course specification of Instrumental Analysis II

A- Course specifications:

- Program on which the course is given: Master's of Pharmaceutical Sciences
- Major or Minor element of program: Major
- Department offering the program: Biochemistry
- 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**

Physiology

Course specification of ygoloisyhP

A- Course specifications:

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

1- Basic information:

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

2- Overall aim of the course:

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

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

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

4. Course Content of Physiology:

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

5- Teaching and Learning Methods:

- Lectures
- Self learning
- noissucsid nepO

6- Student Assessment methods:

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

Assessment schedule:

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

Weighting of Assessment:

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

7- References and books:

A-Scientific papers

B- Essential books:

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

Facilities required for teaching and learning:

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

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

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: Biochemistry
- 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: Biochemistry
- 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: Biochemistry
- 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**

Metabolism of Individual Tissues

Course specification of Metabolism of individual tissues

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: Biochemistry Dept.
- Department offering the course: Biochemistry Dept
- Date of specification approval: 2012/2013

1- Basic information:

Title: **Metabolism of individual tissues** Code: BSp1

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 principles of tissue metabolism, outline abnormalities relevant to tissue metabolism and integrate metabolism background to identify clinical problems and interpret scientific results.

3. Intended learning outcome s (ILOs) of Metabolism of individual tissues:

A- Knowledge and Understanding	
a1	Outline control mechanisms of metabolism.
a2	Describe metabolic roles and pathways in different organs.
a3	Identify the correlation between environmental changes and metabolism.
a4	Illustrate up to date diagnosis of metabolic disorders.
B- Intellectual skills	
b1	Integrate and link metabolic background to determine metabolic abnormalities.
b2	Correlate the knowledge of different biochemical aspects to solve health problems.
D- General and transferable skills	
d1	Use computer skills as internet and power point in the activities.
d2	Gain information from various sources as text books, scientific journals, internet……..
d3	Work effectively as a member of a team.
d4	Search on various topics and write reports.

4. Course Content of Metabolism of individual tissues

Week number	Lecture contents (4hrs/week)
1	High energy compounds.
2	• Major metabolic control mechanisms. - Control of enzyme levels. - Control of enzyme activity. • Activity
3	• Major metabolic control mechanisms. - Compartmentation. - Hormonal regulation.
4	• Receptors in the tissues.
5	• Metabolic roles of organs - Liver - Kidney
6	• Metabolic roles of organs - Brain – Heart
7	• Metabolic roles of organs - Adipose tissue - Locomotor system (muscle- bone)
8	• Abnormalities in these tissues.
9	• Abnormalities in these tissues.
10	• Biochemical and non biochemical diagnosis

	of metabolic abnormalities.
11	• Open discussion for some case studies.
12	• Activity (presentation of review articles)
13	• Metabolic effect of smoking and malnutrition.
14	• Effect of environment on metabolism. - Heavy metals - Radiation - Insecticides
15	• Revision and open discussion

5- Teaching and Learning Methods:

- Lectures
- Self learning
- noissucsid nepO and presentations

6- Student Assessment methods:

Written exams assess: a1, a2, a3, a4, b1, b2

Oral exam assess: a1, a2, a3, a4, b1, b2,d4

Activity assess: d1, d2, d3, d4

Assessment schedule:

Assessment (1): Activity	Week 2-12
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:

Biochemistry, 2nd edition, Mathews, van Holde.

Biochemistry, fifth edition, 2002, Jereny M. Berg, John L. Tymoczko, Lubert Stryer.

C- Suggested books: Fundamentals of biochemistry upgrade edition, 2002, Donald Voet, Judith G. Voet, Charlotte W. Pratt.

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/ Hoda El-Sayed**
- **Head of Department: Prof Dr/ Mervat Asker**
- **Date:201-9-2 تم اعتماده فى مجلس القسم بتاريخ**

Matrix I of Metabolism of individual tissues (2012-2013)

Course Contents		ILOs of Metabolism of individual tissues course									
		Knowledge and understanding				Intellectual skills		General and Transferable skills			
		a1	a2	a3	a4	b1	b2	d1	d2	d3	d4
1	High energy compounds.	x									
2	• Major metabolic control mechanisms. - Control of enzyme levels. - Control of enzyme activity. • Activity	x						x	X	x	x
3	• Major metabolic control mechanisms. - Compartmentation. - Hormonal regulation.	x									
4	• Receptors in the tissues.	x									
5	• Metabolic roles of organs - Liver – Kidney		X								
6	• Metabolic roles of organs - Brain – Heart		X								
7	• Metabolic roles of organs		X								

	- Adipose tissue - Locomotor system (muscle- bone)										
8	• Abnormalities in this tissues.					**x**					
9	• Abnormalities in this tissues.					**x**					
10	• Biochemical and non biochemical diagnosis of metabolic abnormalities.				**x**		**x**				
11	• Open discussion for some case studies.			**x**							
12	• Activity (presentation of review articles)							**x**	**X**	**x**	**x**
13	• Metabolic effect of smoking and malnutrition.						**x**				
14	• Effect of environment on metabolism. - Heavy metals - Radiation - Insecticides			**x**			**x**				
15	• Revision and open discussion	**x**	**X**	**x**	**x**	**x**	**x**	**x**	**X**	**x**	**x**

Matrix II of Metabolism of individual tissues (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 biochemistry and their widely growing subjects including molecular biology, biotechnology, routes and chemistry of the metabolism.	a1	High energy compounds. • Major metabolic control mechanisms. - Control of enzyme levels. - Control of enzyme activity. • Activity • Major metabolic control mechanisms.	Textbooks, Scientific papers and self learning	X	X	X	x	

				- Compartmentation.						
				- Hormonal regulation.						
				• Receptors in the tissues.						
			a2	• Metabolic roles of organs	Textbooks, Scientific papers and self learning	X	x	X	x	
				- Liver - Kidney						
				• Metabolic roles of organs						
				- Brain – Heart						
				• Metabolic roles of organs						

				- Adipose tissue - Locomotor system (muscle- bone)						
	2.1.2- Mutual influence between professional practice and its impact on the environment.	A.2- Identify the mutual interaction between professional practices on one hand and community and surrounding environment on the other hand	a3	• Open discussion for some case studies.	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 biochemistry, genomics and applications of biotechnology in different fields.	a4	• Biochemical and non biochemical diagnosis of metabolic abnormalities	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 interpret quantitative data obtained from biochemistry research in a specific and suitable form.	b1	• Abnormalities in this tissues	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	b2	• Biochemical and non biochemical diagnosis of metabolic abnormalities.	Textbooks, Scientific papers and self learning	X	x	X	x	

				• Metabolic effect of smoking and malnutrition.						
				• Effect of environment on metabolism.						
				- Heavy metals						
				- Radiation						
				- Insecticides						
2.4	2.4.2- Effectively use information technology in professional practices	D.2- Acquire computer skills such as internet, word processing, SPSS and data sheet.	d1	• Activity (presentation of review articles)	Textbooks, Scientific papers and self learning	X	x			X

	2.4.4- Use variable sources to get information and knowledge.	D.4- Retrieve information from various sources in the field of biochemistry.	d2							
	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							
	2.4.8- Continuous and self learning.	D.8- Study independently and plan research studies.	d4							

									X	

Integration of Metabolism

Course specification of Integration of Metabolism

Course specifications:

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

1- Basic information:

Title: Integration of metabolism Code: BSp3

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 illustrate interconnected metabolic pathways, outline principles of metabolic adaptation and link metabolic pathways to the abnormalities that may rise.

3. Intended learning outcome s (ILOs) of Integration of metabolism

A-Knowledge and Understanding	
a1	Outline interconnected pathways of metabolism.
a2	Identify the regulation of metabolic pathways.
a3	Demonstrate metabolic changes during fed/ fasting cycle and diseases.
a4	Illustrate some nutritional aspects.
B-Intellectual skills	
b1	Solve some health problems based on academic knowledge.
b2	Write and present review articles.
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 Integration of metabolism

Week number	Lecture contents (4hrs/week)
1	• Overview of the major metabolic pathways
2	• Interconnected pathways
3	• Fed fasting cycle
4	• Effect of hormones on individual metabolic pathways
5	• Fuel choice during exercise

6	• Ethanol alters metabolism
7	• Activity (review article)
8	• Obesity
9	• Obesity and case studies
10	• Diabetes mellitus
11	• Nutrition: nutritional consideration for specified individuals
12	• Nutrition: Drug - nutrient interaction
13	• Nutrition: Diet linked diseases + case studies
14	• Final term oral presentation
15	• Revision and open discussion

5- Teaching and Learning Methods:

- Lectures
- Self learning
- Open discussion and presentations

6- Student Assessment methods:

Written exams assess: a1, a2, a3, a4, b1, b2
Oral exam assess: a1, a2, a3, a4, b1, b2 and d3
Activity assess: d1, d2 and d3

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- Handouts

B- Essential books:

-Concise Biochemistry, 1996, Anatoly bezkorovainy, Max. E. Rafelson.

-Text book of biochemistry with clinical clinical correlation 4th edition, 1997, Thomas M. Delvin.

C- Suggested books:

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/ Mervat Asker**
- **Head of Department: Prof Dr/ Mervat Asker**
- **Date: 2012-9-2 تم اعتماده فى مجلس القسم بتاريخ**

Matrix I of Integration of Metabolism (2012-2013)

	Course Contents	ILOs of Integration of Metabolism course								
		Knowledge and understanding				Intellectual skills		General and transferable skills		
		a1	a2	a3	a4	b1	b2	d1	d2	d3
1	• Overview of the major metabolic pathways	X								
2	• Interconnected pathways	X								
3	• Fed fasting cycle			x						
4	• Effect of hormones on individual metabolic pathways		x							
5	• Fuel choice during exercise		x							
6	• Ethanol alters metabolism		x							
7	• Activity (review article)							x	x	X
8	Obesity			x						
9	Obesity and case study			x		x				
10	Ethanol alters metabolism			x						
11	• Nutrition: nutritional consideration for specified individuals				x	x				
12	• Nutrition: Drug- nutrient interaction				x					
13	• Nutrition: Diet linked diseases + case studies				x	x				
14	• Final term oral presentation							x	x	x
15	• Revision and open discussion	X	x	x	x	x	X	x	X	x

Matrix II of Integration of Metabolism (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 biochemistry and their widely growing subjects including molecular biology, biotechnology, routes and	a1	• Overview of the major metabolic pathways • Interconnected pathways	Textbooks, Scientific papers and self learning	x	x	x	x	
			a2	• Effect of hormones on individual metabolic pathways						

		chemistry of the metabolism.		• Fuel choice during exercise						
				• Ethanol alters metabolism						
	2.1.2- Mutual influence between professional practice and its impact on the environment.	A.2- Identify the mutual interaction between professional practices on one hand and community and surrounding environment on the other hand.	a3	• Fed fasting cycle						
				• Obesity						
				• Obesity and case studies						
				• Diabetes mellitus						
			a4	• Nutrition: nutritional consideration for specified individuals						
				• Nutrition: Drug - nutrient interaction						
				• Nutrition: Diet linked diseases + case studies						

2.2	2.2.2- Solve specified problems in the lack or missing of some information.	B.2- Suggest significant solutions for biochemical results and outcome errors based on a wide academic background.	b1	• Obesity and case studies • Nutrition: nutritional consideration for specified individuals • Nutrition: Diet linked diseases + case studies	Textbooks, Scientific papers and self learning	x	x	X	x	
	2.2.4- Conduct research and write scientific report on research specified topics	B.4- Write concrete reports on the obtained results with conclusive significances.	b2	• Activity (review article) • Final term oral presentation		x	x	x	x	

2.4	2.4.2- Effectively use information technology in professional practices	D.2- Acquire computer skills such as internet, word processing, SPSS and data sheet.	d1	• Revision and open discussion	Textbooks, Scientific papers and self learning	x	x			X
	2.4.4- Use variable sources to get information and knowledge.	D.4- Retrieve information from various sources in the field of biochemistry.	d2							
	2.4.8- Continuous and self learning.	D.8- Study independently and plan research studies	d3						X	

Advanced Biochemistry

Course specification of Advanced Biochemistry

Course specifications:

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

1- Basic information:

Title: Therapeutic drug monitoring Code: BSp2

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 outline clinical significance of tumor and inflammatory markers, focus on clinical chemistry of geriatrics and pediatrics and acquire information about body fluids and relation to health problems

3. Intended learning outcome s (ILOs) of ecnavdAd Biochemistry:

A-Knowledge and Understanding	
a1	Illustrate tumor and inflammatory markers and demonstrate their clinical significance.
a2	Discuss clinical chemistry of geriatric and pediatric patients.
a3	Recognize the source, physiologic purpose and clinical utility of laboratory measurements for body fluids.
B-Intellectual skills	
b1	Analyze and interpret laboratory measurements for tumor and inflammatory markers and body fluids.
b2	Correlate changes in extreme ages to manage their health problems.
D- General and transferable skills	
d1	Use computer skills as internet and power point in the activities.
d2	Gain information from various sources as text books, scientific journals, internet……..
d3	Work effectively as a member of a team.

4. Course Content of Advanced Biochemistry:

Week number	Lecture contents (4hrs/week)
1	• Metabolic aspects of malignant diseases
2	• Tumor markers (types and applications)
3	• Tumor markers (detection and frequently ordered tumor markers)
4	• Oxidative stress
5	• Clinical chemistry of geriatric patients • Biochemical and physiologic changes of aging
6	• Clinical chemistry results of aging
7	• Midterm oral presentations
8	• Clinical chemistry of pediatric patients - Childhood disorders
9	• Case studies
10	• Body fluids - Amniotic fluids- Cerebrospinal fluid
11	• Body fluids - Synovial fluid- Serous fluids
12	• Inflammatory markers
13	• Inflammatory markers
14	• Final term oral presentations
15	• Revision and Open discussion

5- Teaching and Learning Methods:

- Lectures
- Self learning
- Open discussion and presentations

6- Student Assessment methods:

Written exams assess: a1, a2, a3, b1and b2
Oral exam assess: a1, a2, a3, b1, b2 and d3
Activity assess: d1, d2 and d3

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:

- Bishop clinical chemistry, sixth edition, 2010,Michael L Bishop, Edward P Fody, Larry E Schoeff
- Clinical Chemistry, fifth edition, 2004, William J Marshall, Stephen K Bangert

c- Websites: pubmed, Sciencedirect, Nejm, Weilyinterscience

Facilities required for teaching and learning:

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

- **Course Coordinators: Prof Dr/ Sousou Ibrahim**
- **Head of Department: Prof Dr/ Mervat Asker**
- **Date: 2012-9-2 تم اعتماده فى مجلس القسم بتاريخ**

Matrix I of Advanced biochemistry (2012-2013)

Course Contents		ILOs of Advanced biochemistry course							
		Knowledge and understanding			Intellectual skills		General and transferable skills		
		a1	a2	a3	b1	b2	d1	d2	d3
1	• Metabolic aspects of malignant diseases	x							
2	• Tumor markers (types and applications)	x			x				
3	• Tumor markers (detection and frequently ordered tumor markers)	x			x				
4	• Oxidative stress	x			x				
5	• Clinical chemistry of geriatric patients • Biochemical and physiologic changes of aging		X			x			
6	• Clinical chemistry results of aging		X			x			
7	• Midterm oral presentations						x	x	X
8	• Clinical chemistry of pediatric patients - Childhood disorders		X			x			
9	• Case studies		X			x			
10	• Body fluids - Amniotic fluids- Cerebrospinal fluid			X	x				
11	• Body fluids - Synovial fluid- Serous fluids			X	x				
12	• Inflammatory markers	x			x				
13	• Inflammatory markers	x			x				
14	• Final term oral presentations						x	x	X
15	• Revision and Open discussion	x	X	X	x	x	x	x	X

Matrix II of Advanced biochemistry (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- Mutual influence between professional practice and its impact on the environment.	A.2- Identify the mutual interaction between professional practices on one hand and community and surrounding environment on the other hand	a2	• Clinical chemistry of geriatric patients • Biochemical and physiologic changes of aging • Clinical chemistry results of aging • Clinical chemistry of pediatric patients - Childhood disorders	Textbooks, Scientific papers and self learning	X	x	x	X	

				• Case studies						
	2.1.3- Scientific developments in the area of specialization.	A.3- Express clearly the up to date information and methods in biochemistry, genomics and applications of biotechnology in different fields.	a1	• Metabolic aspects of malignant diseases • Tumor markers (types and applications) • Tumor markers (detection and frequently ordered tumor markers) • Oxidative stress • Inflammatory markers	Textbooks, Scientific papers and self learning	X	x	x	X	

			a3	• Body fluids - Amniotic fluids- Cerebrospinal fluid • Body fluids - Synovial fluid- Serous fluids	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 interpret quantitative data obtained from biochemistry research in a specific and suitable form	b1	• Tumor markers (types and applications) • Tumor markers (detection and frequently ordered tumor markers) • Oxidative stress • Body fluids - Amniotic fluids- Cerebrospinal fluid • Body fluids - Synovial fluid-	Textbooks, Scientific papers and self learning	X	x	x	X	

				Serous fluids • Inflammatory markers						
	2.2.3-Correlate and integrate different pharmaceutical knowledge to solve professional problems.	B.3- Acquire the needed pharmaceutical knowledge to manage professional problems	b2	• Clinical chemistry of geriatric patients • Biochemical and physiologic changes of aging • Clinical chemistry results of aging • Clinical chemistry of pediatric patients - Childhood disorders • Case studies	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 such as internet, word processing, SPSS and data	d1	• Revision and open discussion	Textbooks, Scientific papers and self learning	x	x		X	X

		sheet.								
	2.4.4- Use variable sources to get information and knowledge.	D.4- Retrieve information from various sources in the field of biochemistry.	d2							
	2.4.8- Continuous and self learning.	D.8- Study independently and plan research studies	d3							

Thesis Specification

Thesis of Master Degree

A- Thesis specifications:

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

1- Basic information:

Title: Master Thesis in Biochemistry

Credit hours: 30 hrs

2- Overall aim of the thesis:

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

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

3- Intended learning outcome's (ILOs):

Knowledge and Understanding	
a1	Outline theoretical and advanced bases of biochemistry and biology related to main objectives of the thesis
a2	Determine the problem the thesis will handle in correlation with the community and surrounding environment
a3	Explain clearly the principles of different and advanced biochemical and analytical techniques
a4	Understand any legal aspects related to the thesis work.
a5	Demonstrate GLP and quality assurance related to practical work of the thesis
a6	Identify and apply scientific experimental ethics.
Intellectual skills	
b1	Solve problems related to practical work by obtained quantitative data from the practical work
b2	Discuss professional problems and suggest solutions relay on different pharmaceutical knowledge and recent information
b3	Combine required specialties to manage the subject under study
b4	Integrate scientific results and write report following conducting research
b5	Manage risks and hazards related to professional practical area
b6	Design a laboratory protocol for the work
b7	Decide what to do with full responsibility in scientific research
Professional and practical skills	
c1	Perform practical work relative to experimental design. Apply different techniques related to practical thesis work.

c2	Use and evaluate practical data to write report
c3	Apply various biochemical techniques involved in the protocol
General and Transferable skills	
d1	Communicate effectively with all people related to the work
d2	Use information technology in review and thesis preparation
d3	Evaluate the work and learning needs
d4	Use various sources to get information about the subject understudy
d5	Set rules for evaluation and judging others performance.
d6	Work effectively as a member of a team
d7	Acquire time management skills
d8	Study independently and plan research studies.

4. Thesis Content:

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

	determined by the protocol. Integrate different knowledge (biochemistry, pharmacological knowledge, biostatistics, histology ……..) to solve suggested problem. Continuous evaluation to the thesis outcome according to the schedule.
2nd	Identify different practical techniques and methods to assess biochemical parameters related to the subject under study. 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). Perform surgical operations to prepare animal model to certain disease (nephrectomy, ovarectomy…..). Induction of some diseases in experimental animals (obesity, diabetes…….). Separate biological samples and tissues (e.g. blood, plasma, csf, urine, kidney, liver……). Apply ethical recommendations during dealing with humans/ experimental animals. Understand any legal aspects related to the thesis work.
3rd	Collect raw data for the tested biochemical parameters. Interpret raw data to get valuable information. Perform statistical analysis and biological correlation for the results. Present and describe the results graphically. Suggest solution to the problem understudy based on this

	presented data.
4th	- Communicate with supervisors to discuss results and with patients to collect case history and samples. Work effectively as a member of a team (e.g. Supervisors, various professionals and Technicians). Present the results periodically in seminars. Write scientific reports on the obtained results with conclusive significance. Discuss obtained results in comparison with pervious literatures. Suggest possible recommendations based on the outcome of the thesis and decide future plans. Summarize the thesis in an understandable Arabic language for non professionals. Write references in the required form (Thesis, Paper…….). Demonstrate the thesis in a final power point presentation. Continue self-learning throughout the experimental work and writing scientific papers.

5- Teaching and Learning Methods:

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

6- References:

- Websites: Pubmed, Sciencedirect, Weilyinterscience

Facilities required for:

1. **For practical work:** U.V spectrophotometer, centrifuge, PCR, ELISA, Gamma counter, Electrophoresis

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- **Head of Department: Prof. Dr. Mervat Asker**

	Master Thesis (Biochemistry)			
	NARS	**Program ILOs**	**Thesis ILOs**	**Thesis content**
Knowledge and Understanding	2.1.1- Theories and fundamentals related to the field of learning as well as in related areas.	A.1- Illustrate properly the principles of biochemistry and their widely growing subjects including molecular biology, biotechnology, routes and chemistry of the metabolism.	Outline theoretical and advanced bases of biochemistry and biology related to main objectives of the thesis	• Collect all available information about this subject by all possible means.
	2.1.2- Mutual influence between professional practice and its impact on the environment.	A.2- Identify the mutual interaction between professional practices on one hand and community and surrounding environment on the other hand	Determine the problem the thesis will handle in correlation with the community and surrounding environment	• Suggest the possible points/ problems of research that the candidate can work on in the frame of the aim of work and choose proper point related to the problems of the community and surrounding environment.
	2.1.3- Scientific developments in the area of specialization.	A.3- Express clearly the up to date information and methods in biochemistry, genomics and applications of biotechnology in different fields.	Explain clearly the principles of different and advanced biochemical and analytical techniques	• Increase the awareness of the recent biochemical and analytical techniques that will be used during practical work and determined by the protocol.

	2.1.4- Moral and legal principles for professional practice in the area of specialization.	A.4- Understand the legal aspects of for professional practices	Understand any legal aspects related to the thesis work.	• Understand any legal aspects related to the thesis work.
	2.1.5- Principles and the basics of quality in professional practice in the area of specialization.	A.5- Identify the essentials and committance to good laboratory practice and quality assurance in the wide field of biochemistry.	Demonstrate GLP and quality assurance related to practical work of the thesis	• Identify different practical techniques and methods to assess biochemical parameters related to the subject under study. • Operate scientific instruments according to instructions.
	2.1.6- The fundamentals and ethics of scientific research.	A.5- Demonstrate full awareness of ethics in all aspects of scientific research.	Identify and apply scientific experimental ethics.	• Apply ethical recommendations during dealing with humans/ experimental animals.

Intellectual Skills	2.2.1- Analyze and evaluate information in the field of specialization and analogies to solve problems	B.1- Analyze and interpret quantitative data obtained from biochemistry research in a specific and suitable form.	Solve problems related to practical work by obtained quantitative data from the practical work	• Collect raw data for the tested biochemical parameters. • Interpret raw data to get valuable information. • Perform statistical analysis and biological correlation for the results. • Present and describe the results graphically. • Suggest solution to the problem understudy based on this presented data.
	2.2.2- Solve specified problems in the lack or missing of some information.	B.2- Suggest significant solutions for biochemical results and outcome errors based on a wide academic background.	Discuss professional problems and suggest solutions relay on different pharmaceutical knowledge and recent information	• Discuss obtained results in comparison with pervious literatures. • Suggest possible recommendations based on the outcome of the thesis and decide future plans.

	2.2.3-Correlate and integrate different pharmaceutical knowledge to solve professional problems.	B.3-Acquire the needed pharmaceutical knowledge to manage professional problems.	Combine required specialities to manage the subject under study	• Integrate different knowledge (biochemistry, pharmacological knowledge, biostatistics, histology ……..) to solve suggested problem.
	2.2.4- Conduct research and write scientific report on research specified topics.	B.4- Write concrete reports on the obtained results with conclusive significances.	Integrate scientific results and write report following conducting research	• Write scientific reports on the obtained results with conclusive significance.
	2.2.5- Evaluate and manage risks and potential hazards in professional practices in the area of specialization	B.5- Recognize possible hazards during work and how to deal with	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- Design a laboratory protocol for a requested biochemical issue.	Design a laboratory protocol for the work	• Design the protocol including the steps of work following the suitable timetable.

	2.2.7- Professional decision-making in the contexts of diverse disciplines.	B.7- Take professional decisions in the area of specialization	Decide what to do with full resposibility 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 related to the problems of the community and surrounding environment. Suggest possible recommendations based on the outcome of the thesis and decide future plans.
Professional and Practical Skills	2.3.1- Master basic and modern professional skills in the area of specialization.	C.1- Recognize with personal command the recent laboratory techniques in medical laboratories and academic biochemical research as well.	Perform practical work relative to experimental design. Apply different techniques related to practical thesis work.	• Identify different practical techniques and methods to assess biochemical parameters related to the subject under study.

	2.3.2- Write and evaluate professional reports.	C.2- Write with confidence reliable scientific reports in biochemical research and medical laboratories.	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- Conduct various methods and biochemical techniques of analysis and assure the quality and suitability of instruments.	Apply various biochemical techniques involved in the protocol	• Operate scientific instruments according to instructions. • Perform surgical operations to prepare animal model to certain disease (nephrectomy, ovarectomy…..). • Induction of some diseases in experimental animals (obesity, diabetes…….). • Separate biological samples and tissues (e.g. blood, plasma, csf,

				urine, kidney, liver……).
General and Transferable Skills	2.4.1- Communicate effectively.	D.1- Interact effectively with patients and biochemistry professionals.	Communicate effectively with all people related to the work	• Communicate with supervisors to discuss results and with patients to collect case history and samples.
	2.4.2- Effectively use information technology in professional practices	D.2- Acquire computer skills such as internet, word processing, SPSS and data sheet.	Use information technology in review and thesis preparation	• Present the results periodically in seminars • Demonstrate the thesis in a final power point presentation.
	2.4.3- Self-assessment and define his personal learning needs.	D.3- Practice self assessment of learning needs in the field of biochemistry.	Evaluate the work and learning needs	• Continuous evaluation to the thesis outcome according to the schedule.

	2.4.4- Use variable sources to get information and knowledge.	D.4- Retrieve information from various sources in the field of biochemistry.	Use various sources to get information about the subject understudy	• Use internet, journals, books and others thesis to get previous and recent information about the subject understudy.
	2.4.5- Set criteria and parameters to evaluate the performance of others	D.5- Set rules for judging others performance in the field of biochemistry and molecular biology.	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.	Work effectively as amember 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	· Organize the experimental work according to the designed protocol (either individual, parallel or sequential experiments).
	2.4.8- Continuous and self learning.	D.8- Study independently and plan research studies.	Study independently and plan research studies.	• Continue self-learning throughout the experimental work and writing scientific papers.

PhD Degree

Program Specification

Program Specification

A- Basic Information

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

2- Program type: Monodisciplinary.

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

4- Department: Biochemistry

5- Coordinator: Prof. Dr. Mohamed El-sewidey

6- Date of program specification approval: 2012

B- Professional Information

1- Program aims:

The Biochemistry PhD program aims to provide the doctorate students with a special and advanced education in the field of biomedical sciences and enable them to gain the skills and attitudes required for the responsible practice of Pharmacy.

2-Intended Learning Outcomes (ILOs):

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

2-1- Knowledge and Understanding :

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

A1- Explain the basics and in-depth information of biochemistry and their relevant subjects including molecular biology, metabolic aspect and clinical biochemistry.

A2- Determine methods, techniques and ethics of scientific research.

A3- Identify ethical and legal aspects of academic and professional practice.

A4- Understand principles of quality assurance in clinical biochemistry practice.

A5- Demonstrate awareness of his role in guiding the community.

2-2 - Intellectual Skills:

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

B1- Analyze and evaluate information in the fields of biochemistry, molecular biology, and genetics.

B2- Utilize and correlate background and practical knowledge to overcome difficulties in the fields of biochemistry and molecular biology.

B3- Construct research study in biochemistry, molecular biology that open new horizons for the discovery of new biochemical pathways and mechanisms.

B4- Write professional scientific paper in biochemistry field.

B5- Determine practical difficulties in the field of clinical biochemistry and molecular biology.

B6- Develop current methods and techniques in clinical biochemistry and molecular biology.

B7- Take professional and scientific decisions regarding biochemical, molecular and genetic research.

B8- Demonstrate creativity and innovation in biochemical research study and practice.

B9- Manage seminars and open discussion settings in the field of biochemistry and relevant fields.

2-3 - Professional and Practical Skills:

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

C1- Perform high quality laboratory techniques in biochemical analysis that fulfill good laboratory practice in clinical biochemistry research studies.

C2- Write and judge scientific research in biochemistry and related subjects.

C3- Assess various methods and techniques of analysis and instruments quality in the field of biochemistry.

C4- Use computer and internet skills professionally in biochemistry research.

C5- Develop different methodologies in biochemistry, molecular biology and laboratory performance.

2-4 - General and Transferable Skills:

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

D1- Communicate effectively with colleagues in the field of biochemistry and molecular biology and advise patients.

D2- Utilize information technology skills in professional development.

D3- Evaluate learning needs and professional performance of juniors.

D4- Practice self learning continuously to improve academic and professional performance .

D5- Retrieve information from different sources .

D6- Work effectively as a leader of team.

D7- Perform research study in the field of biochemistry within specified time.

3- Academic Standards:

- NARS (National Academic Reference Standards)

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

	NARS		Program ILOs
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.	A1 Explain the basics and in-depth information of biochemistry and their relevant subjects including molecular biology, metabolic aspect and clinical biochemistry.
	2.1.2	Fundamentals, methods, techniques, tools and ethics of scientific research.	A2 Determine methods, techniques and ethics of scientific research.
	2.1.3	The ethical and legal principles in pharmacy and academic practices.	A3 Identify ethical and legal aspects of academic and professional practice.

	2.1.4	The principles and bases of quality assurance in professional practice in the field of specialization.	A4 Understand principles of quality assurance in clinical biochemistry practice.
	2.1.5	All relevant knowledge concerning the impact of professional practice on society and environment and the ways of their conservation and development.	A5 Demonstrate awareness of his role in guiding the community .
Intellectual Skills	**2.2.1**	Analyze, evaluate the data in his / her specified area, and utilize them in logical inference processes (induction/deduction).	B1 Analyze and evaluate information in the fields of biochemistry, molecular biology, and genetics.
	2.2.2	Propose solutions to specified problems in the light of the available data (information).	B2 utilize and correlate background and practical knowledge to overcome difficulties in the fields of biochemistry and molecular biology.
	2.2.3	Conduct research studies that add to	B3 Construct research study in

		the current knowledge.	biochemistry, molecular biology that open new horizons for the discovery of new biochemical pathways and mechanisms.
	2.2.4	Formulate scientific papers.	B4 Write professional scientific paper in biochemistry field.
	2.2.5	Assess hazards and risks in professional practice in his / her area of specialization.	B5 Determine practical difficulties in the field of clinical biochemistry and molecular biology.
	2.2.6	Plan to improve performance in the pharmaceutical area of interest.	B6 Develop current methods and techniques in clinical biochemistry and molecular biology.
	2.2.7	Take professional decisions and bears responsibility in wide array of pharmaceutical fields.	B7 Take professional and scientific decisions regarding biochemical, molecular and genetic research.
	2.2.8	Be creative and innovative.	B8 Demonstrate creativity and innovation in biochemical research study and practice.
	2.2.9	Manage discussions and arguments based on evidence and logic.	B9 Manage seminars and open discussion settings in the field of biochemistry and relevant fields.

Professional and Practical Skills	**2.3.1**	Mastery of basic and modern professional skills in the area of specialization.	C1 Perform high quality laboratory techniques in biochemical analysis that fulfill good laboratory practice in clinical biochemistry research studies.
	2.3.2	Write and critically evaluate professional reports	C2 Write and judge scientific research in biochemistry and related subjects.
	2.3.3	Evaluate and develop methods and tools existing in the area of specialization.	C3 Assess various methods and techniques of analysis and instruments quality in the field of biochemistry.
	2.3.4	Properly use technological means in a better professional practice.	C4 Use computer and internet skills professionally in biochemistry research.
	2.3.5	Plan to improve professional practices and to improve the performance of other scholars .	C5 Develop different methodologies in biochemistry, molecular biology and laboratory performance.
Transf erable	**2.4.1**	Effective communication in its different forms.	D1 Communicate effectively with colleagues in the field of biochemistry and molecular biology and advise

			patients.
	2.4.2	Efficiently use the information technologies (IT) in improving the professional practices.	D2 Utilize information technology skills in professional development.
	2.4.3	Help others to learn and evaluate their performances.	D3 Evaluate learning needs and professional performance of juniors.
	2.4.4	Self- assessment and continuous learning.	D4 Practice self learning continuously to improve academic and professional performance .
	2.4.5	Use various sources to get information and knowledge.	D5 Retrieve information from different sources .
	2.4.6	Work as a member and lead a team of workers .	D6 work effectively as a leader of team.

	2.4.7	Direct scientific meetings and to manage time effectively.	D7 Perform research study in the field of biochemistry within specified time.

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:		
Bsp4	Molecular endocrinology	4	A1, A5, B1, B2, D2, D5
Bsp5	Biotransformation	4	A1, A5, B1, B2, D2, D5, D6
Bsp6	Regulation of gene Expression	4	A1, A5, B1, B2, D2, D5,
	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. Hoda El-sayed	Program evaluation Courses evaluation	Program report Courses report
External evaluator: Professor Dr. Mamdouh El-sheshtawy	Program evaluation Courses evaluation	Program report Courses report
Others methods	Matrix with NARS Questionnaires	The Matrix Results of the questionnaires

Program coordinator **Head of Department**

Prof. Dr. Mohamed El-Sweidy **Prof. Dr. Mervat Asker**

Biotransformation

Course specification of Biotransformation

Course specifications:

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

1- Basic information:

Title: Biotransformation Code: BSp5

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 explain principles of biotransformation reactions and factors affecting these reactions, define effects of xenobiotic processing on health and analyze biotransformation information to conclude body processing of different xenobiotics as well as bioactivation causes.

3.Intended learning outcome s (ILOs) of Biotransformation

A-Knowledge and Understanding	
a1	Outline basics of biotransformation.
a2	Illustrate biotransformation reactions and processes in details.
a3	Compare between phase I and phase II biotransformation reactions.
a4	Define biotransformation enzymes consequences of their induction & inhibition and their applications in pharmaceutical preparations .
a5	Summarize modifiers to xenobiotics biotransformation, bioactivation and their impact on public health.
B-Intellectual skills	
b1	Assess biotransformation reactions and factors influencing them to conclude different profiles xenobiotics.
b2	Propose causes of xenobiotics bioactivation and toxicity in the light of biotansformation background.
D- General and transferable skills	
d1-	Use information technology skills in developing professional practices
d2-	Gain different information from various sources
d3-	Work effectively as team leader with team workers

4- Course Content of Biotransformation (PhD degree)

Week number	Lecture contents (4hrs/week)
1	• Biotransformation (definition, biomedical importance)
2	• Biotransformation Reactions
3	• Phase I reactions
4	• Phase II reactions
5	• Phase III reactions
6	• Biotransformation Sites
7	• Biotransformation Enzymes • Activity (review article)
8	• Induction of Biotransformation Enzymes
9	• Inhibition of Biotransformation Enzymes
10	• Applications of enzymes induction -Inhibition in pharmaceutical preparations

11	• Factors Affecting Biotransformation
12	• Bioactivation of xenobiotics
13	• Toxic effects of xenobiotics (i.e: carcinogenic, immunologic reactions, cell death…etc)
14	• Activity (presentations)
15	• Revision and open discussion

5- Teaching and Learning Methods:

- Lectures
- Self learning
- Group discussion and presentations

6- Student Assessment methods:

Written exams assess: a1, a2, a3, a4, a5, b1, b2

Oral exam assess: a1, a2, a3, a4, a5, b1, b2, d2

Activity assess: d1, d2, d3

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:

i- Biotransformation (metabolism) 2000

ii- Biotransformation and Metabolite Elucidation of Xenobiotics: Characterization and Identification: Ala F. Nassar; John wiley &sons.

C- Suggested books:

i- Metabolite conjugation

ii- Harper's Illustrated Biochemistry (28th edition); Robert K. Murray, David A Bender, Kathleen M. Botham, Peter J. Kennelly, Victor W. Rodwell, P. Anthony Weil; The Mc Graw Hill companies Inc. (2009).

D- Websites: pubmed, Sciencedirect, Nejm, Weilyinterscience

Facilities required for teaching and learning:

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

- **Course Coordinators: Prof Dr/ Mohamed Mahmoud ElSeweidy**
- **Head of Department: Prof Dr/ Mervat Asker**
- **Date: 2012-9-2 تم اعتماده فى مجلس القسم بتاريخ**

Matrix I of Biotransformation (2012-2013)

Course Contents		ILOs of Biotransformation									
		Knowledge and Understanding					Intellectual skills		General and transferable skills		
		a1	a2	a3	a4	a5	b1	b2	d1	d2	d3
1	Biotransformation (definition, biomedical importance)	x									
2	Biotransformation reactions	x	x				x				
3	Phase I reactions	x	x	x			x				
4	Phase II reactions	x	x	x			x				
5	Phase III reactions		x				x				
6	Biotransformation Sites		x				x				
7	Biotransformation Enzymes - activity (review article)		x						X	x	x
8	Induction of Biotransformation Enzymes				x						
9	Inhibition of Biotransformation Enzyme				x		x				
10	Applications of enzyme induction-inhibition in pharmaceutical preparations				x		x				
11	Factors Affecting Biotransformation					x	x				
12	Bioactivation of xenobiotics					x		x			
13	Toxic effects of xenobiotics ()i.e: carcinogenic, immunologic reactions, cell death..etc)					x		x			
14	Activity (presentations)	x	x	x	x	x	x	x	X	x	x
15	Revision and open discussion	x	x	x	x	x	x	x	X	x	x

Matrix II of Biotransformation (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
2.1.1	Fundamental and in-depth knowledge and basic theories in the field of specialty and the closely related areas of pharmaceutical sciences.	A1	a1	Biotransformation (definition, biomedical importance), Biotransformation reactions: phase I, phase II, phase III reactions	Scientific papers, text books and self learning	x	X	x	x	

			a2	Biotransformation reactions: phase I, phase II, phase III reactions, Biotransformation Sites	Scientific papers, text books and self learning	x	X	x	x	
2.1.5	All relevant knowledge concerning the impact of professional practice	A5	a3	phase I, phase II, phase III reactions,	Scientific papers, text books and self learning	x	X	x	x	

	on society and environment and the ways of their conservation and development.		a4	Biotransformation Enzymes,Enzymes induction&inhibition, • Applications of enzymes induction -Inhibition in pharmaceutical preparations	Scientific papers, text books and self learning	x	X	x	x	
			a5	Factors Affecting Biotransformation, Bioactivation of xenobiotics, toxic effects of xenobiotics,	Scientific papers, text books and self learning	x	X	x	x	

2.2.1	Analyze, evaluate the data in his/her specified area, and utilize them in logical inference processes (induction/deduction)	B1	b1	Biotransformation reactions: phase I, phase II, phase III reactions, Biotransformation Sites, Enzymes, Enzymes induction&inhibition, Factors Affecting Biotransformation,	Scientific papers, text books and self learning	x	X	X	x	
2.2.2	Propose solutions to specified problems in the light of the available data (information).	B2	b2	Bioactivation of xenobiotics, toxic effects of xenobiotics	Scientific papers, text books and self learning	x	X	X	x	

2.4.2	Efficiently use the information technologies (IT) in improving the professional practices.	D2	d1	Revision and open discussion - Activity	Scientific papers, text books and self learning	x	X			X
2.4.5	Use various sources to get information and knowledge.	D5	d2							
2.4.6	Work as a member and lead a team of workers .	D6	d3						x	

Regulation of Gene Expression

Course specification of Regulation of gene expression

Course specifications:

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

1- Basic information:

Title: Regulation of gene expression Code: BSp6
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 principles of regulation of gene expression and its mechanism, demonstrate replication, transcription, translation and their applications and analyze and interpret data in genetics.

3-Intended learning outcome s (ILOs) of Regulation of gene expression:

A-Knowledge and Understanding	
a1	Outline phases of cell cycle, DNA structure and replication.
a2	Explain RNA structure, genetic code, transcription and translation.
a3	Differentiate between regulation of gene expression in prokaryotes and eukaryotes.
a4	Determine types and causes of gene mutations.
a5	Define recent advances and applications relevant to gene expression.
B-Intellectual skills	
b1	Analyze and interpret alteration in gene expression.
b2	Utilize genetic information to clarify diseases arising from genetic abnormalities and suggest suitable detection method.
D- General and transferable skills	
d1-	Use information technology skills in developing professional practices
d2-	Gain different information from various sources

4- Course Content of Regulation of Gene expression

Week number	Lecture contents (4hrs/week)
1	• Overview
2	• Cell cycle
3	• DNA structure
4	• DNA replication
5	• RNA structure
6	• Transcription
7	• Posttranscriptional modification • Activity (review article)
8	• Genetic code
9	• Translation
10	• Posttranslational modification
11	• Applications: detection of specific sequences among DNA fragments and gene mutation
12	• Regulation of prokaryotic gene expression
13	• Regulation of eukaryotic gene expression
14	• Mutations (definition, causes, types) • Activity (presentations)

15	• Revision and open discussion

5-Teaching and Learning Methods:

- Lectures
- Self learning
- Group discussion and presentations

6-Student Assessment methods:

Written exams assess: a1, a2, a3, a4, b1, b2

Oral exam assess: a1, a2, a3, a4, b1, b2, d2

Activity 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: Genetics

C- Suggested books: Molecular genetics (Hawkins, John D.) 1996

D- Websites: pubmed, Science direct, Nejm, Weilyinterscience

Facilities required for teaching and learning:

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

- **Course Coordinators: Prof Dr/ Mohamed Mahmoud ElSeweidy**
- **Head of Department: Prof Dr/ Mervat Asker**
- **Date: 2012-9-2 تم اعتماده فى مجلس القسم بتاريخ**

Matrix I of Regulation of Gene expression (2012-2013)

Course Contents		ILOs								
		KU					IS		GTS	
		a1	a2	a3	a4	a5	b1	b2	d1	d2
1	Overview	x								
2	Cell cycle	x					x			
3	DNA structure	x								
4	DNA replication	x								
5	RNA structure		x							
6	Transcription		x							
7	Posttranscriptional modification -activity (review article)		x						x	x
8	The genetic code		x							
9	Translation		x							
10	Posttranslational modification		x							
11	Applications: detection of specific sequences among DNA fragments and gene mutation					X		x		
12	Regulation of prokaryotic gene expression			x			x	x		

13	Regulation of eukaryotic gene expression			x			x	x		
14	Mutations (definition, causes, types) - activity (presentations)				x			x	x	X
15	revision and open discussion	X	X	x	x	x	x	x	x	X

Matrix II of Regulation of Gene Expression (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
2.1.1	Fundamental and in-depth knowledge and basic theories in the field of specialty and the closely related areas of	A1	a1	Overview, Cell cycle, DNA structure, DNA replication,	Scientific papers, text book and self learning	X	x	x	x	

	pharmaceutical sciences.		a2	RNA structure- Transcription - Posttranscriptional modification- Genetic code- Translation- Posttranslational modification	Scientific papers, text book and self learning	X	x	X	x	
			a3	Regulation of prokaryotic gene expression- Regulation of eukaryotic gene expression	Scientific papers, text book and self learning	X	x	x	x	

			a4	Mutations (definition, causes, types)	Scientific papers, text book 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	A5	a5	Applications: detection of specific sequences among DNA fragments and gene mutation	Scientific papers, text book and self learning	X	x	X	x	

2.2.1	Analyze, evaluate the data in his / her specified area, and utilize them in logical inference processes (induction/deduction).	B1	b1	Cell cycle- Regulation of prokaryotic gene expression- Regulation of eukaryotic gene expression- Open discussion	Scientific papers, text book and self learning	X	x	x		

2.2.2	Propose solutions to specified problems in the light of the available data (information).	B2	b2	Applications: detection of specific sequences among DNA fragments and gene mutation- Regulation of prokaryotic gene expression- Regulation of eukaryotic gene expression- Mutations (definition, causes, types	Scientific papers, text book and self learning	X	X	X	x	

2.4.2	Efficiently use the information technologies (IT) in improving the professional practices.	D2	d1	activity - revision and open discussion	Scientific papers, text book and self learning					x
2.4.5	Use various sources to get information and knowledge.	D5	d2						X	

Molecular Endocrinology

Course specification of Molecular Endocrinology

Course specifications:

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

1- Basic information:

Title: Molecular endocrinology Code: BSp4

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 explain mechanism of action, functions and disorders of hormones, summarize different hormones receptors and regulation of hormone secretion and analyze and interpret endocrinal abnormalities and uses of hormone therapy.

3. Intended learning outcome s (ILOs) of Molecular endocrinology

A- Knowledge and Understanding	
a1	Illustrate principles of hormones structure, function and mechanism of action.
a2	Outline different hormones receptors and regulation of hormone secretion.
a3	Describe detailed disorders of different kinds of hormones.
a4	Demonstrate awareness of all relevant knowledge to hormone storage, transport and hormone therapy.
B- Intellectual skills	
b1	Analyze role of receptors in mediating hormonal action and in regulation of hormone secretion.
b2	Determine symptoms of hormonal abnormalities in the light of academic study.
b3	Demonstrate creativity in selection of the most appropriate hormonal therapy used for treatment various endocrinal disorders by comparing between its benefits and risks.
D- General and transferable skills	
d1-	Use information technology skills in developing professional practices
d2-	Gain different information from various sources

4. Course Content of Molecular endocrinology

Week number	Lecture contents (4hrs/week)
1	• Biomedical importance of molecular endocrinology
2	• Hormones (Definition, general functions, classification)
3	• Hormone receptors
4	• Mechanism of action of steroidal hormones
5	• Mechanism of action of hormones that use cAMP as second messenger
6	• Mechanism of action of hormones that use cGMP as second messenger
7	• Mechanism of action of hormones that use calcium and phospholipids as second messenger • Activity (review article)
8	• Mechanism of action of hormones that use kinase or phosphatase cascade
9	• Transport of hormones
10	• Storage of hormones

11	• Regulation of hormone secretion
12	• Diseases associated with hormone disorders
13	• Hormone therapy
14	• Revision • Activity (presentations)
15	• Open discussion

5- Teaching and Learning Methods:

- Lectures
- Self learning
- Group discussion and presentations

6- Student Assessment methods:

Written exams assess: a1, a2, a3, a4, b1, b2, b3
Oral exam assess: a1, a2, a3, a4, b1, b2, b3,d2
Activity 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: Hormones

C- Suggested books: Hormone receptors

D- Websites: pubmed, Sciencedirect, Nejm, Weilyinterscience

Facilities required for teaching and learning:

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

- **Course Coordinators: Prof Dr/ Mohamed Mahmoud ElSeweidy**
- **Head of Department: Prof Dr/ Mervat Asker**
- **Date: 2012-9-2 تم اعتماده فى مجلس القسم بتاريخ**

Matrix I of Molecular endocrinology (2012-2013)

Course Contents		ILOs of Molecular endocrinology								
		KU				IS			GTS	
		a1	a2	a3	a4	b1	b2	b3	d1	d2
1	Biomedical importance of molecular endocrinology	x								
2	Hormones Definition, general functions, classification)	x								
3	Hormone receptors		X			x				
4	Mechanism of action of steroidal hormones	x				x				
5	Mechanism of action of hormones that use cAMP as second messenger	x				x				
6	Mechanism of action of hormones that use cGMP as second messenger	x				x				

7	Mechanism of action of hormones that use calcium and phospholipids as second messenger -activity (review article)	x				x			x	x
8	Mechanism of action of hormones that use kinase or phosphatase cascade	x				x				
9	Transport of hormones				X					
10	Storage of hormones				X					
11	Regulation of hormone secretion		x			x				
12	Diseases associated with hormone disorders			x			x	x		
13	Hormone therapy				X			x		
14	Revision -activity (presentations)	x	x	x	X	x	x	x	x	X
15	Open discussion	x	x	x	X	x	x	x	x	X

Matrix II of Molecular endocrinology (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
2.1.1	Fundamental and in-depth knowledge and basic theories in the field of specialty and the closely related areas of pharmaceutical sciences.	A1	a1	Biomedical importance of molecular endocrinology	Scientific papers, text book and self learning	x	x	x		
				Hormones Definition, general functions, classification)	Scientific papers, text book and self learning	x	x	x		

				Mechanism of action of steroidal hormones	Scientific papers, text book and self learning	x	x	x		
					Notebook, text book and internet	x	x	X		
				Mechanism of action of hormones that use cAMP as second messenger	Scientific papers, text book and self learning	x	x	x		
				Mechanism of action of hormones that use cGMP as second messenger	Scientific papers, text book and self learning	x	x	x		

				Mechanism of action of hormones that use calcium and phospholipids as second messenger	Scientific papers, text book and self learning	x	x	x		
				Mechanism of action of hormones that use kinase or phosphatase cascade	Scientific papers, text book and self learning	x	x	x		
				Revision and open discussion	Scientific papers, text book and self learning	x	x	x		
			a2	Hormone receptors	Scientific papers, text book and self	x	x	x		

					learning					
				Regulation of hormone secretion	Scientific papers, text book and self learning	x	x	x		
				Revision and open discussion	Scientific papers, text book and self learning	x	x	x		
			a3	Diseases associated with hormone disorders	Scientific papers, text book and self learning	x	x	x		
				Revision and open discussion	Scientific papers, text book and self learning	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.	A5	a4	Transport of hormones	Scientific papers, text book and self learning	x	x	x		
				Storage of hormones	Scientific papers, text book and self learning	x	x	x		
				Hormone therapy	Scientific papers, text book and self learning	x	x	x		
				Revision and open discussion	Scientific papers, text book and self learning	x	x	x		
2.2.1	Analyze, evaluate the data in his/her specified area, and	B1	b1	Hormone receptors	Scientific papers, text book and	x	x	x		

	utilize them in logical inference processes (induction/deduction)				self learning					
				Mechanism of action of steroidal hormones	Scientific papers, text book and self learning	x	x	x		
				Mechanism of action of hormones that use cAMP as second messenger	Scientific papers, text book and self learning	x	x	x		
				Mechanism of action of hormones that use cGMP as second messenger	Scientific papers, text book and self learning	x	x	x		

				Mechanism of action of hormones that use calcium and phospholipids as second messenger	Scientific papers, text book and self learning	x	x	x		
				Mechanism of action of hormones that use kinase or phosphatase cascade	Scientific papers, text book and self learning	x	x	x		
				Regulation of hormone secretion	Scientific papers, text book and self learning	x	x	x		
				Revision and open discussion	Scientific papers, text book and self	x	x	x		

					learning					
2.2.2	Propose solutions to specified problems in the light of the available data (information).	B2	b2	Diseases associated with hormone disorders	Scientific papers, text book and self learning	x	x	x		
				Revision and open discussion	Scientific papers, text book and self learning	x	x	x		
			b3	Diseases associated with hormone disorders	Scientific papers, text book and self learning	x	x	x		
				Hormone therapy	Scientific papers, text book and self learning	X	X	x		

				Revision and open discussion	Scientific papers, text book and self learning	X	x	x		
2.4.2	Efficiently use the information technologies (IT) in improving the professional practices.	D2	d1	Revision and open discussion - activity (review article - presentations)	Scientific papers, text book and self learning					x
2.4.5	Use various sources to get information and knowledge.	D5	d2						x	

Thesis Specification

Thesis Specification of PhD Degree

A- Course specifications:

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

1- Basic information:

Title: Title: Master Thesis in Biochemistry
Credit hours: 30 hrs

2- Overall aim of the thesis:

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

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

3- Intended learning outcome's (ILOs):

Knowledge and Understanding	
a1	Illustrate fundamentals and advanced bases of biochemistry, genetics, and metabolic pathways related to main objectives of the thesis
a2	Identify recent techniques, methods to analyze biochemical samples as well as ethics of scientific research
a3	Understand the legal aspects of for professional and academic practices
a4	Define GLP and quality assurance bases related to practical work of the thesis
Intellectual skills	
b1	Solve problems related to practical work by obtained quantitative data from the practical work
b2	Discuss professional problems and suggest solutions relay on different pharmaceutical knowledge and recent information
b3	Plan a research in the field of biochemistry and molecular biology that allow discovery of alternative effects and pathways to add to current data .
b4	Integrate scientific results and write report following conducting research
b5	Manage risks and hazards related to professional practical area
b6	Adopt GLP principles 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	Manage evidence based arguments in the field of biochemistry and metabolism.
Professional and practical skills	
c1	Perform practical work relative to experimental design. Apply different techniques related to practical thesis work.
c2	Use and evaluate practical data to write report
c3	Estimate laboratory techniques used in biochemistry and genetics lab. Develop methods of assay of various parameters. Apply GLP in Biochemistry research to develop laboratory performance.
c4	Apply technology in methodology development during practical work. Use IT skills in collecting information, presenting results and writing thesis
c5	Modify laboratory techniques.
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 biochemistry and molecular biology.
d5	Reprocess up-to-date information in biochemistry and molecular biology.
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 understudy. -Design the protocol including the steps of work following the suitable timetable. -Increase the awareness of the recent biochemical and analytical techniques that will be used during practical work and determined by the protocol. -Integrate different knowledge (biochemistry, pharmacological knowledge, biostatistics, histology ……..) to solve suggested problem. -Continuous evaluation to the thesis outcome according to the schedule.

2nd	-Identify different practical techniques and methods to assess biochemical parameters related to the subject under study. -Operate scientific instruments according to instructions and GLP basics. -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). -Perform surgical operations to prepare animal model to certain disease (nephrectomy, ovarectomy…..). -Induction of some diseases in experimental animals (obesity, diabetes…….). -Separate biological samples and tissues (e.g. blood, plasma, csf, urine, kidney, liver……). -Apply ethical recommendations during dealing with humans/ experimental animals
3rd	-Collect raw data for the tested biochemical parameters. -Modify methods for biological samples analysis -Interpret raw data to get valuable information. -Perform statistical analysis and biological correlation for the results. -Present and describe the results graphically.

	-Suggest solution to the problem understudy based on this presented data.
4th	-Communicate with supervisors to discuss results and with patients to collect case history and samples. -Work effectively as a member of a team (e.g. Supervisors, various professionals and Technicians). -Present the results periodically in seminars. -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 and presentations

6- References:

- Websites: Pubmed, Sciencedirect, Weilyinterscience

Facilities required for:

1. **For practical work:** U.V spectrophotometer, centrifuge, PCR, ELISA, Gamma counter, Electrophoresis

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- **Head of Department: Prof. Dr. Mervat Asker**

	Matrix of PhD Thesis in Biochemistry Program for 2011-2012				
	NARS		Program ILOs	Thesis ILOs	Thesis content
KU	2.1.1	Fundamental and in-depth knowledge and basic theories in the field of specialty and the closely related areas of pharmaceutical sciences.	A1 Explain the basics and in-depth information of biochemistry and their relevant subjects including molecular biology, metabolic aspect and clinical biochemistry.	Illustrate fundamentals and advanced bases of biochemistry, genetics, and metabolic pathways related to main objectives of the thesis	Collect all available information about this subject by all possible means.
	2.1.2	Fundamentals, methods, techniques, tools and ethics of scientific research.	A2 Determine methods, techniques and ethics of scientific research.	Identify recent techniques, methods to analyze biochemical samples as well as ethics of scientific research	Increase the awareness of the recent biochemical and analytical techniques that will be used during practical work and determined by the protocol.
					Identify different practical techniques and methods to assess biochemical parameters related to the subject under study.
					Define ethics of scientific research.

					Identify different practical techniques and methods to assess biochemical parameters related to the subject under study.
					Apply ethical recommendations during dealing with humans/ experimental animals.
	2.1.3	The ethical and legal principles in pharmacy and academic practices.	A3 Identify ethical and legal aspects of academic and professional practice.	Understand the legal aspects of for professional and academic practices	Apply ethical recommendations during dealing with humans/ experimental animals.
					Define ethics of scientific research.
	2.1.4	The principles and bases of quality assurance in professional practice in the field of specialization.	A4 Understand principles of quality assurance in clinical biochemistry practice.	Define GLP and quality assurance bases related to practical work of the thesis	Operate scientific instruments according to instructions and GLP basics.
	2.1.5	All relevant knowledge concerning the impact of professional practice on society and environment and the ways of their conservation and development.	A5 Demonstrate awareness of his role in guiding the community.		
	2.2.1	Analyze, evaluate the data in his / her specified	B1 Analyze and evaluate information in the fields of	Solve problems related to practical work by obtained quantitative data from the	Collect raw data for the tested biochemical parameters.

IS		area, and utilize them in logical inference processes (induction/deduction).	biochemistry, molecular biology, and genetics.	practical work	Interpret raw data to get valuable information.
					Perform statistical analysis and biological correlation for the results.
					Present and describe the results graphically.
					Suggest solution to the problem understudy based on this presented data.
	2.2.2	Propose solutions to specified problems in the light of the available data (information).	B2 utilize and correlate background and practical knowledge to overcome difficulties in the fields of biochemistry and molecular biology.	Discuss professional problems and suggest solutions relay on different pharmaceutical knowledge and recent information	Suggest solution to the problem understudy based on this presented data.
					Integrate different knowledge (biochemistry, pharmacological knowledge, biostatistics, histology ……..) to solve suggested problem.
	2.2.3	Conduct research studies that add to the current knowledge.	B3 Construct research study in biochemistry, molecular biology that open new horizons for the discovery of new biochemichal pathways and mechanisms.	Plan a research in the field of biochemistry and molecular biology that allow discovery of alternative effects and pathways to add to current data .	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.
					Design the protocol including the steps of work following the suitable timetable.

	2.2.4	Formulate scientific papers.	B4 Write professional scientific paper in biochemistry field.	Integrate scientific results and write report following conducting research	Write scientific reports on the obtained results with conclusive significance.
	2.2.5	Assess hazards and risks in professional practice in his / her area of specialization.	B5 Determine practical difficulties in the field of clinical biochemistry and molecular biology.	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 Develop current methods and techniques in clinical biochemistry and molecular biology.	Adopt GLP principles in research to develop laboratory performance	Design the protocol including the steps of work following the suitable timetable. Modify methods for biological samples analysis
	2.2.7	Take professional decisions and bears responsibility in wide array of pharmaceutical fields.	B7 Take professional and scientific decisions regarding biochemical, molecular and genetic 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.
	2.2.8	Be creative and innovative.	B8 Demonstrate creativity and innovation in biochemical research study and practice.	Demonstrate creativity and innovation in modifying techniques and in utilization of various therapy.	Modify methods for biological samples analysis.

	2.2.9	Manage discussions and arguments based on evidence and logic.	B9 Manage seminars and open discussion settings in the field of biochemistry and relevant fields.	Manage evidence based arguments in the field of biochemistry and metabolism.	Present the results periodically in seminars
PS	**2.3.1**	Mastery of basic and modern professional skills in the area of specialization.	C1 Perform high quality laboratory techniques in biochemical analysis that fulfill good laboratory practice in clinical biochemistry research studies.	Perform practical work relative to experimental design. Apply different techniques related to practical thesis work.	Identify different practical techniques and methods to assess biochemical parameters related to the subject under study.
	2.3.2	Write and critically evaluate professional reports	C2 Write and judge scientific research in biochemistry and related subjects.	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.	C3 Assess various methods and techniques of analysis and instruments quality in the field of biochemistry.	Estimate laboratory techniques used in biochemistry and genetics lab. Develop methods of assay of various parameters. Apply GLP in Biochemistry research to develop laboratory performance.	Operate scientific instruments according to instructions. Perform surgical operations to prepare animal model to certain disease (nephrectomy, ovarectomy…..). Induction of some diseases in experimental animals (obesity, diabetes…….). Separate biological samples and tissues (e.g. blood, plasma, csf, urine, kidney,

					liver……).
	2.3.4	Properly use technological means in a better professional practice.	C4 Use computer and internet skills professionally in biochemistry research.	Apply technology in methodology development during practical work. Use IT skills in collecting information, presenting results and writing thesis	Use internet, journals, books and others thesis to get previous and recent information about the subject understudy. Perform statistical analysis and biological correlation for the results. Present and describe the results graphically. Present the results periodically in seminars.
	2.3.5	Plan to improve professional practices and to improve the performance of other scholars .	C5 Develop different methodologies in biochemistry, molecular biology and laboratory performance.	Modify laboratory techniques.	Modify methods for biological samples analysis
GTS	**2.4.1**	Effective communication in its different forms.	D1 Communicate effectively with colleagues in the field of biochemistry and molecular biology and advise patients.	Interact with health care professional.	Communicate with supervisors to discuss results and with patients to collect case history and samples.
	2.4.2	Efficiently use the information technologies (IT) in improving the	D2 Utilize information technology skills in professional development.	Use information technology in review and thesis preparation	Present the results periodically in seminars

		professional practices.			Demonstrate the thesis in a final power point presentation.
	2.4.3	Help others to learn and evaluate their performances.	D3 Evaluate learning needs and professional performance of juniors.	Set rules for evaluation and judge others performance.	Discuss obtained results in comparison with pervious literatures.
	2.4.4	Self- assessment and continuous learning.	D4 practice self learning continuously to improve academic and professional performance.	Study independently and evaluate learning needs in biochemistry and molecular biology.	Continue self-learning throughout the experimental work and writing scientific papers.
	2.4.5	Use various sources to get information and knowledge.	D5 Retrieve information from different sources .	Reprocess up-to-date information in biochemistry and molecular biology.	Use internet, journals, books and others thesis to get previous and recent information about the subject understudy.
	2.4.6	Work as a member and lead a team of workers .	D6 work effectively as a leader 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.	D7 Perform research study in the field of biochemistry within specified time.	Utilize time effectively to achieve goals	Organize the experimental work according to the designed protocol (either individual, parallel or sequential experiments).